

School of Psychology

SOCIAL INTERACTION IN VIRTUAL ENVIRONMENTS

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**This thesis is presented as part of the requirements for the
award of the degree of Doctor of Philosophy of
the Curtin University of Technology.**

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DECLARATION

"I declare that this thesis does not incorporate, without acknowledgement, any material previously submitted for publication for a degree or diploma in any other university, or any other educational institution. Further, to the best of my knowledge and belief it does not contain any previously published or written material by another person except where due reference is made in the text. The ethical principles and procedures as specified by Curtin University of Technology's policy on human research and experimentation have also been adhered to."

Signature:

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke at the end, positioned above a horizontal line.

Date:

16/12/2001

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ABSTRACT

The rapid growth of the Internet over the past decade has provided increasing opportunities for individuals to engage in computer-mediated social interaction in virtual environments. Despite this rapid growth there has been limited research into the way people use the Internet, and the effect Internet use has on their lives (Kraut, 1996). The overall aim in the research presented in this thesis was to explore how characteristics of the individual interact with characteristics of computer-mediated communication to enable socio-emotional communication and behaviour in social text-based virtual environments. Three studies are presented. Studies One and Two are qualitative studies of social interaction in two text-based, synchronous ('real time') virtual environments: MOOs (Multi User Dimensions, Object Oriented) and Internet Relay Chat (IRC). Grounded Theory (Glaser & Strauss, 1967) methodology was used to develop formal theories of social interaction within these environments. Stage models of virtual environment use were developed that described changes in social interaction over time. In MOOs, changes in social interaction over time reflected the process of coming to terms with what was initially viewed by users as an alternative reality. In IRC the central feature of social interaction that emerged was the perceived ease of communication. This was attributed to the effortlessness of meeting a wide range of potential communication partners in a social context where the communication itself was simplified to text only communication. The hypotheses developed from the qualitative research in Studies One and Two were tested in Study Three. This was a longitudinal study of new Internet users that examined the bi-directional effects of personality characteristics and computer-mediated communication on behaviour. Personality measures were poor predictors of time spent in both specific types of virtual environments and on-line in general. Based on the usage patterns across the three studies a decision pathway for the use of virtual environments was developed. A key finding across the studies was the potential for virtual environments to enhance psychological well-being for individuals who experience social discomfort in off-line settings. Limitations of the research were discussed and suggestions made for future research.

CHAPTER 1. INTRODUCTION

“On one side is the hype, hoopla, and how-to-oriented discourse of the popular media, the communications industry, and computer hobbyists and professionals. On the other, there is denial, dismissal, and silence. Between the two lies the path we must follow if we are to take cyberspace seriously, to study it as a communication phenomenon” (Strate, Jacobson & Gibson, 1996, p. 23).

The Internet is a distributed network of computer networks spanning the world. The growth of the Internet has been exponential. From its origin of 4 hosts in 1969, the Internet had grown to 72.4 million hosts by January 2000, with a predicted one billion hosts by 2005 (Matrix Information and Directory Services, 2000). Two recent estimates place the number of Internet users at 259 million (Cyberatlas: http://cyberatlas.internet.com/big_picture/geographics/article/0,1323,5911_151151,00.html) and 275 million (Nua Internet Surveys: http://www.nua.ie/surveys/how_many_online/index.html). eTForecasts (2000) predicted there would be 375 million Internet users by the end of 2000. The Internet is now the largest network of computer networks in existence.

The last decade has seen the expansion of Internet users from a restricted, predominantly academic audience to a broader section of the general public. Computer use within the home has changed. In the 1980s approximately 70% of computer use in the home was work related, and 75% of computer use was by male adults. The 1990s have seen the development of more sophisticated, easier to use software and increasing use of computers by children, teenagers and adult females. Increasingly, home computers are being connected to the Internet (Venkatesh, 1996).

Individuals can use the Internet for a variety of purposes. While on-line (connected to the Internet), individuals can search for information, shop, gamble, bid at auctions, log into remote databases or access pornographic material. However, perhaps the most common use of the Internet today is to communicate with others.

The Internet, as a network of computers, has the capacity to support all the communication modes from previous technologies in addition to new forms of communicating (Postmes, Spears, & Lea, 1998). The Internet provides access to a

range of virtual environments that support one-to-one and/or one-to-many communication. These environments vary in the media supported (e.g. text, graphics, audio, video), their synchronicity ('real time' or delayed), and accessibility to the public. Communication that takes place within these virtual environments is commonly referred to as computer-mediated communication (CMC).

CMC is communication between two or more individuals that occurs via computer networks. Where this communication takes place between geographically dispersed individuals using the Internet, the conceptual 'location' of this communication is commonly referred to as cyberspace. At present, the majority of CMC takes place in text, with communicators typing messages and responses to one another. Asynchronous text-based virtual environments such as email, discussion boards and discussion lists allow users to send and receive messages at their convenience. Synchronous text-based virtual environments such as World Wide Web (WWW) chats, Internet Relay Chat (IRC), ICQ ('I Seek You') and Multi-User Dimensions or Dungeons (MUDs) enable users to engage in 'real time' social interaction¹.

While synchronous text-based virtual environments can be used for business or educational purposes, the majority of communication within these environments is social in nature. Socio-emotional communication has been reported in IRC (Reid, 1991; Surratt, 1996) and MUDs (Allen, 1996; Parks & Roberts, 1998; Reid, 1994; Ryan, 1995; Rintel & Pittam, 1997).

To date, psychological researchers have paid scant attention to CMC within these social virtual environments accessible over the Internet (Gackenbach & Ellerman, 1998). Kraut (1996) noted that despite the rapid growth of the Internet there has been little research into the way people use the Internet, and the effect Internet use has on their lives. Notably absent in research to date has been a) an exploration of the relationship between personal characteristics of users and characteristics of text-based virtual environments in explaining socio-emotional communication, and b) an examination of changes in socio-emotional communication within virtual environments over time.

¹ For definitions of Internet related terms and abbreviations please see the Glossary (Appendix 1)

The overall aim of the research presented in this thesis was to explore how characteristics of the individual interact with characteristics of the CMC medium to enable socio-emotional communication and behaviour in social text-based virtual environments. The results of a research program that combines the use of qualitative and quantitative research methodologies to meet this aim are presented in this thesis.

The use of both qualitative and quantitative research methods is referred to as methodological pluralism. Steckler, McLeroy, Goodman and Bird (1992) outlined four ways in which qualitative and quantitative methods can be combined:

1. Qualitative methods may be used to aid in the construction of quantitative measures and instruments.
2. Qualitative methods may be used to aid in the interpretation of quantitative research findings.
3. Quantitative methods may be used to provide support for qualitative research findings.
4. Qualitative and quantitative methods can both be used equally and the results combined (triangulation of methods)

Bryman (1988) suggested a further way of combining methodologies: quantitative research can be used to provide macro level results, with qualitative research used to provide a micro-level examination of an area.

The research presented in this thesis uses a multi-method approach combining strategies 1 and 4 suggested by Steckler et al. (1992) above with Bryman's (1988) macro/micro distinction. Three studies are presented. Studies One and Two used qualitative research methodology to examine the process of social interaction within MOOs (social MUDs that use object-oriented programming) and IRC. The results are used to develop hypotheses and inform the development of a quantitative measure for use in Study 3 (a longitudinal study of new Internet users). This relationship is depicted graphically in Figure 1.1.

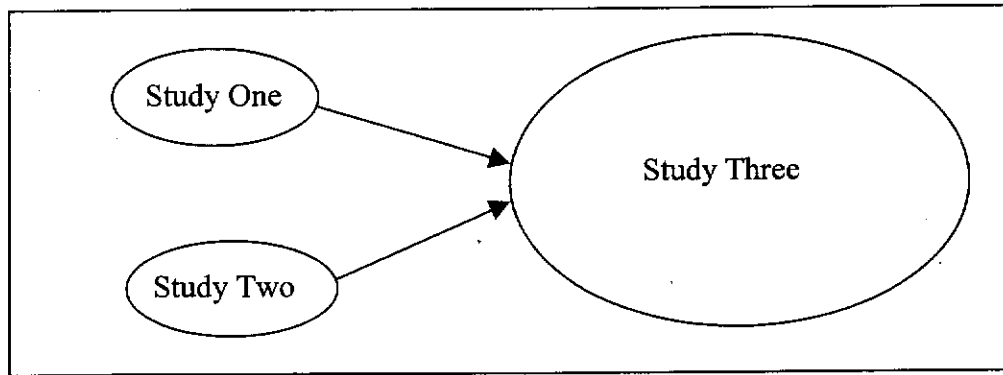


Figure 1.1. The research process: Results from Study One and Study Two inform the development of Study Three.

In turn, the quantitative results obtained in Study Three are used to paint a macro-picture which aids the interpretation of the micro-picture results of Study One and Study Two. That is, the findings on the changing process of social interaction in MOOs and IRC over time (from 0 to 5 years) are partially situated within the broader framework of changes in Internet use over time, of which Study Three examines the first 6 months of Internet use. This relationship is depicted graphically in Figure 1.2.

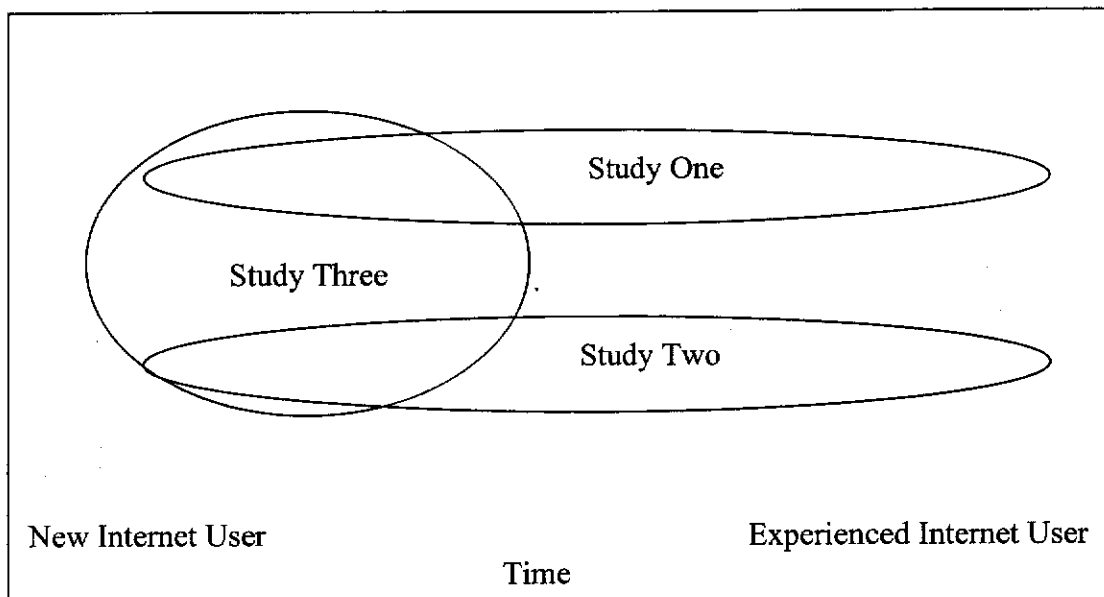


Figure 1.2. Interpretation of results: Results from Study Three provide a macro-environment that aids the interpretation of the results of Study One and Study Two.

This thesis is divided into nine chapters. A review of the literature pertaining to social interaction in virtual environments is provided in Chapter 2. The chapter has five sections. The first section provides an overview of the history of the Internet and briefly describes the range of virtual environments accessible via the Internet. The second section provides an overview and critique of media, relationship and CMC theories that can be applied to computer-mediated social interaction. The third section reviews the literature on social interaction within text-based virtual environments, focussing on the individual, behaviours and contextual factors. The fourth section reviews longitudinal studies that have examined the effect of Internet use on individuals. Based on the identification of shortcomings in theories and research in the previous four sections, the final section summarises the chapter and introduces the first two studies to be undertaken and presented in this thesis.

In Chapter 3 an overview of the research methodology for Study One and Study Two is presented. As an emerging area of psychological research, there are no established methods for the study of social interaction in virtual environments. This chapter addresses issues relating to the selection of research settings and methodologies for conducting such research. Grounded Theory (Glaser & Strauss, 1967) methodology with the researcher as participant observer is selected as the optimal methodology for use in Studies One and Two.

In Chapter 4 a grounded theory study of social interaction in MOOs (social text-based chat environments accessible over the Internet) is developed. The theory details the stages an individual passes through in the process of integrating MOO use into their lives as they come to terms with what initially appears to be an alternative reality. A description is provided of how individuals represented by virtual personae engage in social interaction within the MOO environment, and the effect this has on their off-line lives.

In Chapter 5 a grounded theory study of social interaction on IRC is presented. The theory developed centres on the ease of communication experienced by users, and details the stages individuals pass through in their use of IRC. A thick description is provided of how individuals engage in social interaction within IRC and the effect this has on their off-line lives.

In Chapter 6 the two grounded theories developed in MOOs (Chapter 4) and IRC (Chapter 5) are compared and contrasted. The views of research participants who have used both types of virtual environments are outlined. Similarities and differences between the two stage models developed are highlighted. Differences between models are attributed to contextual differences in the programmability, permanence and difficulty of use of the two virtual environments.

In Chapter 7 the development of parameters, research design and methodology for Study Three are overviewed. The research design consists of a longitudinal study measuring personality and on-line use across a range of virtual environments. The research methodology consists of a series of three surveys administered on the World Wide Web at three monthly intervals. Issues relating to the methodology are addressed.

The third study, a longitudinal study of new Internet users, is presented in Chapter 8. Hypotheses developed from the findings of the previous two studies are tested. Study Three focuses on how the characteristics of the individual interact with the characteristics of the computer-mediated environment to affect the type of computer-mediated environment preferred, the extent of use of these environments, and in turn the effect of Internet use on personality characteristics.

In Chapter 9 the findings from the three studies are integrated and evaluated. The process of social interaction in MOOs and IRC over time are examined within the broader framework of Internet use over time. A decision pathway for the use of virtual environments is presented. The wider implications of this research are discussed and suggestions made for future research.

CHAPTER 2. REVIEW OF THE LITERATURE

Joe Fox: You're crazy about him--

Kathleen Kelly: Yes. I am.

Joe Fox: Then why don't you run off with him? What are you waiting for?

Kathleen Kelly: I don't actually know him.

Joe Fox: Really?

Kathleen Kelly: We only know each other--oh, God, you're not going to believe this--

Joe Fox: Let me guess. From the Internet.

Kathleen Kelly: Yes.

Joe Fox: You have mail.

Kathleen Kelly: Yes.

Joe Fox: Very powerful words.

Kathleen Kelly: Yes.

(Excerpt from film: "You've got mail", Ephron & Donner, 1998).

2.1 Introduction

Social interaction in virtual environments occurs using computer-mediated communication (CMC). This chapter is used to provide a review of the literature pertaining to this topic. The chapter has five main sections. The first section begins with an overview of the history of the Internet. The range of virtual environments accessible via the Internet is briefly described. In the second section an overview and critique of media, relationship and CMC theories that can be applied to computer-mediated social interaction is provided. In the third section the literature on social interaction within text-based virtual environments is reviewed, focussing on individuals, behaviours and contextual factors. In the fourth section longitudinal studies that have examined the effect of Internet use on individuals are reviewed. In each section shortcomings in the literature are identified. Based on the identified shortcomings in theories and research in the previous four sections, the final section is a summary of the chapter and provides an introduction to the first two studies to be presented in this thesis.

2.2 Virtual Environments

There is a range of software applications that can be used to create virtual environments to enable communication via computers. Many software applications have been developed for use within organisations over small computer networks. This section focuses solely on Internet based virtual environments that are accessible by the general public using a computer and modem.

2.2.1 The Internet

The Internet is a distributed network of computer networks spanning the globe. Two competing versions of the origins of the Internet exist. One oft-repeated version claims the Internet was developed by the US Department of Defense as a way of routing information and communications over a range of pathways in case of nuclear attacks (see, for example AT and T Technology, 1995; Zimmerman, 1997). This version has been exposed as a myth (Gaffin, 1994; Hafner & Lyon, 1996). The second version states that the origins of the Internet can be found in a series of developments in the research community dating from the 1960s, and drawn together by the Advanced Research Projects Agency (ARPA) of the U.S. Department of Defense. This section will briefly outline the development of the Internet according to this version.

In 1962, J. C. R. Licklider, an eminent psychologist, was appointed to direct the Command and Control Research Office of ARPA (Hafner & Lyon, 1996). Licklider brought to ARPA his vision of what he called an 'intergalactic computer network' (Hauben & Hauben, 1997). Memos written by Licklider during that year outlined a vision of social interaction via computers connected across the world (Leiner, et al., 1997). During his two years with ARPA, Licklider directed the research conducted by the office into time sharing, computer graphics and improved computer languages, reflected in the change of office name to the Information Processing Techniques Office (IPTO; Hafner & Lyon, 1996).

Bob Taylor, a successor to Licklider and the third director of IPTO, obtained a million-dollar budget from ARPA to experiment with networking computers. Lawrence Roberts, who had in 1965 created the first ever wide-area network by connecting two computers together, was employed by Taylor in 1966 to develop the proposed network, ARPANET (Hafner & Lyon, 1996; Leiner et al., 1997).

Influential in the development of the networking project was the independent research on packet switching conducted in the early to mid 1960s by Paul Baran¹ at the RAND Corporation, Leonard Kleinrock at Massachusetts Institute of Technology in the United States of America, and Donald Davies in the United Kingdom.

The ARPA contract to build the first four Interface Message Processors (IMPs) for ARPANET was awarded to Bolt, Beranek and Newman Inc. in 1969. The first IMP was installed on 30 August 1969 at UCLA, and the second at Stanford Research Institute (SRI) on 1 October 1969, enabling for the first time two computers at disparate locations to communicate with each other. By December 1969, all four IMPs were connected enabling communication across the four locations (Hafner & Lyon, 1996). By 1971, 15 nodes and 23 hosts were connected to ARPANET (Zakon, 1997). A complete protocol, Network Control Protocol (NCP), was developed to enable communication between computers on the network in 1971, and File Transfer Protocol (FTP) was released in 1972 (Hafner & Lyon, 1996). ARPANET was established as a national communication network.

While communication was possible to computers connected to ARPANET using the protocol NCP, communication was not possible to computers on other networks. In 1973, Vint Cerf and Bob Kahn developed Transmission Control Protocol (TCP) to enable communication across networks (Hafner & Lyon, 1996). The first international connections to the ARPANET were to the University College of London and the Royal Radar Establishment in Norway in 1973 (Zakon, 1997). In 1978, Internet Protocol (IP) was separated from TCP and TCP/IP was created. During October 1979 the first demonstration of a three-way network using packet radio, ARPANET and satellite occurred. In 1980, TCP/IP was adopted as the American Defense standard. 1983 saw the official switch of protocols from NCP to

¹ Baran, employed by the RAND Corporation began researching the feasibility of building a communication structure that would continue to operate even after parts of it were destroyed by a nuclear attack. Baran envisaged a distributed switching network of interconnected nodes, over which messages could be sent in small parts and reassembled upon arrival. In 1965, Baran ceased work on this due to the failure to find a satisfactory organisation to implement his plan. However, while Baran was later employed as an informal consultant to ARPA, his vision of creating a network capable of surviving nuclear attack was not adopted as an aim of the research (Hafner & Lyon, 1996).

TCP/IP on ARPANET. In 1985, the ARPANET was replaced by the National Science Foundation Network (NSFNET) as the backbone network in the United States, with ARPANET finally shut down in 1989 (Hafner & Lyon, 1996; Leiner et al, 1997). On April 30th, 1995 the National Science Foundation ceased funding the NSFNET backbone, and later that year charges began to be made for domain registration (Anderberg, 2001).

The growth of the Internet has been exponential. From its origin of 4 hosts in 1969, the Internet had grown to 72.4 million hosts by January 2000, with a predicted one billion hosts by 2005 (Matrix Information and Directory Services, 2000). Two recent estimates place the number of Internet users at 259 million (Cyberatlas: http://cyberatlas.internet.com/big_picture/geographics/article/0,1323,5911_151151,00.html) and 275 million (Nua Internet Surveys: http://www.nua.ie/surveys/how_many_online/index.html). Estimates of the number of Internet users tend to vary widely and variations are attributable to methodological flaws, survey bias and differences in definitions of Internet use (Hoffman, Kalsbeek & Novak, 1996).

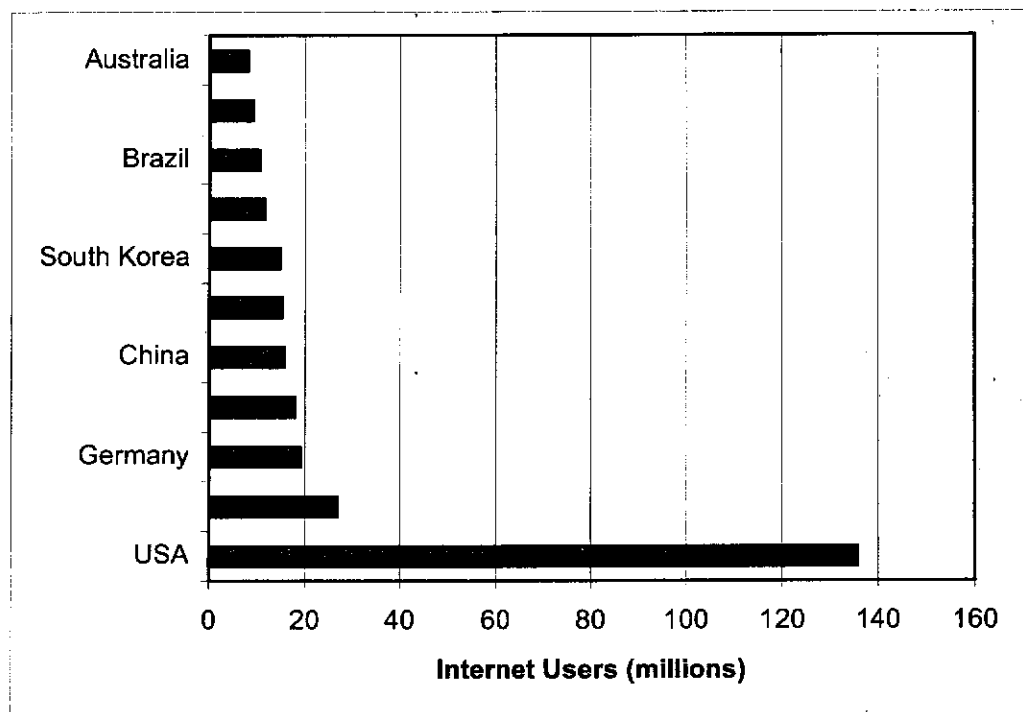


Figure 2.1. Predicted top 12 Internet use countries and number of users for the end of Year 2000 (Source: eTForecasts, 2000)

eTForecasts (2000) predicted there would be 375 million Internet users by the end of 2000. Figure 2.1 graphically presents the predicted number of Internet users for the top 12 countries at the end of Year 2000. It was estimated that Australia would be the 12th largest Internet use country in the world at this time.

The Australian Bureau of Statistics (2000) estimated that 44% (6 million) of the adult population of Australia accessed the Internet during the 12 months prior to November, 1999. The main sites of Internet access were work and home. In November, 1999 nearly half of all households had a home computer and 25% had Internet access. A further 704,000 households with a computer intended to acquire home Internet access during the next year. Figure 2.2 displays the rapid increase in Internet access, compared to computer ownership, for Australian households from 1998 to 1999.

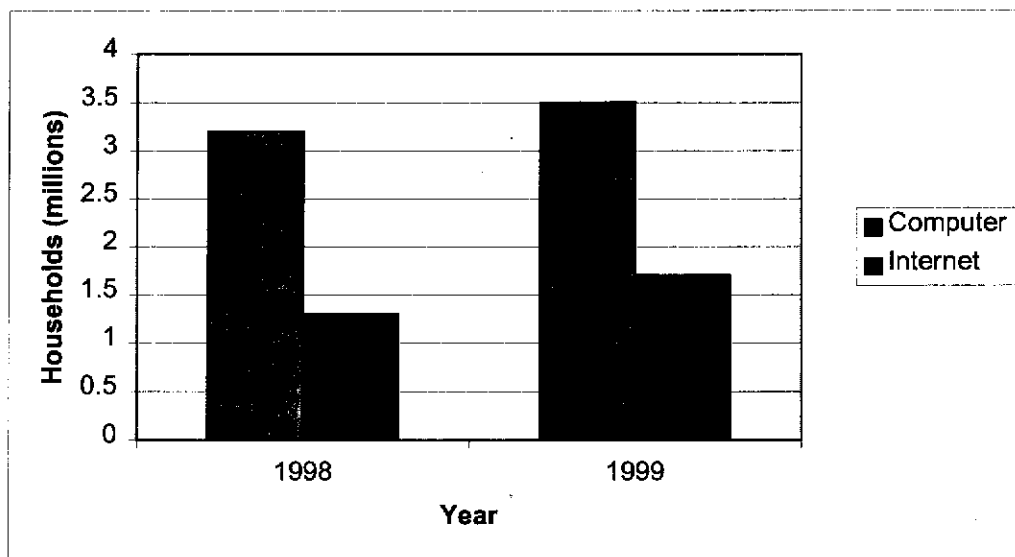


Figure 2.2. Computer ownership and Internet access for Australian Households from November 1998 to November 1999 (Source: ABS Catalogue: 8147.0, Nov 1999).

While previous Internet growth has been exponential, there is currently a decline in the growth of new Internet users. Cyber Dialogue (1999) attributed this decline to three factors. First, there is still a divide between those who can and cannot

financially afford computers and Internet access. Second, many individuals believe they do not need Internet access. Third, there is a growing group of ex-Internet users (currently estimated at 27.7 million people in the United States of America alone). Despite this, the last decade has seen the expansion of the Internet from a restricted, predominantly academic audience to a broader section of the general public. While designed for the exchange of academic information and research, even from the early days ARPANET was used for personal as well as professional communication purposes (Hafner & Lyon, 1996). The Internet now provides access to a range of virtual environments that support personal and social communication, in line with Licklider's vision of social interaction via computers connected across the world.

2.2.2 Types of virtual environments.

There is a range of virtual environments accessible via the Internet. These virtual environments vary along a number of dimensions. First, virtual environments vary in the media supported. Some environments support text only, while others may support the use of graphics, video, sound, or a combination of these. Second, virtual environments may provide for synchronous ('real time') or asynchronous (delayed) communication. Third, virtual environments range along a dimension from public to private spaces. At one extreme, public spaces can be accessed by anyone who has Internet access. At the other extreme are private spaces that are set up for the use of the individual only. In between are virtual environments that provide access to selected individuals. Table 2.1 provides a comparison of virtual environments referred to in this dissertation along these dimensions. Each of these virtual environments is briefly described in the following sections.

2.2.2.1 Bulletin Board System (BBS)

A BBS is a single computer which subscribers can dial into via their modems. BBS's support email between members, and access to group conferencing facilities in the form of message boards (Quarterman & Carl-Mitchell, 1994). Subscribers can read and reply to the messages of other subscribers and post new messages of their own. Message boards may be moderated (messages are approved by the board owner prior to posting) or unmoderated. Bulletin boards were a precursor to newsgroups (see Section 2.2.3.3 below).

Table 2.1

Comparison of virtual environments on the dimensions of media, synchronicity and access (public/private).

Virtual Environment	Media	Synchronicity	Public/Private
Bulletin boards	predominantly text	asynchronous	subscribers only
Email	predominantly text	asynchronous	mainly private
Newsgroups	text	asynchronous	Public
Chats	predominantly text	synchronous	provides both
Internet Relay Chat	predominantly text	synchronous	provides both
MUDs	predominantly text	synchronous	provides both
MOOs	predominantly text	synchronous	provides both
World Wide Web	text/graphics/video/sound	either	mainly public
Internet Phone	sound	synchronous	provides both
CUSEeMe	sound/video/text	synchronous	provides both

2.2.2.2 Electronic Mail (Email)

Email is a system for sending messages from one computer user to another. Email was developed by Ray Tomlinson, an engineer at BBN in 1972 (Hafner & Lyon, 1996, Leiner et al, 1997). Email quickly became widely established as a means of communication. In 1973 an ARPA commissioned study found that email constituted 75% of all ARPA traffic (Hafner & Lyon, 1996). In addition to providing a form of person-to-person communication, email can be used for many-to-many communication through mailing lists. While the total number of public mailing lists is unknown, it is likely to run into the hundreds of thousands. In February 2000, there were 90,095 mailing lists registered with Liszt, a mailing list directory on the World Wide Web (<http://www.liszt.com/>).

2.2.2.3 USENET Newsgroups

Newsgroups are electronic bulletin boards accessible to anyone with Internet access. Individuals can post their own messages to a newsgroup and read the messages of others. Responses to an original message appear together as threads within a newsgroup. Newsgroups may be moderated or unmoderated.

USENET is a distributed conferencing service that broadcasts messages that have been posted to newsgroups (Quarterman & Carl-Mitchell, 1994). Tom Truscott, Jim Ellis and Steve Bellovin developed USENET in 1979. The initial protocol used auto-dial modems and the Unix to Unix Copy Program (UUCP) to share information between Duke and University of North Carolina (Hauben & Hauben, 1997; Zakon, 1997). USENET was linked to ARPANET when the University of California at Berkeley joined USENET. Since that time Usenet has expanded across America and the world. In March 2000 there were 30,000 newsgroups listed with Liszt (<http://www.liszt.com/news/>).

2.2.2.4 Chats

There is a range of Internet protocols that allow computer users to 'chat' (type) in real time over the Internet. While most are text based, some (e.g., The Palace, <http://www.thepalace.com>) enable the use of images or icons, known as avatars, to graphically represent the individual (Suler, 1997). The most widely used of the chat programs is Internet Relay Chat (IRC).

IRC is a communication medium that began in 1988, based on an initial software program written by Jarkko Oikarinen, a 2nd year electrical engineering and information technology student in Finland (Harris, 1995). IRC provides a simple text-based virtual environment accessible by computer and modem² for synchronous typed communication between multiple users. IRC users can talk publicly in channels, privately send messages to one another within the IRC environment, or establish a Direct Client to Client (DCC) link to interact with one person only. Users can also send and receive sound and graphics files (including photographs).

From small beginnings, IRC has developed into large networks. The exact number of IRC users is unknown as there are many different IRC networks in existence, but is likely to be in excess of one million users at any point in time.

IRC is predominantly used for social interaction within a social setting. In addition to purely social purposes, IRC has been used as a communication tool in other settings. For example, IRC was used as a communication device during disasters such as the 1994 Californian earthquake, the Oklahoma bombings and the Gulf war (logs are available at <http://www.2meta.com/chats/logs/>). IRC has also

² IRC is no longer accessible only by modems but can be accessed by alternative means

been used for the production of virtual theatre (Danet, 1995). From its social beginnings, IRC is increasingly used for technical support and customer service (Randall, 1997). However, the majority of IRC use is still social in nature.

2.2.2.5 Multi-User Dungeons or Dimensions (MUDs)

Multi-User Dungeons, or Multi-User Dimensions (MUDs) are text-based virtual reality programs that can be accessed by geographically dispersed individuals simultaneously. MUDs originated as on-line multi-player versions of adventure games. Roy Trubshaw, an undergraduate student at Essex University, wrote the first MUD program in 1979. MUD programs provide a database of rooms, descriptions and objects that are useable and extensible by players (Curtis, 1992, Curtis & Nicholls, 1993). MUDs vary in terms of the type of software, the complexity of programming, the forms of communication that are available to users, the rights of users to build, and the aims of the MUD.

There are two main types of MUDs: MUDs oriented towards role-playing and social MUDs (Bruckman, 1992; Carlstrom, 1992). MUDs began as recreational environments, but in recent years there has been an increase in the use of MUDs as learning, research, business, and teaching environments (Curtis & Nichols, 1993).

The exact number of MUDs that are currently in existence is unknown. The MUD Connector, a site on the World Wide Web (<http://www.mudconnect.com/>) that provides details and links to MUDs, listed 1556 MUDs in March 2000, but there may be many more that are unlisted.

MOOs (MUDs, Object-Oriented) are a type of MUD that is socially oriented and uses object-oriented programming. All MOO users have access to object-oriented programming to create and modify the virtual environment. For example, MOOers can create and describe buildings and objects and write computer programs for use within the environment. MOOers 'own' the objects they create and can allow or deny other MOOers access to these objects. MOOers are assigned a character that they can name, gender and describe in text. Characters, buildings, objects and programs written modify the database, meaning the items continue to 'exist' even while the user is not logged in.

MOOs vary in their purpose, size and requirements for identifying information. Allen (1996) identified four genres of MOOs: social, adventure,

professional and special interest. MOOs have been used for a variety of purposes including education and scientific conferences (Towell & Towell, 1995). Most MOOs have a stated theme which newcomers are encouraged to read prior to requesting a character on the MOO, and are expected to adhere to once a character is granted. The number of individuals with characters on a MOO varies widely. MOOs range from private MOOs set up for the use of owners and their invited friends to large public MOOs that are accessible by anyone with telnet access. The largest of the public MOOs, Lambda MOO, has more than 5000 users. While most MOOs are accessible by the general public, some have particular requirements for membership. For example, Media MOO is for media researchers only (Bruckman & Resnick, 1995) and MOOSE Crossing is specifically for children (Bruckman, 1997).

2.2.2.6 World Wide Web

The World Wide Web (WWW) is a hypertext medium that enables non-sequential links between information (Gilster, 1993). Tim Berners-Lee created Hypertext Markup Language (HTML) in 1990, and the WWW was released in 1991. The Mosaic web browser (a tool to search the WWW) was developed in 1993 by Marc Andreessen, Eric Bina and other graduate students, effectively making the WWW accessible to the general public (Miller, 1997). More recently, advanced web browsers such as Netscape and Microsoft Explorer have been launched (Miller, 1997; Zakon, 1997). Many WWW sites contain graphics, animation, audio and audiovisual material in addition to, or replacing, text.

2.2.2.7 Internet Telephony

Internet telephony enables users to talk to one another over the Internet with a quality that is nearing that of telephone calls. Internet telephony requires a computer with soundcard, microphone and Internet telephony software. Utterances are digitised and transmitted in packages over the Internet. Where gateways are used, communication partners can communicate by computer to telephone (one gateway) or telephone to telephone (two gateways; Fromm, 1997). Internet phone calls to any part of the world are free (Levy, 1996).

Internet telephony is a relatively new Internet application that was introduced early in 1995 and is experiencing rapid growth (Haramaty, 1997). International Data Corporation (IDC) estimated there would be at least 16 million Internet telephony

users by 1999 (Edwards, 1997). Internet telephony has been hampered by a lack of common standards for software applications, poor voice transmission quality, and response delays of up to 2 seconds, but rapid improvements are being made in all these areas (Edwards, 1997; Fromm, 1997; Levy, 1996).

2.2.2.8 Internet Video Conferencing

The most commonly used freely available software package for social Internet video conferencing is CUSeeMe®. CUSeeMe® is a video conferencing system developed by Cornell University's Information Technology department in 1993 for use on the Internet. CUSeeMe® enables users to see, hear, talk and type messages to other users simultaneously. In addition to a computer and modem, for full participation users require a camera and digitiser for video and audio transmission. CUSeeMe® supports one to one and party connections at corporate, education and public reflector sites. Social activity on CUSeeMe® includes staged events, casual chat and sexual exhibitionism (Becker, 1995; Dorcsey, 1995). More recently, commercial videoconferencing software, such as CUSeeMe Pro® and Microsoft NetMeeting® have become available for use on the Internet.

2.2.2.9 Trend towards Integration of Media

Many virtual environments are now expanding the number of media used. For example, WWW pages may provide discussion boards and synchronous chat facilities. Similarly, chat environments have developed from using ASCII text only to allowing HTML and, in some cases, graphics (e.g., The Palace, Virtual Worlds). Some Internet telephony software also allow the transfer of text through shared whiteboards (Levy, 1996). Each additional sensory component potentially affects the communication process.

2.2.3 Summary

The Internet, the largest network of computer networks in existence, provides access to a large range of virtual environments. While these environments vary along the dimensions of media supported, synchronicity and access, each serves as the site for CMC. The remainder of this chapter and the following three chapters focus on CMC within text-based virtual environments. Text-based virtual environments were selected as they require limited bandwidth and low computing power, enabling access to a wide range of individuals. Graphical, audio and audio-visual virtual

environments will be reintroduced in Chapter 7. The next section defines CMC and examines theories and research that relate to CMC within text-based virtual environments.

2.3 Computer-Mediated Communication (CMC)

CMC is communication between two or more individuals that occurs via computer networks. Where this communication takes place between geographically dispersed individuals using the Internet, the conceptual 'location' of this communication is commonly referred to as cyberspace (a term created by Gibson (1984) in his science fiction novel 'Neuromancer'). Within cyberspace, virtual environments, such as those listed in the previous section, exist where individuals interact with one another using CMC. CMC as a term is used to encompass more than just the communication process. As Jones (1995a) noted, CMC is:

not just a tool; it is at once technology, medium, and engine of social relations. It not only structures social relations, it is the space within which relations occur and the tool that individuals use to enter that space. It is more than the context within which social relations occur (although it is that, too) for it is commented on and imaginatively constructed by symbolic processes initiated and maintained by individuals and groups.
(p.16)

There are differences between face-to-face (FTF) communication and CMC in virtual environments. Communication partners using CMC do not have to be present in the same physical location or at the same time. Virtual environments have no geographical limitations, and are accessible at any time by users. In virtual environments, there are no proxemics, or spacing of users. Indeed, text-based CMC is acorporeal, disengaging the sender from the message and removing the body and associated body language from the communication process. Social cues and markers are reduced, and in many virtual environments users can remain anonymous (Aoki, 1995; Carlstrom, 1992; McKenna & Bargh, 2000).

The process of communication itself differs as a function of the technology. CMC has limited bandwidth, placing a technological limitation on the speed and flow of communication. In asynchronous CMC text-based communication, messages

can be sent and retrieved at any time and stored for later use if required (Aoki, 1995; Bradley, Holm, Steer & Stormquist, 1993). In virtual realities there is no need for turn taking, a requirement for off-line conversation. Silences (or breaks in communication) are accepted within CMC as part of the process, unless they are prolonged (Carlstrom, 1992). CMC users adopt strategies to overcome these limitations imposed by the medium.

In adapting to the limitations of the technology, CMC users employ a unique style of language incorporating speech patterns into written text, transforming the text from static to active (Greller & Barnes, 1993). Paralinguistic cues (e.g., linguistic style, typing errors, punctuation such as exclamation marks and ellipsis, and emoticons such as smiley faces ‘:-’) aid the interpretation of messages and provide social information about communication partners. Both novice and experienced CMC users attend to paralinguistic cues (Lea & Spears, 1992). Users express higher rates of satisfaction with CMC systems where they have access to emoticons (Rivera, Cooke & Bauhs, 1996). Emoticons can modify perceptions of flaming (vitriolic messages, often of a personal nature) in email messages (Thompson & Foulger, 1996). Chat room users use emoticons, ‘gifs’ (graphics interchange format, used to display graphics or photographs) and acronyms to decrease the number of keystrokes required to impart meaning (Leaning, 1998). Paralanguage provides social information that cannot be conveyed by the content of the message itself. Language and paralanguage are not homogeneous across virtual environments, but change in style and genre with changes in technology, synchronicity, purpose and group membership (Herring, 1996b).

2.3.1 Media theories applied to CMC

A range of theoretical perspectives has been applied to the study of CMC. Theories of media use predating the proliferation of CMC have been used to predict the effect of CMC on interpersonal communication. Their failure to explain socio-emotional behaviour in CMC has resulted in the development of new models and theories. This section briefly outlines and critiques models in the light of CMC research conducted to date.

2.3.1.1 Social Presence Model

The Social Presence Model of Media Comparison (Short, Williams & Christie, 1976) ranked the suitability of media for interpersonal communication in terms of social presence. Social presence was defined by Short et al. (1976) as “the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationship” (p. 65). Non-verbal cues and the perceived distance and perceived reality of the other all contribute to social presence. However, whether social presence is an objective characteristic of the medium, a subjective perception of the medium by the user, or a combination of both is unclear. Short et al. (1976) referred to social presence using each of these perspectives at different times. The Social Presence Model was based on the premise that users are conscious of the degree of social presence of various media, and select the medium according to the degree of social presence required for the intended use. Tasks requiring warmth and socio-emotional communication require high social presence. High social presence in turn increases intimacy. The Social Presence Model predated the widespread use of CMC and as such, made no specific predictions for CMC. However, extrapolating from the model, CMC should be low in social presence, and as such, unsuited to social communication.

The Social Presence Model has been criticised on a number of grounds. Early studies by the model's authors produced results contrary to theoretical predictions. Spears and Lea (1992) attributed this to the formulation of presence in physical and informational terms. Supporting this view, research by Williams and Rice (1983) noted that social presence was affected by the interactivity of the medium, the privacy offered, the perceptual set of users and the context in which the medium was used.

Rutter (1987) further criticised the lack of conceptual clarity of the definition of social presence, and outlined two shortcomings in the methodology used to test theoretical predictions. First, all subjects took part in all conditions, resulting in subjects making comparative ratings of media. Different results may have been obtained if independent groups were used. Second, ratings of media made at the end of experiments confounded media ratings with process and outcome effects.

2.3.1.2 Cuelessness Model

The Cuelessness Model (Kemp & Rutter, 1982; Rutter, 1987, 1989) has its basis in the Social Presence Model of Media Comparison. The social presence and Cuelessness Models share a focus on non-verbal social cues, but differ in their theoretical complexity. The Cuelessness Model separates social cues and psychological distance dimensions, and theorises on the causes of psychological distance, while the Social Presence Model does not (Rutter, 1987).

The Cuelessness Model is a theory of media based on the aggregate number of social cues available within a specific medium. The model predicts that the fewer the social cues, the greater the psychological distance between communication partners, with few social cues resulting in task-oriented communication. Social cues (e.g., body language, voice, tone) enhance the communication process by providing information on communication partners and providing a social context for the communication. Extrapolating from the Cuelessness Model, CMC should filter out these social cues, negatively affecting the communication process by disinhibiting behaviour, increasing anonymity, and reducing social influence effects. The Cuelessness Model has been criticised as failing to account for research findings through ignoring the social contexts of communication (Spears & Lea, 1992).

2.3.1.3 Reduced Social Cues Approach

A similar approach to the Cuelessness Model, the Reduced Social Cues approach, has been adopted by researchers at Carnegie Mellon University (Kiesler, 1986; Siegel, Dubrovsky, Kiesler & McGuire, 1986; Sproull & Kiesler, 1986, 1991). The Reduced Social Cues approach posited that the social context of information exchange is affected by geographic and situational variables. Geographical variables that affect the social context of CMC are the physical and temporal proximity of communication partners. Situational variables affecting the social context of CMC include the relationship of communication partners, the reason for communication, and prevailing social norms. These static and dynamic social context cues affect CMC through influencing the cognitions, perceptions, emotions and behaviour of communication partners. Where social context cues are strongly present, behaviour is regulated and focused on the communication partner. In contrast, where social context cues are weak, behaviour is deregulated and the focus shifts to the self.

Sproull and Kiesler (1991) noted that even simple messages are context-dependent for their meaning. Instruction, experience and situational cues usually guide the communication process.

CMC provides a unique communication environment with limited static (e.g., status of person) or dynamic (e.g., tone of voice) cues, limited situational norms, and users who are relatively inexperienced due to the newness of the technology. The Reduced Social Cues approach is based on the premise that the reduction in social and contextual cues associated with CMC results in reduced social influence effects on the individual. The lack of social cues decreases social inhibitions and normative constraints on behaviour. The increased anonymity, reduced self-regulation and reduced selfawareness result in individuals becoming deindividuated and depersonalised, with a resultant shift of attention away from the communication partner to the message. Deindividuation is most likely to occur in CMC situations that feature anonymity, few situational cues, and weak norms. Deindividuated behaviour is reflected in feelings of loss of identity and disinhibited behaviour (Siegel et al., 1986), and results in lessened conformity to social norms.

The Reduced Social Cues approach has been criticised by Spears and Lea (1992) as containing elements of both warm and cold models of CMC, and rational and irrational elements. Spears and Lea (1992) argued that isolation at a computer terminal should be individuating rather than deindividuating. There is some support for this proposition. Bresler (1990a, b) noted that CMC is a very private activity. The computer acts as a buffer between the individual and their communication partner, allowing the individual to focus in on themselves. Matheson and Zanna (1988) found CMC users experienced greater private self-awareness and lower public self-awareness than individuals in FTF conditions. Public self-awareness is induced by situations that emphasise social evaluation or social distinctiveness, drawing attention to others' evaluations of the self. Private self-awareness is enhanced in situations where the individual focuses upon the self. Because CMC is low in social presence it should reduce public self-awareness and increase private self-awareness.

These early models of CMC, Social Presence, Cuelessness, and Reduced Social Cues, have been grouped together and collectively labelled 'cues filtered out' (Culnan & Markus, 1987) or 'social cues perspective' (Spears & Lea, 1992). The

three approaches suggest that CMC is a predominantly 'cool' medium, suited to informational exchange, but not to socio-emotional communication due to the limited bandwidth and associated reduced number of social cues (e.g., tone of voice, body language, facial expressions). This was seen as prohibiting, or at least slowing, the development of personal relationships.

In a critique of these early models, Spears and Lea (1992) argued that CMC is situated within social and technical contexts. Social information is derived from whatever cues are available, and can be transmitted in electronic environments through the use of paralanguage and emoticons. Over time, norms of behaviour develop in each CMC environment based on the accumulation of available social cues.

2.3.1.4 Media Richness

Daft and Lengel (1984, 1986; Daft, Lengel & Trevino, 1987) developed a theory of Media Richness, proposing that the successful completion of information tasks and the success of an organisation were related to the balance of information richness within an organisation. Media richness was defined as "the potential information-carrying capacity of data" (Daft & Lengel 1984, p. 196). Media richness was judged in terms of the number of communication channels, feedback capability, personal focus and language variety that a medium offers. FTF communication was rated as the medium highest in media richness, to which all other media were compared.

Similar to the predictions of the Reduced Social Cues approach, CMC is predicted to be low in media richness, hence, suited to informational rather socio-emotional exchange. Some support has been received for this view. For example, Markus (1994a) reported that within an organisation employees preferred the telephone for personal messages, and email for informational messages. Zack (1993; 1994) found electronic messaging was not a substitute for FTF interaction, but was an effective communication tool when a shared interpretative context had been developed FTF and was used for exchange of low-ambiguity messages.

However, other research has not supported theoretical predictions. Schmitz and Fulk (1991) found that perceptions of media richness were not based on objective features of the medium, but were dependent upon the keyboard skills and

computer experience of the individual and the use of the medium by others. The higher the perceived richness of the medium, the higher the usage. D'Ambra, Rice, and O'Connor (1998) reported that media richness was not a predictor of media choice for tasks varying in equivocality. Dennis, Kinney and Hung (1999) found media richness predictions were supported for females only, hypothesising that this may be due to females' greater sensitivity to non-verbal cues.

2.3.1.5 Applying media theories to research on CMC

Early research on CMC was largely based on laboratory studies and research within organisations. The focus of research was on the effects of CMC on efficiency and effectiveness within organisations (Kiesler, Siegel & McGuire, 1984). The bulk of this early research into CMC was based on rationalist assumptions. From this systems rationalism perspective, CMC was viewed as a channel for the transfer of information within an organisational context, and research focused on issues of productivity and efficiency. CMC was viewed as increasing efficiency and productivity through the filtering of irrelevant social and affective cues from messages, freeing the worker to concentrate on the task at hand. Studies, therefore, examined the impacts of CMC at the individual, group and organisational level, but ignored the social aspects of CMC use (Lea, 1991; Lea, O'Shea, Fung & Spears, 1992). Research conducted within this rationalist paradigm is outlined below.

Research into the effect of CMC on group work had mixed results. Some studies found that CMC groups took increased time to reach decisions and complete tasks, but no differences were found in the quality of decisions reached or work produced (Gallupe & McKeen, 1990; Reid, Malinek, Stott & Evans, 1996). CMC groups performed better than FTF groups in generating unique and high quality ideas, with physically distributed CMC groups performing better than physically proximate groups (Valacich, Paranka, George & Nunmaker, 1993; Valacich, George, Nunmaker & Vogel, 1994). Other research has found that CMC groups make more polarised decisions than FTF groups, with physically distributed groups making more polarised decisions than physically proximate groups (e.g., Gallupe & McKeen, 1990). In deindividuated groups, polarisation in decision-making is in the direction of pre-established group norms. Physically isolating group participants may lead to increased group loyalty, as group members are perceived as prototypical, and

deviations from social norms go unnoticed (Lea & Spears, 1991; Spears, Lea & Lee, 1990).

Some research suggested that CMC increased democracy in groups because members participated more equally (e.g., Straus, 1996; Tan, Wei & Walczuch, 1998). Democracy may be enhanced when group members are anonymous and deindividuated (Jessup, Connolly & Tansik, 1990). It has been argued that CMC increases democracy because of ease of accessibility, the absence of identifying information and social status cues, reduced group influence, the absence of norms for use and lack of censorship (Herring, 1996a; Spears & Lea, 1994).

However, the equalisation or democratic effect of CMC has not gone unchallenged. Not all studies have found evidence of differences in equality between FTF and CMC groups (Adrianson & Helmquist, 1993). Available social cues may reduce the democratic effect, reproducing existing off-line power relationships (Herring 1996b; Spears & Lea, 1994). For example, where gender is known or presumed, users may be treated in stereotypical ways perpetuating patterns of off-line behaviour. Different expectations are held for communication with male and female partners (Matheson, 1991). Males dominate communication in electronic academic discussion lists while female contributors may be censored or ignored (Herring, 1996b).

CMC has been posited to affect both private and public self-awareness. CMC users may experience greater private self-awareness and lower public self-awareness than individuals in FTF conditions (Matheson & Zanna, 1988). Public self-awareness is induced by situations that emphasise social evaluation or social distinctiveness, drawing attention to others' evaluations of the self. Private self-awareness is enhanced in situations where the individual focuses upon the self (Matheson & Zanna, 1988). Because CMC is low in social presence it should reduce public self-awareness and increase private self-awareness. However, Rice and Love (1987) claimed that reports of uninhibited behaviours, less socially desirable responses, and increased likelihood of disclosure of personal information suggested a state of psychological deindividuation associated with both reduced self and other awareness.

CMC is a medium that is contextually embedded (Lea, 1992, Mantovani, 1994), and early laboratory research in CMC underestimated social, contextual and

normative factors (Lea & Spears, 1991). Walther (1992, 1993, 1996) identified further weaknesses in previous CMC research that resulted in the failure to recognise the development of interpersonal relationships in CMC. Experimental studies were conducted over short time spans insufficient for the development of interpersonal relationships. Compounding this problem, text-based CMC is slowed by lag times and communicators' typing speeds. Where studies directly compared CMC and FTF groups, applying the same time limitations to both groups resulted in fewer messages being exchanged in CMC. In most experiments, group members did not previously know each other, and many had little or no CMC experience. Non-verbal messages in FTF groups in CMC research were not recorded or coded, making the comparison of total socio-emotional communication between the media impossible to assess. In addition the commonly used method of coding messages as either socio-emotional or task oriented did not recognise that a message may contain elements of both or neither.

Some researchers (e.g., Jessup et al., 1990; Spears & Lea, 1992; Trevino & Webster, 1992) have argued that it is the very cuelessness of the CMC medium that encourages the use of paralanguage and playfulness by users. Media with few social cues can lead to psychological closeness between communication partners, because the paucity of cues allows disclosure based on anonymity (Spears & Lea, 1992). Where studies have examined the use of CMC in contexts outside of the laboratory, clear evidence of socio-emotional communication has been found. Wellman et al. (1996) noted that people develop social relationships in CMC, even when the technology has been specifically introduced for information exchange. This has included settings such as high schools (Bresler 1990a, b), universities (McCormick & McCormick, 1992), and organisations (Kiesler, 1986; Matheson, 1991).

The use of CMC had unintended and unforeseen social effects on work and social activities within organisations. Email was found to be used for both work (task-related) and personal (socio-emotional) purposes within organisations (Ku-Linlin, 1996). Up to one third of messages exchanged in CMC within an organisational setting are socio-emotional in content (Matheson, 1991). Social effects of email within organisations included the sharing of new information, the creation of new groups and new forms of social interaction between organisational members

(Kiesler, 1986; Lea, 1991). New members of an organisation used CMC to build networks (Rice & Love, 1987). Email and discussion groups increased the connections between employees, and were especially marked for peripheral employees of an organisation. The increased connections resulted in increased communication, participation, affiliation and commitment to the organisation (Sproull & Kiesler, 1996). Huff, Sproull and Kiesler (1989) reported that usage of computer mail and bulletin boards was predictive of organisational commitment, whereas usage of traditional media (paper and telephone) was not. This was attributed to the informality, ease of interaction and asynchronicity offered by CMC. CMC was found to be particularly advantageous for shift-workers in overcoming isolation from other workers. However, Caldwell and Taha (1993) argued that the use of CMC might actually increase the isolation of individual users within an organisational context, by reducing the amount of FTF communication.

In addition to these closed systems, field research has reported socio-emotional communication and the formation of personal relationships in CMC environments accessible to the general public: IRC (Reid, 1991; Surratt, 1996), MUDs (Allen, 1996; Parks & Roberts, 1998; Reid, 1994; Ryan, 1995; Rintel & Pittam, 1997), newsgroups (Parks & Floyd, 1996; Surratt, 1996), email (McCormick & McCormick, 1992) email forums (Korneman & Wyatt, 1996) and bulletin boards (Rice & Love, 1987).

The differences in socio-emotional communication reported in laboratory and field studies may be due to a number of factors. First, in field settings participants may have longer periods to form relationships, and may already be known to one another outside of the CMC environment (Walther, 1992). Second, CMC users in field studies may be more experienced than their experimental counterparts. Experienced users of CMC use the medium differently than inexperienced users (Adrianson & Helmquist, 1991; 1993). Performance in CMC groups is strongly affected by experience with CMC technology (Hollingshead, McGrath & O'Connor, 1993), and social use of CMC increases as computer competence increases (McCormick & McCormick, 1992). Third, the effects of CMC may be context-specific (Mantovani, 1994). There may be marked differences in behaviours between on-line social virtual environments and laboratory task focussed groups, and even

differences between groups using the same software. For example, Cheung (1995) noted that appropriate behaviours differ between IRC channels according to the context and norms of each channel.

Early media models (Social presence, Cuelessness, Reduced Social Cues and Media Richness) applied to CMC have failed to account for research findings of the social use of CMC and the formation of interpersonal relationships in some CMC contexts. Given the failure of media models to explain socio-emotional communication in CMC, the next section will examine models of relationship development and their applicability to CMC environments.

2.3.2 Relationship theories applied to CMC

This section briefly outlines theories of attraction and relationship formation in FTF settings and applies them to the formation of social relationships in CMC.

2.3.2.1 Theories of attraction

Research on the formation of relationships in FTF settings has suggested a number of bases for attraction between individuals. Reviews of the literature by Brehm (1995) and Dickens and Perlman (1981) reported that attraction is based on physical attractiveness, similarity, complementarity, being liked and physical proximity. More recently, Parks (1997) suggested that social proximity (represented by the number of network links separating people) might be more important than physical proximity in relational development.

2.3.2.2 Social Penetration theory

Social Penetration theory (Altman & Taylor, 1973) posited that relationships develop gradually and systematically as relational partners move from superficial to intimate exchanges. Over time the breadth and depth of topics of conversation and self-disclosure increase allowing access to greater depth of personality and intimacy. Individuals subjectively evaluate the immediate and predicted future rewards and costs of social interaction with the relational partner, to decide whether the relationship is worth pursuing. Verbal, non-verbal and environmentally oriented behaviours are important components in the social penetration process.

Altman and Taylor (1973) contended that the social penetration process might be affected by individual differences, situational and environmental factors. Individual differences that may affect social penetration are personality, biographical,

demographic and cultural factors. The rate of social penetration should be increased in informal settings, social settings, and situations that require no ongoing contact or relationship (e.g., stranger-on-the-train phenomenon, Thibaut & Kelley, 1959).

Hesse, Werner and Altman (1988) used Social Penetration theory to predict the likely progression of interpersonal relations in CMC. They stated:

To the degree that computers restrict personal aspects of communication, members of a developing relationship may find it difficult to move beyond the initial stages of relationship development without being able to resort to some other medium for interaction. Consequently the scale of early relational stages may lengthen for individuals who are forced to interact solely by computer. Furthermore, without a solid background of positive interactions, negative exchanges during the early stages might become especially salient and ultimately lead to reduced liking; thereby postponing the onset of later, more intimate, stages (p. 152).

2.3.2.3 Uncertainty Reduction theory

Uncertainty Reduction Theory (URT; Berger, 1986, 1987, 1988; Berger & Calabrese, 1975) was based on the notion that individuals seek to reduce uncertainties in the formation of relationships. Individuals acquire information about each other using a range of passive, active and interactive strategies. Both verbal and non-verbal communications contribute to information exchange. Information acquired is processed and the relationship evaluated. Where future interaction is anticipated, relational partners are driven to reduce uncertainty. Reduction of uncertainty increases interpersonal attraction, while continuing high levels of uncertainty place strain on relationships.

2.3.2.4 Applying relationship theories to CMC environments

Extrapolating from these theories of attraction and relationship formation, the bases for attraction to CMC partners should be minimal and relationships should be slow to form. In text-based virtual environments there is no physical proximity and no way to judge the physical appearance of relational partners. The reduction in social cues should slow the rate of social penetration and uncertainty reduction.

Lea and Spears (1995) noted a number of deficiencies and biases in relationship theories that reduced their explanatory power for relationships formed in CMC environments. Relationship research has typically focussed on FTF interactions and neglected relationship formation in other media. Physical proximity was thus seen as an essential requirement for the development of relationships. In contrast, CMC increases the potential range of people an individual can come in contact with, and physical proximity is no longer a limiting factor to the formation of relationships. Relationship theories emphasised the role of non-verbal communication and social cues. In text-based virtual environments all interaction is written, reducing the available social cues. Relationship theories were also biased towards talking as the primary communication channel of relationships. In contrast, most interactions in virtual environments occur in text. In their current state with their bias towards FTF interaction, the logical prediction of relationship theories is that relationships would be unlikely to be formed or maintained using CMC.

Given the failure of both media and relationship theories to explain socio-emotional communication in CMC settings, new theories of CMC have been developed and will be outlined in the next section.

2.3.3 CMC theories

Two new theoretical perspectives on CMC have emerged in the last decade that draw on relationship and identity theories. In contrast to earlier models of CMC, each new perspective takes as a starting premise that socio-emotional communication is possible in CMC.

2.3.3.1 Social Identity and Deindividuation (SIDE) model

The SIDE model (Lea & Spears, 1991, 1992a, 1992b; Spears & Lea, 1992; 1994) was developed to overcome the failure of previous models to explain differences in experimental and field research findings. The SIDE model has its basis in social identity (Tajfel & Turner, 1986) and social categorization (Turner, Hogg, Oaks, Reicher & Wetherell, 1987) theories. The SIDE model predicted that the visual anonymity and physical isolation of CMC users in text-based virtual environments should result in deindividuation, attenuating the effects of the individual's salient identity (personal or social). Behaviour in CMC will differ according to the salient identity in any particular situation. In situations where group norms are strong, social

identity will be salient, and behaviour will be in line with group normative behaviour. In situations where group norms are weak or non-existent, personal identity will become salient and behaviour will be in line with personal norms.

The SIDE model posited that the reduced social cues of CMC do not equate to a reduced social context. Because the number of social cues is reduced in CMC, those that remain, or can be implied, become more important in forming impressions of communication partners. Paralinguistic social cues communicate social information, aid in regulating behaviour, and provide a social context for the communication. Impression development in CMC is based on the available cues and social categorising.

More recent research has provided support for the SIDE model. Postmes et al., (1998) reviewed recent, predominantly unpublished studies of the SIDE model to examine the impact of characteristics of CMC on social influence. Across studies, where group identity was salient, anonymity in CMC increased social identification with the group, group attraction, conformity to group norms and stereotyping by depersonalising perceptions of the self and others.

Coleman, Paternite and Sherman (1999) argued that the SIDE model erred in viewing deindividuation as an independent variable created by the anonymity of CMC, and should instead be conceptualised as the dependent variable. Coleman and colleagues conducted a study where 117 undergraduate students took part in a consensus decision-making task in a FTF or computer-mediated setting. A chat system was used for the computer-mediated condition as the authors proposed that synchronous CMC environments were more conducive to deindividuation than asynchronous environments because the constant flow of communication increases absorption and spontaneity and reduces self-regulation. Students in the computer-mediated condition met the criteria for a deindividuated state. They rated themselves as more submerged in the discussion, more self-disclosing, and less often perceived as an individual than FTF group members. They were more likely to address their messages to the whole group rather than to individuals within the group. However, despite the deindividuated state there were no differences across the groups in negative interpersonal behaviours. The results are not inconsistent with predictions from the SIDE model.

Postmes and Spears (1998) conducted a meta-analysis of 60 deindividuation studies to test the hypothesis that “deindividuation is the cause of anti-normative and disinhibited behaviour” (p. 242). The results provided little support for the deindividuation hypothesis, with a very small overall effect size ($r=.09$). While manipulations of anonymity to the ingroup and private self-awareness did not produce reliable results, reduced accountability (operationalised by manipulations of anonymity to the outgroup and public self-awareness) resulted in anti-normative behaviour. Reduced public self-awareness was a better predictor of deindividuated behaviour than private self-awareness. Anti-normative behaviour was more likely to occur in groups. In contrast to the hypothesis tested, the deindividuation conditions of anonymity, larger groups, and reductions in self-awareness resulted in behaviour consistent with situational norms, rather than behaviour that opposed general social norms. These findings, while not based on studies conducted in computer-mediated environments, support SIDE model predictions.

2.3.3.2 Social Information Processing perspective

Walther (1992) developed a Social Information Processing (SIP) perspective of CMC to account for the discrepancy between ‘cues filtered out’ theoretical predictions of CMC as unsuited for socio-emotional communication, early findings of CMC as an impersonal medium, and findings from field research that personal relationships do develop within CMC.

SIP has its basis in theories of social cognition and interpersonal relationship development. SIP is based on the assumption that people seek to affiliate in their communication, whether this communication occurs FTF or in CMC. CMC users form initial impressions of each other based on the exchange of textual messages. As increasing numbers of messages are exchanged assumptions about communication partners are tested and interpersonal impressions adjusted. Interpersonal relationships and personalised communication will develop over time, with conversation moving from impersonal to personal topics. Given the reduced social information conveyed in textual messages, the SIP perspective predicted that impression formation and relational communication would take longer to establish in CMC than in FTF situations. (Walther, 1992).

The SIP prediction that CMC and FTF groups may operate at different rates has received some support. A meta-analysis of studies of socially oriented communication reported a higher percentage of socially-oriented communication and smaller differences between FTF and CMC groups in unlimited time groups than in restricted time groups (Walther, Anderson & Park, 1994). Consistent with social penetration and reduced uncertainty theory predictions, other studies have reported increased relational communication, increased impression management and a reduction in uncertainty in CMC over time (Walther, 1993; Walther & Burgoon, 1992).

Two weaknesses have emerged in the SIP perspective. First, Walther (1994) identified the failure of SIP to account for affiliation drive differences. Consistent with Uncertainty Reduction Theory (Berger, 1987), findings of impersonal communication in single time synchronous CMC and laboratory studies may be explained by the absence of anticipation of future interaction with group members. Second, drawing on the SIDE model, Walther (1997) noted that anticipation of future interaction interacted with a salient group identity to increase social facilitation. Walther (1997) concluded that CMC groups may be more influenced by temporal and identity factors than FTF groups. Research by Tidwell (1998) supported Walther's conclusion. CMC participants who anticipated future interaction with communication partners engaged in more uncertainty reduction behaviours than did those participants where no future interaction was anticipated.

More recently Walther (1996) extended the SIP perspective to incorporate findings of highly personal communication on-line. In text-based CMC environments messages frequently have social-emotional content, with some individuals reporting their CMC relationships are richer than their FTF relationships. Interpersonal bonding of members in CMC groups may surpass that of FTF groups, a phenomenon Walther (1996) called 'hyperpersonal communication'. Walther (1996) defined hyperpersonal communication as "CMC that is more socially desirable than we tend to experience in parallel FTF interaction" (p. 17).

Walther posited that for a social relationship to develop in CMC, users must be motivated to form a relationship, and develop impressions of their communication partners through interpreting the available social cues. The reduced social cues and

ability to formulate messages before sending enables individuals to manipulate their self-presentation to project a favourable image. In the absence of contradicting information, communication partners may form idealised stereotypical impressions based on the over-attribution of the minimal social cues available and the selective self-presentation offered. These impressions may be reinforced through behavioural confirmation (Snyder, Tanke & Bersheid, 1977) induced by the communication partners' expectations.

Utz (2000) tested the SIP perspective using a survey of 103 German MUD users. The results generally supported the SIP perspective. The use of paralinguistic cues to express nonverbal communication increased over time, and predicted the development of friendships. MUD users who were sceptical about CMC were less likely to use paralanguage and less likely to form relationships.

2.3.4 Summary

Early media and relational models applied to CMC have failed to account for research findings of the social use of CMC and the formation of interpersonal relationships in some CMC contexts. Later theoretical perspectives (SIDE and SIP) draw on theories of social identity and relationship development to explain research findings, but have yet to be fully tested across a range of virtual environments. The next section examines research on computer-mediated social interaction within text-based virtual environments.

2.4 Computer-mediated Social Interaction

In this section the existing literature on social interaction in text-based virtual environments accessible over the Internet is reviewed. The research reviewed focuses on the effect of text-based CMC on the individual (self-presentation and identity), their interactions with others (disinhibited behaviour, relationship formation and 'addiction') and their conceptions (telepresence and sense of community) of the social virtual environments they inhabit.

2.4.1 Self-presentation and Identity

In text-based virtual environments, individuals have complete control over their self-presentation, from the name they use to the degree and timing of information they choose to disclose about themselves. Takala and Gerlander (1997)

used the term 'fractional relationships' to describe how communicators can control the degree and timing of releasing information about themselves to other in cyberspace.

The first element of self-presentation in virtual environments is the selection of a name. Names are an important aspect or symbol of self-identity (Ellington, Marsh & Critelli, 1980). Names have both denotative and connotative meanings, defining the individual as a unique identity, and providing clues to religion, socio-economic status, and age. Names have an impact on how individuals are perceived by others, and in turn, how they perceive themselves (Horne, 1986). Individuals may use different forms of their names for different purposes, or in different situations, manipulating self-presentation in line with the way they wish to be perceived by others (Leirer, Hamilton and Carpenter, 1982). New names may be adopted for denotative or connotative reasons, to reflect a sense of identity, identification with a group, or a desired characteristic (Seeman, 1976).

In addition to the denotative and connotative implications of name choice, the selection of a new name for use in text-based virtual environments may be psychologically freeing for the individual. Jaffe (1995) reported that people are more at ease and increase their level of participation in CMC when they adopt pseudonyms. Turkle (1995) argued that anonymity provides individuals with the freedom to explore aspects of themselves and their identities.

In CMC environments that do not support character creation, the major means of managing self-presentation is through the choice of nickname (Bechar-Israeli, 1995; Rintel & Pittam, 1997). Bechar-Israeli (1995) studied the nicknames of 260 individuals in IRC. Six major categories of nicknames were found: real names; self-related names; names related to the medium or technology; flora and fauna; objects; plays on word or sounds; and names related to famous figures. Although the IRC system provides for each individual to change nicknames both during and between IRC sessions, most IRC users tend to keep the same nickname. Commonly, an individual forms an attachment to the nickname used, seeing it as a reflection/extension of the self. Because of this self-identification with the nickname, arguments erupt when others are found to be using the same name. Bechar-Israeli concluded that the nickname chosen on IRC becomes part of the user's identity.

Because nicknames are self-chosen they can be used to enhance one's identity, and reflect an idealised self.

Name choice represents one element of self-presentation in MUDs and MOOs. Ryan (1995) examined the nicknames of 222 MOOers and divided them into eleven categories, listed here in descending order of use: real life names, literary references, nicknames, fantasy, field of study or interest, joke, liking the name, popular culture reference, ideal of self, names meaning nothing, and names based in real life. Of these, 115 MOOers had both a primary nickname and other aliases. The selection of names may not have the same importance in MUDs and MOOs as in chat environments as self-presentation can also be manipulated by other means.

Users of MUDs and MOOs have total control over their self-presentation. In addition to choosing a name each individual creates, genders and describes their virtual character(s). Character descriptions vary in length, type of prose, ambiguity and depth. Descriptions may be used to portray an idealised self. The physical descriptions of characters often represent wish fulfilment on the part of the individual, with themes of beauty, power and mystery common (Curtis, cited in Reid, 1994). The combination of nickname and self-description are the basis for first impressions by other users.

Jacobson (1999b) used prototype theory (Lakoff, 1987) to examine impression formation in four social MOOs. Two sets of data were used. First, interviews were conducted with 15 MOOers. Second, 23 of Jacobson's students were asked to interact on MOOs and form impressions of MOOers. Impression formation of MOOers was firstly based upon character name, character description and text-based interactions. These were then interpreted in terms of typical examples, stereotypes and exemplars based on people known off-line. Discrepancies between the image of an individual formed on-line and the off-line individual were highlighted when MOOers met FTF. Frequently expectations were not met, particularly in the areas of body image and talkativeness. Jacobson concluded that impression formation on MOOs was driven not only by available cues, but the interpretation of those cues based on existing conceptual categories and cognitive models.

Control over naming and self-presentation in text-based virtual environments provides the opportunity for the creation of new and multiple identities. The virtual environments of MUDs and IRC have been described as providing a psychological environment for the construction, exploration and deconstruction of identity (Bruckman, 1992; Reid, 1991, 1994; Turkle, 1995, 1997a). In some MUDs and MOOs the user can create 'morphs', alternate characters that can be switched between instantaneously. Morphs are used to role-play, to have fun, to switch genders, for sexual purposes, and to disguise the user (Ryan, 1995). Reid (1994) noted that the virtual environments of MUDs become 'real' to users. Simultaneously situated in 'real-life' (sitting at the computer) and in virtual reality, users reflect on their different behaviours in each setting, a process which may help them gain a better understanding of themselves.

Users can adopt multiple identities on-line within and between virtual environments. An ongoing debate in psychology is whether the identity of an individual consists of one unifying structure, or multiple identities. Identity has been studied from many perspectives. Deaux (1992) described three major identity paradigms: symbolic interactionism, role theory, and social identity theory. Underlying these paradigms are two main streams of thought. The first assumes that each individual has an integrated identity that is relatively stable across situations. In contrast, the second assumes that each individual has multiple identities, and will change identities with changing situations. Roles, and thus identities, are embedded within a social context. In a review of the social psychological literature, Marcus and Wurf (1987) noted the trend toward research emphasising the dynamic nature of the self-concept, providing support for the concept of multiple identities.

The assuming of multiple identities is consistent with post-modern conceptions of identity. Gergen (1972) claimed that research into the single unifying identity is based on two assumptions. First, that a fixed identity is normal, and second that a fixed identity is healthy, and multiple identities are not. Contrary to this view, Gergen argued that individuals are complex beings and have many possible selves. Markus and Nurius (1986) expanded upon the idea of possible selves, defining possible selves as representing "individual's ideas of what they might become, what they would like to become, and what they are afraid of becoming" (p.

954). Gergen (1972) advocated the adoption of alternative identities, or possible selves, as a means of realising potential, noting that “once donned, masks become reality” (p. 64). More recently Gergen (1991, 1994) has expanded upon this position within a social constructionism framework. From this perspective an individual’s identities are “never individual; each is suspended in an array of precariously situated relationships” (Gergen, 1994, p. 209).

The ability to adopt multiple characters on-line challenges the assumption of unity of identity (Figueroa-Sarriera, 1999). Social virtual environments provide settings in which individuals can freely explore possible selves. As such, they may function to support psychosocial moratorium periods (Turkle, 1995, Wallace, 1999). Turkle (1995) situated identity play on MUDs within the larger context of post-modern society. She described the experience of some MUD users as a “cycling through” (p.12) of different worlds as they lead “parallel lives” with “parallel identities” (p. 14).

Donahue, Robins, Roberts and John (1993) outlined two theoretical formulations of the effect of self concept differentiation associated with multiple role identities. The first, specialisation of role identities, views self concept as an adaptive process meeting the requirements of different social roles. Gergen’s (1991) notion of the ‘saturated self’ fits this formulation well. Self-concept differentiation is seen as a psychologically healthy response to the increasing myriad of social relationships that an individual engages in. The second formulation, fragmentation of the self, views self-concept differentiation as more problematic and indicative of a lack of integration of the core self. Based on their studies of college students and women Donahue et al. reported high self concept differentiation was associated with poor emotional adjustment (depression, neuroticism, anxiety and low self-esteem and well-being), providing support for the concept of fragmentation of identity rather than the specialisation of role identities.

The nature of the body and sexuality are problematised in virtual environments, since the physical is never fixed, and gender is a self-selected attribute. The social and physical presence of an individual are separated (Reid, 1994). In IRC, the choice of nickname infers gender, and in MUDs gender can be set by the use of a simple command. In addition to the initial construction of gender

through nickname selection or setting gender, use of speech, self-referencing pronouns and behaviour can be used to 'perform' gender (Leaning, 1998; Rodino, 1997). Shared cultural conceptions enable the performance of gender.

Because self-presentation in text-based virtual environments is under the total control of the individual, there is the potential for cross gendering. Suggested reasons for gender-switching on-line include gender and sexual exploration, increasing sexual opportunities, increasing attention, avoiding sexual harassment, balancing the ratio of men to women, and role-playing (Bruckman, 1993; Germain, 1993; McRae, 1996, Turkle, 1995). Male and female identities may be treated differently in virtual environments. Female nicknames on IRC attract high levels of attention from users with both male and female nicknames. (Rintel & Pittam, 1997). Women notice a drop in friendly, helpful communication when they swap genders (Serpentelli, 1992). Reid (1994) reported that some people object to gender-crossing, perceiving it as cheating, unethical, and confusing.

While anecdotal reports of gender-switching are common, to date there has only been one study that examined the prevalence of gender-switching on-line. Roberts and Parks (1999) conducted on-line surveys of two stratified random samples of MOOers. The majority of social MOOers (60%) had never engaged in gender-switching, while the majority in role-playing MOOs (56.7%) had gender-switched at some time. The most common gender-switches were male to female and female to male (78.7%), despite the capability to use indeterminate or plural genders. The main reason given for gender-switching was the desire to play roles of people different from one's self. The primary barrier to gender-switching was the belief that it was dishonest and manipulative. Roberts and Parks (1999) concluded that gender-switching within MOOs was best understood as an experimental behaviour rather than as an enduring expression of sexuality, personality, or gender politics.

Is the adoption of an alternative or multiple identities and genders in cyberspace problematic for identity? Kenway (1996) noted that the anonymity of cyberspace allows for a fluidity of gender and identity, enabling individuals to lead parallel lives with multiple identities. Identity itself becomes flexible, with different identities for different settings. Mantovani (1995) adopted a dramaturgical view of identity, describing virtual reality as a puppet-show, with users manipulating

puppets. However, he noted that this mediated presence could result in puppeteers questioning their 'real-life' identities. The extent of role involvement, combined with the amount of time the individual spends within a role relative to the amount of time spent in other roles, may have important implications for identity. McKenna and Bargh (2000) argued that on-line identity play may be most important for individuals who have either few roles or feel constrained in their off-line lives. However, they warn that the long-term effects of identity exploration on-line on self-understanding, emotion and mental health are presently unknown.

There is some suggestion in the CMC literature that the amount of role-playing and identity play may reduce over time. MOOers may switch from using pseudonyms to off-line names when they wish to signify a message is 'real' (Jacobson, 1996). Some long term MOOers revert permanently to off-line names and descriptions, interacting with others as their 'real' selves rather than as characters (Curtis, 1992, Ryan, 1995). Based on her research on MUDs, Kendall (1999) argued that despite the opportunities to create multiple identities on-line individuals seek to incorporate their own and others identities into "integrated consistent wholes" (p.62). These findings are suggestive of an integration of virtual and off-line identities.

In summary, research conducted to date on self-presentation has described the different ways in which users of text-based virtual environments control their self-presentation and can establish one or many on-line identities. A number of questions remain:

- *To what degree do individuals identify with their on-line identities?*
- *How do on-line identities evolve over time?*
- *How do individuals conceptualise the relationship between their off-line and on-line identities?*

2.4.2 Disinhibited behaviour

Disinhibited behaviour in CMC is behaviour on-line that is less inhibited than behaviour in comparable FTF situations. Factors hypothesised to contribute to on-line disinhibition are perceived anonymity, reduced public self-awareness, absorption and social norms for on-line behaviour (Joinson, 1998). Disinhibited behaviour may be positive or negative, although the term is most commonly used in relation to negative behaviours.

Examples of negative disinhibited behaviour in text-based virtual environments are virtual rape (Dibbell, 1993), virtual stalking (Gilbert, 1997, Whitelaw, 1996), deception (McRae, 1996; Van Gelder, 1985) and most commonly, flaming (Dery, 1994; Lea, O'Shea et al., 1992; Mabry, 1997; Thompsen & Foulger, 1996, Wang, 1996; Witmer, 1997). Many differing definitions of flaming have been used in CMC research, but most refer to negative verbal behaviours such as swearing and insults (Lea et al., 1992). Flaming has been attributed to poorly defined social contexts with less regulated communication, lack of status and social cues, normlessness and anonymity (Kiesler, 1986). Other researchers have challenged the notion that CMC promotes flaming. In a review of CMC articles, Lea et al. (1992) found that while there were frequent references to flaming in CMC, few empirical studies of flaming existed. In addition, there were no comparative studies of flaming and disinhibited behaviour in CMC and FTF situations. Based on this review of the literature, they concluded that flaming is comparatively rare in CMC and is context-dependent.

Reports of disinhibited sexual activity on-line (Bingham & Pitrowski, 1996; Cooper, Scherer, Boies & Gordon, 1999; McRae, 1996; Witmer, 1997; Reid, 1991; 1994) are often framed in a negative light. For example, Bingham and Pitrowski (1996) claimed that "sex in 'cyberspace' offers yet another vehicle by which individuals can express (and act on) their aberrant sexual and carnal influences" (p. 256). Cooper, Scherer, Boies and Gordon, (1999) described individuals who used the Internet for sexual pursuits for eleven or more hours per week as "compulsive users" who experienced psychological distress and negative effects as a result of their on-line sexual activity. Care needs to be taken in labeling all on-line sexual activity as negative or anti-social behaviour due to the value judgements involved. On-line sexual activity can also be viewed as a neutral or positive disinhibited behaviour involving sexual experimentation within a safe environment.

While early research focused on negative anti-social disinhibited behaviours, more recent research has identified positive or pro-social disinhibited behaviours in CMC. High levels of emotional support and self-disclosure have been reported in on-line self-help groups (Braithwaite, Waldron & Finn, 1999; Dunham et al., 1998; Finn, 1999; Glasser Das, 1999; McKenna & Bargh, 1998; North, 1998; Salem, Bogat

& Reid, 1997; Sharf, 1997; Sproull & Faraj, 1996; Winzelberg, 1997). Finn (1999) reported that 55.3% of messages on a self-help group bulletin-board for disabled people were socioemotional in nature. Dunham et al. (1998) reported that 98% of replies to concerns posted to a BBS group of young single mothers provided positive social support. Over a six-month period there was evidence of the development of close personal relationships, a sense of community, and decrease in parenting stress.

Many individuals are using on-line self-help groups as adjuncts to off-line self-help groups, while others may initiate off-line therapeutic attempts as a result of participation in on-line support groups (King & Moreggi, 1998). Participation in an on-line support group may in itself be therapeutic. Miller and Gergen (1998) conducted a content analysis of postings to a suicide bulletin board. The majority of postings related to self-revelation and help seeking, or supporting responses to those posts. The authors equated this support first to that provided in close friendships, and second to neighbourly support. By participating in an on-line group individuals were both client and helper. Miller and Gergen concluded that "a substantial degree of 'therapeutic work' can and does spontaneously take place on the Internet" (p. 200).

Limitations of on-line support groups are the transient membership, the risk of misunderstandings given the lack of non-verbal cues, the lack of interpersonal responsibility, and the possibility of unhelpful advice (Lebow, 1998; Miller & Gergen, 1998). Lebow contended that on-line support groups that were not facilitated by therapists offered higher risks and lower rewards than traditional FTF therapies, concluding that chat groups were not a substitute for therapy.

Individuals with marginalised identities may benefit more from on-line support groups than others. McKenna and Bargh (1998) conducted a series of three studies of newsgroups. Newsgroups that catered for individuals with marginalised, but concealable, identities were rated as more important to the individuals concerned than other newsgroups to their participants. Active participants in newsgroups catering for marginalised sexual and ideological identities gained greater benefits (decreased feelings of social isolation, greater self-acceptance of identity, coming out to family and friends and less estrangement from society) than lurkers (those who read but do not post messages). Kleinman (1998) studied an on-line discussion group for women in science and engineering. Participation resulted in increased self-

confidence, expanded social and knowledge based networks and validated social identities. Kleinman concluded that lurkers, as well as active participants benefited from the discussion group.

The high rate of self-disclosure in social text-based virtual environments may be attributable to situational factors. The situational factors posited by Altman and Taylor (1973) to increase the rate of social penetration (informal, social settings that are not psychologically confining) are characteristic of many social on-line environments. Research findings to date suggest that these situational factors are conducive to high levels of self-disclosure. In a study of relationships formed on an X-rated bulletin board and on Prodigy, Wysocki (1996) noted that relationships formed faster than FTF, and were marked by higher rates of self-disclosure. This was attributed to the absence of high costs associated with self-disclosure off-line. Some users of 'messaging' (chats) on Minitel, a CMC system developed in 1978 by the French government and distributed free of charge to all French telephone subscribers, have been reported to leave marriages for on-line lovers they have never met. This was attributed to the perceived openness, honesty and depth of intimacy achieved with their electronic lovers. De Lacy (1987) described the attraction of Minitel as "risk-free communication: the emotional equivalent of safe sex, conversation with a condom" (p. 18).

The reasons for self-disclosing may vary between CMC and FTF environments. Based on a study of CMC between North Americans and East Asians Ma (1996) suggested that disclosure in FTF situations is often indicative of a committed relationship, while self-disclosure in CMC is a result of the perceived lack of risks.

Both positive and negative disinhibited behaviours may be present within the same text-based virtual environment. Sempsey (1998b) used Moos' Group Environment Scale questionnaire to examine the social climates of groups within MUDs. In comparison to off-line groups, MUD groups were less formalized and structured, enabled more self-expression, diversity, change, independent action and open-ness. Ryan (1995) asked long-term (two and a half years plus) MOOers to compare their off-line and MOO behaviour. Sixty percent claimed they acted no differently on the MOO. Those who did act differently on the MOO tended to be

more outspoken, outgoing and flirtatious and experienced a feeling of freedom to act as they desired on the MOO. This was attributed to the anonymity of the MOO freeing people from judgements about their 'real' selves. Reid (1994) argued that it is necessary to distinguish between disinhibited and uninhibited behaviour, noting that all interactions within a MUD occur within a social context complete with norms, rules and expectations.

In summary, both positive and negative disinhibited behaviours have been reported in social text-based virtual environments. However, research to date has not examined the following questions:

- *How do individuals account for their own disinhibited behaviour?*
- *How do individuals cope with the disinhibited behaviours of others?*

2.4.3 Formation of relationships

Some of the disinhibited behaviours outlined in the previous section (e.g., high rates of self-disclosure and support, sexual experimentation) are conducive to the formation of relationships. The development of on-line relationships has caught the attention of the popular press. Since the mid-1990's articles have been appearing in mainstream newspapers and magazines about the more sensational on-line relationships: cyber-romances, cyber-sex, cyber-adultery, weddings between cyber lovers and spouses being left in favour of Internet lovers (see for example Craig, 1996; Dvorak, 1994; Griffin, 1996; Kilsheimer, 1996; Toufexis, 1996).

The media interest has been accompanied by academic interest in social interaction on-line. The presence of on-line social relationships has been reported in a wide range of social text-based virtual environments, including bulletin boards (Kaplan & Farrell, 1994; Myers, 1987; Wysocki, 1996), MUDs (Reid, 1994; Turkle, 1995; Utz, 2000), MOOs (Allen, 1996; Parks & Roberts, 1998, Ryan, 1995) IRC (Byrne, 1994; Reid, 1991), chatrooms (Schofield Clark, 1998) and newsgroups (Parks & Floyd, 1996; McKenna, submitted).

The prevalence of relationship formation may vary across virtual environments. In social MUDs and MOOs, social interaction and the formation and maintenance of personal relationships are the primary activities. Social interaction (predominantly in small groups) accounts for more than half the time spent MOOing (Schiano, 1997). The main reasons cited by individuals for using MOOs are personal

contact, the development and maintenance of personal relationships, and the chance to socialise with others (Ryan, 1995; Schiano, 1997). Turkle (1995) noted that relationships in MUDs form and intensify quickly, and may involve projection and transference. Parks and Roberts (1998) reported 94% of MOO users surveyed formed at least one on-going personal relationship on a MOO, with most reporting the existence of several relationships. In newsgroups relationship formation is also commonplace, but not as prevalent as in MOOs. Parks and Floyd, (1996) reported that 60.7% of newsgroup survey respondents had formed at least one ongoing relationship. Length of time subscribed to a newsgroup and participation in the newsgroup were the best predictors of relationship formation. The prevalence of relationship formation in other social virtual environments has not been established.

While the existence of computer-mediated relationships has been noted in a wide range of virtual environments, little research has been conducted into the process of computer-mediated relationship development. Byrne (1994) examined relationships formed on IRC using social penetration theory. She described how individuals used emoticons, action commands and textual markers to counteract the absence of non-verbal communication. Relationships developed with the common virtual space of IRC as the social context for communication. In the absence of physical attraction, IRC users were frequently attracted to one another on the basis of the nickname they selected. The nickname was seen as providing an indication of the role the individual wished to adopt. Additional information about an individual could also be obtained through the use of system commands (e.g., /whois). Biographical information was frequently exchanged through reciprocal self-disclosure. As with off-line relationships the degree and appropriateness of self-disclosures, commonality and complementarity determined the likelihood of further social interactions.

Cooper and Sportolari (1997) reported specifically on the development of romantic relationships on-line. The formation of romantic relationships on-line was not dependent upon physical attraction. Instead, impressions were formed by how individuals described and expressed themselves. Romantic feeling developed from emotional involvement rather than physical attraction. As a romantic bond had already been established before meeting FTF, physical attractiveness was not as important in defining the continuation of relationships. On-line proximity of users

replaced physical proximity, with individuals able to seek out people with similar interests. Cooper and Sportolari argued that the Internet might facilitate relationship development by providing an interpersonal space free from the press of other individuals, and providing greater control over the communication process. However, they highlighted the possibility that faster self-disclosure may result in quickly intensifying relationships that develop without a foundation of trust and knowledge.

McKenna (1999, submitted; McKenna & Bargh, 2000) conducted surveys and laboratory studies to examine social interaction on-line. Individuals were better able to present ideal qualities on-line than in FTF settings. Individuals liked each other more if they meet on-line rather than FTF, and this result held even when those who met on-line went on to meet their relational partners FTF. McKenna and Bargh (2000) speculated that physical appearance might be less important once a positive impression of a communication partner has already been formed. Extrapolating from this, they raised the possibility that relationships formed on-line may last longer and be of greater depth than relationships formed in off-line settings as liking was not dependent on physical attractiveness and proximity.

Based on a survey of over 500 users of Usenet newsgroups, McKenna (submitted) identified socially anxious and lonely individuals as the most likely to express their 'real self' on the Internet rather than in off-line life. Locating the 'real self' on the Internet was associated with fast-forming strong attachments on-line, with these relationships frequently moving to off-line settings. Those who were not socially anxious or lonely, but who located their 'real self' on the Internet also formed strong attachments on-line, but were less likely to meet FTF.

Drawing on theories of relationship development, Parks (1997) suggested that relational development could be conceptualised in terms of six dimensions: interdependence, breadth or variety of interaction, depth or intimacy of interaction, commitment, predictability and understanding, code change and coordination. These six relationship dimensions have been used to measure relational development in newsgroups (Parks & Floyd, 1996), MOOs (Parks & Roberts, 1998) and FTF settings (Parks & Roberts, 1998). Results of these studies revealed that on average MOO relationships were more developed than newsgroup relationships, but less developed than off-line relationships on the relational development dimensions measured.

In both MOOs (83.6%) and newsgroups (55.1%), the majority of relationships formed were with members of the opposite sex (Parks & Floyd, 1996; Parks & Roberts, 1998). This is in sharp contrast to the 'norm of homosociality' in FTF settings where same sex friendships are more common across the life-span span (Booth & Hess, 1974; Dickens & Perlman, 1981; Parker & de Vries, 1993). Parks and Roberts (1998) suggested a possible explanation is the absence of structural and normative constraints to cross-sex friendships on-line.

The range of media used may affect trajectories of on-line relationships. In the two studies outlined above, the majority of relationships formed on both MOOs and newsgroups had migrated to other on-line settings, with many migrating to off-line settings (Parks & Floyd, 1996; Parks & Roberts, 1998). Similarly, Katz and Aspden (1997) reported that more than 60% of people who had formed friendships on-line had gone on to meet an Internet friend FTF. The proportion of friends met off-line after meeting on-line approximated 65%, regardless of the number of Internet friends an individual had. These studies suggest a fluidity of media use and settings for relationships formed on-line.

Relations begun in one virtual setting may change with the use of additional media. On-line romances appear to be the most affected by the transition from on- to off-line settings. While some on-line romances evolve into off-line romances and may result in marriage, not all net romances transfer off-line successfully. Wysocki (1996) reported that meeting off-line commonly resulted in either the intensification of, or end to, an on-line relationship.

The failure of some romantic relationships to transfer off-line may be a function of differences between on- and off-line personae (Geake, 1994; Shannon, 1995). Alternatively, on and off-line romances may be qualitatively different. Gwinnell (1998) used Sternberg's (1988) triangular theory of love to examine on-line romances. In comparison to off-line romances, Internet romances were higher in intimacy, lower in commitment, and passion was based on fantasy.

On-line romantic partners do not necessarily seek to move their relationship into off-line settings. For example, Schofield Clark (1998) discussed how teens are using chatrooms to develop romantic relationships, noting that most relationships

formed were transient and regarded as fun, with limited off-line consequences or obligation to on-line partners.

Walther (1998) described the circumstances under which hyperpersonal relationships are likely to develop, and how relationships begun within CMC settings transfer to off-line settings. Walther posited that sociotechnical characteristics (e.g., level of anonymity, requirement for identifying information, physical proximity of users) that vary across CMC environments result in varying degrees of constraint on social behaviour and identity play. Virtual environments that support anonymity or pseudonymity and where physical meeting is unlikely and avoidable (e.g., MUDs and MOOs) provide the opportunity for hyperpersonal relationships and low warrant identities. Warrant refers to the level of relatedness between on and off-line identities. In contrast, virtual environments that require off-line demographic details, where users are in close physical proximity or share social networks demand a higher level of warrant.

Walther (1998) hypothesised that as relationships migrate from virtual environments towards FTF meetings the degree of warrant increases. Warrant is increased where information about the self is disclosed and is verifiable from other sources. Walther suggested three possible ways in which communication partners may treat warranting information. Some individuals may reserve judgements about communication partners until they meet FTF. Others may treat information such as appearance as irrelevant, and merely assimilate the information. Alternatively, where new information violates expectations, relationships may end or escalate according to whether expectations are not met or exceeded.

Walther (1998) highlighted the inadequacies of previous CMC theories to explain the migration of relationships from on-line to off-line settings. The prediction from Uncertainty Reduction theory, that liking increases as uncertainty is reduced, fails to account for cases where relationships end once communication partners meet FTF. The prediction from Social Information Processing theory that off-line information has little impact once a virtual relationship is formed fails to account for the horror some individuals express upon meeting CMC partners FTF. Cases of the escalation of relationships following FTF meetings are contrary to SIDE theory

predictions that movement from social category to individuation of communication partner should undermine social attraction.

Walther (1998) proposed that Sunnafrank's (1986) Predicted Outcome Value theory (an extension of Uncertainty Reduction theory) provides the most useful theory for explaining trajectories of migrating relationships from computer-mediated to FTF settings. According to this theory each piece of additional information about a relational partner is evaluated. Where the assessment is positive, the relationship is strengthened. Where the information is negative, the relationship is reassessed in a negative light and may result in the relationship ending.

These studies, while providing insight into the prevalence of social interaction and relationship formation in text-based virtual environments, do not provide insight into how the individuals involved perceive the on-line relationships they are involved in. Specific questions that remain to be addressed include:

- *In the absence of physical proximity and cues to physical attractiveness, how are users of text-based virtual environments attracted to one another?*
- *What types of scripts apply to social interaction and the development of relationships in text-based virtual environments?*
- *Does the process of relationship formation vary across types of text-based virtual environments?*
- *Which aspects of relational development are affected by generic components of CMC, and which are affected by characteristics of specific virtual environments?*
- *How does the transference of on-line relationships into other settings affect relational development?*

2.4.4 Addiction

The origins of the concept of 'Internet Addiction' lies in a parody of the DSM-IV criteria written by Ivan Goldberg (see <http://web.urz.uni-heidelberg.de/Netzdienste/anleitung/wwwtips/8/addict.html>). The parody was taken seriously, and 'Internet Addiction' quickly received coverage in newspapers and magazines (see, for example: Allbritton, 1995; Ezard, 1997; Griffiths, 1995; Hamilton & Kalb, 1995; Juresivich, 1997; Ringwald, 1996; Suryaraman, 1996; Vranizan, 1995) with most articles providing anecdotal reports of individuals who were 'addicted' to the Internet. Accompanying the media interest, research began to

investigate extended periods of Internet use as a possible addiction, and articles began appearing in medical (Huang & Alessi, 1997; O'Reilly, 1996; Stein, 1997) and psychological journals (e.g., Brenner, 1997; Griffiths, 1997; Murray, 1996; Young, 1996c). In a posting to the 'Psychology of the Internet: Research and Theory' discussion group dated 4 November 1996, Goldberg noted "...I never had the slightest idea that it would be taken seriously."

Some psychologists are investigating 'Internet Addiction' as a clinical disorder, and others are providing treatment programs to cure it (Orzack & Orzack, 1999; Young, 1999). 'Internet Addiction' has been variously described as a technological addiction (Griffiths, 1995), computer dependence (Young, 1996b), pathological computer use (Goldberg, 1996, Morahan-Martin & Schumacher, 1997; Young, 1997), an impulse control disorder (Young, 1999), and on-line overuse (Grohol, 1998). The models on which some of these terms are based are described below.

Griffiths (1995) viewed 'Internet Addiction' as a form of technological addiction involving human-machine interaction. From this technological perspective, features of the technology such as graphics, light, colour and sound effects are posited to enhance the telepresence experienced by the user and hence the addictive potential (Griffiths, 1995). Griffiths argued that users could change their state of consciousness through on-line activity.

Models of computer dependency that predated the Internet focused on how introverted socially inept users achieved a sense of control when computing. Turkle (1984) developed a profile of computer hackers, claiming the addiction for this group was to the control offered by the medium. The logical responses offered by a computer program are more controllable than the unpredictable responses of human social interaction.

Shotton (1989, 1991) described a syndrome of computer dependency based on a study of heavy computer users. Computer dependents described themselves as shy, introverted and solitary. They rated highly on fantasy related play, anthropomorphised their computers, treated their computers as friends, and preferred computing to people. Shotton (1998) identified a subgroup of computer dependents as 'networkers'. Networkers were mainly comprised of users of the early MUDs and

bulletin boards. In contrast to other computer dependents, networkers used the computer as a toy, and for social purposes. This group was found to be more outgoing and social than other computer dependents. Interestingly, networking was not seen as a form of pathology. Shotton (1989) concluded that: "there were no suggestions from the results obtained that the networkers' personalities had in any way been affected detrimentally by their use of the networks. Conversely, there were suggestions that some had learnt to become more bold socially and that friendships had developed with people with whom they had communicated in this way" (p.183).

In contrast, Internet dependency has been cast in a negative light. The most prolific researcher/writer about 'Internet Addiction' is Dr Kimberly Young, founder of the Center for On-line Addiction (see <http://www.netaddiction.com/>). Based on surveys and interviews with self-proclaimed 'Internet addicts', Young (1996b) originally defined 'Internet Addiction' in terms of excessive use of the Internet, inability to log-off once connected, hiding the extent of Internet use from others, cravings to get back on-line and experiencing withdrawal symptoms when off-line. Later, Young (1997) renamed 'Internet Addiction' as 'Pathological Internet Use' (PIU), based upon the criteria of Pathological Gambling defined in the DSM-IV (American Psychiatric Association, 1995), modified to suit Internet applications. Young appears to use the terms 'Internet Addiction', 'computer dependence' and 'PIU' interchangeably, and uses the same criteria for each.

Young's (1996b, 1999) studies associated 'Internet Addiction' with long periods spent on-line and self-reports of impairments in academic, relationship, financial, occupational and physical realms of off-line life. Impairments included disrupted sleep patterns, sleep deprivation, less time spent with off-line relational partners, emotional and social withdrawal from marriage, lying about extent of on-line use and activities engaged in, academic failure, and decreased work productivity. Young (1999) also speculated about the possibility of impaired immune system functioning, and increased risk for carpal tunnel syndrome, back strain, or eyestrain.

The absence of agreement over the name and underlying model of 'Internet Addiction' is further compounded by the identification of subtypes of 'Internet Addiction'. Young (1995) initially identified three categories of 'Internet Addiction': cyber pornography, social interaction and informational. This was later changed to

five categories with the addition of net compulsions (on-line stock trading, gambling and shopping) and computer games (Young, Pistner, O'Mara, & Buchanan, 1999). Similarly, Greenfield (1999a, b) identified four categories of compulsive Internet users: sex addicts, 'electronic vagabonds' (net surfers), social users, and task users (e.g., gambling, shopping, trading, auctions).

To date, research into 'Internet Addiction' has been based on case-studies (Belsare, Gaffney & Black, 1997; Young, 1996) and surveys (Griffiths, 1998; Brenner, 1997; Greenfield, 1999a, b; Lavin, Marvin, McLarney, Nola, & Scott, 1999; Morahan-Martin & Schumacher, 2000; Scherer, 1997; Thompson & Moore, 1996). Both techniques have largely relied upon self-selected samples, and in some cases (e.g., Belsare, Gaffney & Black, 1997, Young, 1996b), self-identified Internet addicts.

In the largest study to date Greenfield (1999a, b) conducted an on-line survey of more than 17,000 Internet users. The 'Virtual Addiction Survey' developed for this research was based on pathological gambling criteria. Six percent of respondents met Greenfield's criteria for 'compulsive Internet use'. Greenfield argued that this figure "may represent a small percentage of those who are in some way negatively impacted". Extrapolating from these figures, based on Greenfield's criteria there are more than 15 million compulsive Internet users in the world today, with many more who are experiencing negative effects from their Internet use!

'Internet Addiction', if it exists, is a behavioural addiction. Orford (1985) has developed a psychological model of excessive appetitive behaviours, describing appetitive excess as "a human potential" (p. 5) that is not restricted to chemical substances. Orford (1985) acknowledged that new technologies are producing activities, such as computer-gaming that are potentially addictive. Addiction terminology has been applied to other technologically driven activities such as computer gaming (Griffiths, 1995a), and television (McIlwraith, 1998).

Griffiths (1998, 1999) identified 6 core components of addiction that need to be met before Internet use could be regarded as a behavioural addiction: salience, mood modification, tolerance, withdrawal symptoms and conflict with others or other activities. Grohol (1999) argued that applying these criteria to behaviours is problematic as "Any behavior can be viewed as addictive given such criteria" (p.

396). Walther's tongue-in-cheek description of two addictions: 'Communication Addiction Disorder' (Walther, 1999) and 'Acadaholism' (Walther & Reid, 2000) are apt examples of the potential for the term addiction to be applied to any behaviour. Grohol (1998, 1999) further argued that the Internet addiction research agenda was driven by the newness of the technology, media interest, and was consistent with the dire predictions that are made with the introduction of all new technologies.

The measures used to diagnose 'Internet Addiction' have differed, but most have been based on adaptations of the criteria for substance dependence (e.g., Anderson, 1999; Brenner, 1997; Scherer, 1997) or pathological gambling (e.g., Greenfield, 1999a, b; Young, 1997) in the DSM-IV. While many of the measures of 'Internet Addiction' are based on the core components of addiction outlined above, Griffiths (1999) noted that in some studies (Young, 1996b; Scherer & Bost, 1997) the criteria for addiction was set too low and that in others (Brenner, 1997; Morahan-Martin, 1997) the items did not equate directly to the addiction criteria.

The validity and reliability of the measures used have not been established. Some items on some scales appear to reflect value judgements rather than measure addictive behaviours. For example, items used by Brenner (1997) to indicate "problems" (p. 881) or "interference in role functioning" (p. 881). include:

"I have spent at least 3 hours on the net at least twice"

"I have never made arrangements to rendezvous with someone I knew only from the net" (reverse scored)

"I have used net resources intended for Adults only".

Some publications (e.g., Lavin et al., 1999) do not provide enough information on the measure used to even begin to judge the validity and reliability of the measure.

Some studies have failed to find pervasive negative effects on functioning for students who either spend long hours on-line or meet criteria for 'Internet Addiction'. For example, Anderson (1999) reported that students who spent more than 400 minutes per day on-line did not differ from low Internet users in terms of academic achievement, meeting new people, participating in extracurricular activities, or real life relationships, although they were more likely to report reduced sleep due to Internet activities. Scherer (1997) reported that the majority of computer dependents surveyed believed the Internet had a positive or non-significant effect on life.

Dependents used the Internet for a wider variety of reasons than other students, and were more likely to have a larger proportion of relationships on-line than other students. The majority described themselves as sociable, and not introverted or avoidant. Similarly, Morahan-Martin and Schumacher (2000) reported that in comparison to other users, 'pathological Internet users' visited more World Wide Web sites, used the Internet for a greater number of reasons, were more socially confident on-line and found the Internet more socially liberating. These studies suggest that individuals who use the Internet the most are competent Internet users and comfortable interacting using CMC.

The amount of time spent on-line by those assessed as meeting the criteria for 'Internet Addiction' also varied widely. Morahan-Martin and Schumacher (2000) reported that 'pathological Internet users' spent on average less than 8 1/2 hours per week on-line. Similarly, Scherer (1997) reported that 'computer dependents' used the computer for personal or leisure activities on average just over one hour per day. At the other extreme Young (1996b) reported an average of 5 1/2 hours on-line per day. Reporting an average time of just less than 4 hours per day for 'Internet dependent' college students, Anderson (1999) noted that one individual self-reported spending only 5 minutes per day on-line. Grohol (1999) stated that the hours reported in studies for Internet addicts overlap with the hours reported in studies looking at 'normal' Internet use. Time on-line alone does not appear to be a useful measure of problematic Internet use. Other explanations than Internet addiction for long hours spent on-line are engagement, escapism and the pursuit of leisure (Grohol, 1999).

Suler (1999) suggested that intense Internet use can be seen on a continuum from healthy to pathological. The awareness and depth of underlying needs, how these needs are being met by Internet use, and the effect of this use on the individual and his/her life determine placement along the continuum. Needs that can be met on the Internet include sexual, romantic and relationship needs; the need for an altered state of consciousness; and achievement, mastery and self-actualisation needs. Suler (1999) distinguished between healthy and pathological use on the basis of the "*integration principle*: Internet use becomes pathological when it is dissociated from in-person life. It becomes healthy when it is integrated with in-person living" (p. 393).

'Internet Addiction' is most prevalent in Internet users who have been on-line for less than one year. Young (1996b) reported that 83% of respondents identified as Internet 'dependents' had been on-line for less than one year, compared to 29% of 'non-dependents'. Wallace (1999) suggested two possible interpretations for this finding. First, individuals who are prone to becoming addicted to the Internet may become addicted quickly. Second, 'Internet Addiction' may be a phase that some new Internet users ('newbies') go through and 'recover' from. Suler (1999) also suggested that new Internet users might experience an addictive phase that will resolve itself overtime. The second interpretation raises the possibility that 'Internet Addiction' may be a normative process, and does not necessarily represent psychopathology that requires treatment.

Research on computer game 'addiction' offers some support for this 'newbie' effect. In a review on the literature on computer games, Durkin (1995) reported that while initially time spent playing computer games is high, over time usage drops and computer games become just another activity. Durkin (1995) concluded that computer game addictions "are actually transient phases of excessive involvement rather than enduring dependencies from with the victim will find it very difficult to escape" (p. 25).

'Internet Addiction' has been attributed to features of the Internet medium and characteristics of the individual. Young (1996b; 1997; Young, O'Mara & Buchanan, 1999) identified three components of the Internet that contribute to addiction as anonymity, convenience, and means of escape. Internet use can provide relief from off-line problems and an elevated mood state. Chats and MUDs have been cited as the most addictive of virtual environments (Griffiths 1997; Young, 1996b; 1997). Griffiths (1997) attributed this to an increase in self-esteem experienced when social identities adopted are rewarded by others. It is interesting to note that the technological features argued by Griffiths (1995b) to increase addictive potential are noticeably absent from these interactive text-based virtual environments. Wallace (1999) suggested that operant conditioning is in effect in on-line communication in synchronous chats and MUDs. Variable ratio schedules operate where an individual may, or may not, receive a reply to their messages within

a few seconds. An individual can change their persona to increase the ratio of reinforcement.

The potential for addiction has been recognised by both MUD administrators and researchers (Bruckman, 1992; Curtis, 1992; Rosenberg, 1992; Ryan, 1995). Up to 80 hours per week may be spent on-line in MUDs, replacing all other social activities in the individual's life (Bruckman, 1982). Ryan (1995) reported that some long-term MOOers claimed they had lost up to a year of their lives to self-described MOO addiction. Rosenberg (1992) suggested that MOOs are addictive because they offer escapism from the pressures of everyday life. MOOs can become an alternative reality offering freedom to communicate with others and indulge in fantasy. The disembodiment from the physical body allows the user to create a character of their choosing, fulfilling their own ideals or fantasies. Bruckman (1992) argued this makes the social relationships formed less threatening. However, Bruckman cautioned about the need to make the distinction between addictive behaviour and how people choose to spend their time.

Characteristics of the individual that have been associated with 'Internet Addiction' are personality characteristics (Lavin et al., 1999; Petrie & Gunn, 1998; Young & Rodgers, 1998a), an addictive personality (Greenberg, Lewis & Dodd, 1999), and mental health (Young, 1997, Young & Rodgers, 1998b). Based on a study of Internet dependents using the 16PF, Young and Rodgers (1998a) concluded that Internet dependents are private individuals who are self-reliant, prefer solitary activities, and are non-conformists. Petrie and Gunn reported that self-defined Internet addicts were more introverted and had more positive attitudes towards the Internet than other Internet users. Lavin et al. reported that Internet 'dependent' students scored lower on sensation seeking scales than other students.

Greenberg, et al. (1999) examined the tendency for individuals to be addicted to a range of substances and activities. They reported that the tendency to use the Internet addictively was correlated with tendency to use video games ($r=.64$), gambling ($r=.43$), television ($r=.48$) and alcohol ($r=.42$). The findings were interpreted as supporting multiple addictive tendencies. However, the research used a sample of functional college students who were not overtly displaying any problems associated with any of their so-called 'addictive tendencies'.

'Internet Addiction' has also been posited to co-exist with mental health problems. 'Internet Addiction' has been associated with mild to moderate levels of depression (Young, 1997; Young & Rodgers, 1998b). Self-defined Internet addicts report higher levels of depression than non-addicts (Petrie & Gunn, 1998). Hughes (1999) reported a significant correlation between loneliness and Internet use by undergraduate males. However, as these studies were correlational in nature it is difficult to know if long hours on-line are responsible for the depression, or if depressed people seek to alleviate their depression by using the Internet. Pratarelli, Browne and Johnson (1999) suggested that a loneliness and depression cycle might be set up where the Internet is used to decrease symptoms of loneliness and depression, but in turn further isolates the individual.

In addition to depression, recent research suggests that 'Internet addicts' may suffer from a range of psychiatric disorders, or that psychiatric patients may use the Internet excessively. Shapira, Goldsmith & Keck (1998) conducted structured clinical interviews with 10 outpatients experiencing problematic Internet use. All had a history of psychiatric disorders, with an average of 3.8 diagnoses, most commonly bipolar disorder and impulse control disorder. Black, Belsare and Schlosser (1999) conducted psychiatric interviews with 21 self-described compulsive computer users who acknowledged adverse consequences resulting from their computer use. Based on the Diagnostic Interview Schedule 48% had a lifetime psychiatric diagnosis, most commonly a substance use disorder (38%) or a mood disorder (33%). Twenty-nine percent had a current comorbid psychiatric disorder. Differences in comorbidity rates between the two studies may be partially attributable to the differing recruitment methods used. All the research participants in Shapira et al.'s (1998) sample had sought psychiatric treatment, while none of those recruited by Black et al. (1999) had. Taken together, these studies suggest that extended periods of Internet use may in some cases be a symptom of pre-existing mental illness, rather than the cause of mental illness.

Grohol (1998) suggested that other factors that may result in extended periods of Internet use are relationship problems, level of off-line social interaction and employment status. It is, as yet, unknown whether extended Internet use relieves or

exacerbates existing psychopathology and off-line problems. As Grohol (1998) stated:

Within the next few years it will become clear whether these patterns of maladaptive behaviors are the direct cause of the on-line world, or whether turning to the on-line world for refuge and sanctuary is merely a symptom of other, undiagnosed problems in a person's life or a way of coping with those problems (p. 122).

Stern (1999) situated research on Internet addiction within the historical context of concerns of overuse with the introduction of other technologies such as television and video games. Stern (1999) described the concept of Internet addiction as problematic in that it assumes that pathological behaviours expressed using the Internet are completely dependent upon the existence of the Internet. That is, that Internet Addiction exists as a latent disorder prior to the individual connecting to the Internet for the first time. In contrast, Stern argued that for people with an underlying disorder the Internet could provide another avenue for the expression of pathological behaviours. This explanation can account for the range of Internet related behaviours such as Internet gambling (King & Barak, 1999) and cybersex (Delmonico & Carnes, 1999) that have been included as sub-types under the label of Internet addiction.

Current attempts to have 'Internet Addiction Disorder' accepted as a clinical disorder and included in the DSM-V appear, at best, to be premature. The confusion of terms, definitions and measures of 'Internet Addiction', the lack of research into prevalence and severity, the failure to control for possible third factors, and the absence of base-line data on 'normal' behaviour on-line suggest that significant clarification and further research are required before such attempts should even be contemplated. To substantiate 'Internet Addiction' as a mental illness would require published case studies that define the phenomena, standardised measures for controlled studies, and replication of research findings. As Huang and Alessi (1997) noted:

... we must restrain ourselves from offering simplistic 'popular' labels for potentially complex phenomena. While a number of individuals who use computers may manifest symptoms consistent with an 'addiction', labeling it as if it were a new diagnostic entity

may lead to the misdiagnosis of primary psychiatric disorders for which we have proven therapeutic interventions (p. 890).

2.4.5 Virtual communities and sense of community

Sense of community is “a feeling that members have of belonging, a feeling that members matter to one another and to the group, and a shared faith that member’s needs will be met through their commitment to be together” (McMillan & Chavis, 1986, p. 9). Experiencing a sense of community is good for the mental health of individuals within a community. Previous place-based community research has reported that experiencing a sense of community is positively associated with subjective well-being, especially happiness (Davidson & Cotter, 1991), and negatively associated with loneliness (Pretty, Andrewes & Collett, 1994). However, not everybody experiences a sense of community within their place-based communities.

Sense of community has traditionally been associated with groupings of people from discrete geographical areas (e.g., villages, suburbs, towns and cities). Community psychologists have reported a growing disillusionment amongst people in their search for a sense of community and community values in place-based communities (Dunham, 1977, 1986; Glynn, 1986; Sarason, 1974). Sarason (1974) stated his belief that “the dilution or absence of the psychological sense of community is the most destructive dynamic in the lives of people in our society” (p. viii). The hypothesised declining sense of community in place-based communities has been linked to the social development of western societies, increasing industrialisation, and increasingly centralised bureaucracies and government (Glynn, 1986). However, as Hill (1996) noted, there is a lack of longitudinal research documenting this hypothesised decline in sense of community in urban environments.

Disillusionment with place-based communities has resulted in individuals searching for a sense of community in areas other than their geographical communities, reflecting a movement from place, or structurally-based communities to process-based communities (Dunham 1977, 1986), or non-place communities (Webber, 1964). Consistent with this, research in sense of community has expanded from places of residence such as university residences (Pretty, 1990), suburbs

(Wilson & Baldassare, 1996) existing towns (Puddifoot, 1994) and planned towns (Plas & Lewis, 1996), to non-residential places where people interact: schools (Bateman, Newbrough & Goldman, 1997; Pretty, et al., 1994), corporations (Pretty & McCarthy, 1991; Keren & Bond, 1997; Lambert & Hopkins, 1995) and unions (Catano, Pretty, Southwell, & Cole, 1993). Dunham (1986) attributed this movement to the effects of the industrial revolution, increasing scientific knowledge and technological advances enabling rapid communication across distance. Recent technological advances enabling the widespread usage of CMC have opened up the possibility of process-based communities that are not dependent on the geographical location of members.

Virtual communities are dynamic communities, accessed via CMC, and based on shared interests, rather than shared locations (Little, 1993; Wellman & Gulia, 1999). Virtual communities are social constructions, representing information realities rather than physical realities. Rheingold (1994) defined virtual communities as "social aggregations that emerge from the Net when enough people carry on public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace" (p. 5). Jones (1997) outlined four minimal conditions for virtual communities: interactive communication, a minimum of three communicators, a common public space for interaction, and ongoing members. Community on-line is evidenced by shared norms, values and practices (Tepper, 1996; Watson, 1997).

A body of field research is emerging that suggests that individuals are experiencing a sense of community in a range of virtual environments. The development of sense of community has been reported in IRC (Reid, 1993; Surratt, 1996), MUDs (Clodius, 1997), email discussion groups (Kot, 1999), bulletin boards (Dunham et al., 1998), and newsgroups (Baym, 1995; 1997; Phillips, 1996; Tepper, 1996; Watson, 1997). Content analysis of messages of an email network found evidence of the three factors of sense of community (mission, reciprocal responsibility and disharmony) proposed by Bishop, Chertok, and Jason (1997) to underlie psychological sense of community (Kot, 1999).

MUDs have been proposed as bearing the closest resemblance to traditional communities on the Internet (Falk, 1995). MUD communities develop norms and

systems of social regulation. Over time, consensus is reached over acceptable standards of language and behaviour. Turkle (1995) claimed that MUDs fulfil the need for a 'great, good place', providing a central meeting place that is no longer available in the real world.

In addition to experiencing sense of community within a specific virtual environment, some people may experience a generalised sense of community while on-line. Almost half of the respondents to the GVU 8th WWW User Survey (1997) reported feeling more connected to people since coming on-line. The feeling of connection increased with Internet experience. Women were more likely to feel connected with their families and with people with similar life experiences, while men were more likely to feel connected to people with similar hobbies or professions.

Together this research suggests that even where virtual communities do not have a physical manifestation, they exist as communities nonetheless in the minds of their members. A number of questions remain to be answered:

- *To what degree do individuals experience a sense of community in text-based virtual environments?*
- *At what level of virtual environments do individuals experience a sense of community?*
- *What gives text-based virtual environments a sense of community?*

2.4.6 Telepresence in Text-Based Environments:

Virtual environments can be defined in terms of telepresence: the experience of 'being there'. Steuer (1992) defined telepresence as "the extent to which one feels present in the mediated environment, rather than in the immediate physical environment" (p. 74). Telepresence, thus, refers to the perceptual experience of the individual, rather than to the technology itself. Prothero, Parker, Furness and Wells (undated) describe telepresence as occurring when the individual transfers their attention from situational cues in the physical environment to cues in the virtual reality.

Whether an individual experiences telepresence in a virtual environment is dependent upon characteristics of both the individual and the virtual environment. Individuals within the same virtual environment may differ in the degree of

telepresence experienced. Self-reports of telepresence contain two separate dimensions: the feeling of being in the virtual environment, and the notion of not being in the physical environment (Kim & Biocca, 1997). This suggests that telepresence is experienced on a continuum. Supporting this view, Heeter (1995) noted that across different virtual environments, approximately 25% of users are fully engaged in the virtual reality, 25% remain strongly situated in their physical reality, and the remaining 50% retain a balance between the physical and virtual reality. The degree of telepresence experienced by an individual is not static, but fluctuates over time with changes in sensory cues from the physical and virtual environment (Biocca, 1997).

Dimensions of virtual environments that affect the level of telepresence experienced are vividness (sensory richness), degree of interactivity, and the number of people present within the virtual environment (Steuer, 1992). The number of sensory dimensions (breadth) and their degree of resolution (depth) determine vividness. Interactivity is affected by speed of interaction, range of opportunities for interaction, and the degree of realistic mapping of actions to outcomes. 'Real time' in virtual realities equates to less than .1 of a second, or 'perceived simultaneity' (Piantanida, undated). Higher levels of vividness and interactivity, and the presence of others within the virtual reality are associated with enhanced telepresence (Steuer, 1992).

Little research has been conducted into characteristics of the individual that affect the experience of telepresence. One individual trait frequently cited as affecting telepresence is the willingness of the individual to 'suspend disbelief' (Biocca & Levy, 1995a; Heeter, 1995; Reid, 1994; Ryan, 1994; Steuer, 1992). Heeter (1995) referred to this as the 'Peter Pan principle', claiming the experience of telepresence required "a rather outrageous leap of faith, to transfer your sense of self into a world on the screen" (p. 200). Many forms of entertainment (e.g., novels, films) rely on the suspension of disbelief to project the individual to another imaginary world (Biocca & Levy 1995a). Imagery ability, or imagination, may also be a factor affecting telepresence.

Much previous research into telepresence has focused on three-dimensional virtual reality environments, where users are required to don specialised equipment

such as head mounted displays and data-gloves. In contrast, text-based virtual environments require no specialised equipment other than a keyboard and computer connected to the Internet.

Text-based virtual environments can be examined in terms of Steuer's (1992) dimensions of interactivity, vividness and number of people present. Interactivity is high as these environments provide for synchronous communication, although the time taken to type messages and commands combined with system related lag mean that this is seldom realised. The depth and breadth of vividness is limited as all interaction occurs in text. Numerous people can interact simultaneously on MUDs and chats. Steuer (1992) rated synchronous chats and MUDs as high in interactivity and low in vividness.

Telepresence within these text-based virtual environments may best be conceptualised within the sociocultural conception of telepresence proposed by Mantovani and Riva (1999). Using this perspective, telepresence is experienced when individuals perceive themselves as immersed in virtual environments that provide a social and cultural context for the individual to interact with people and objects.

Synchronous chat environments have been described as "a primitive form of telepresence or virtual reality" (Wilbur, 1994). Chats enable users to 'talk' (type), and perform actions, but not to modify the virtual environment. Holmes (1995) argued that the use of spatial references and actions that include other users increased telepresence in chat environments by creating an illusion of place and proxemics. He regarded this sense of virtual space as 'indeterminate and ephemeral', in direct contrast to the 'determinate and enduring' virtual space in MUDs.

MUDs enable users to talk, perform actions, create and describe a character, and build and modify the virtual environment. Immersion in a MUD requires the individual to focus their attention away from off-line life to the textual occurrences on the MUD (Ito, 1997). Reid (1994) noted that the virtual environments of MUDs become 'real' to users. The individual's perception of the virtual environment as real suggests a high degree of telepresence. In the only published study to date of the prevalence of telepresence in text-based virtual environments Towell and Towell

(1997) reported that 69% of 207 MOOers surveyed experienced a sense of presence in MOOs.

Given the paucity of research into telepresence in text-based virtual environment, the following questions remain:

- *What degree of telepresence do users experience in text-based virtual environments?*
- *What factors affect the degree of telepresence experienced?*
- *What effect does the presence, or absence, of telepresence have on the processes of social interaction?*

2.5 Use of virtual environments over time

Few studies have examined the effect on individuals of Internet use over time. The three published studies to date (Bier, Sherblom & Gallo, 1996; Dunham et al., 1998; Kraut, Patterson, Lundmark, Kiesler, Mukophadhyay & Scherlis, 1998) have all provided research participants with computers and Internet access. Each of these studies is reviewed below.

Bier et al., (1996) provided six low income families with the loan of computer equipment and modem and free Internet access, training and technical support for an unspecified period. They noted that over time the Internet became part of everyday life for the families involved, and resulted in positive effects on personal identity, increased self-confidence, and increased number of friendships.

Dunham et al., (1998) provided 42 young single mothers with computers and access to a computer-mediated social support network for six months. The mothers provided each other with emotional, informational and tangible support. Over time regular users of the network developed close personal relationships, a sense of community, and reported a decrease in parenting stress.

In the most comprehensive longitudinal study to date, Kraut et al. (1998) provided 73 households from 8 neighbourhoods in Pittsburgh, Pennsylvania with a computer, software, telephone line, free Internet access and training in return for participating in their research. Pretest measures included demographic, social involvement, and psychological well-being measures. Internet usage was logged. Follow ups were conducted at 12 and 24 months with post-test measures of social

involvement and psychological well-being. The completion rate over the period of the study was 66%.

A major finding of the study was that Internet use negatively impacted on social involvement and psychological well being. Higher Internet use was associated with decreases in family communication and size of social circles, and increases in depression and loneliness. The authors hypothesised that social disengagement was the causal mechanism for the findings, resulting from the displacement of off-line social activity and strong tie relationships with Internet use and superficial (weak-tie) relationships. While concluding the Internet had a negative effect on social involvement and psychological well being, they noted that for the socially isolated, Internet use might increase social participation and psychological well-being.

These results are very different from those obtained by Katz and Aspden (1997) in a cross-sectional survey of 2500 Americans. After controlling for demographic differences, no statistical differences were found in participation rates in religious, leisure, and community organizations between Internet users and non-users. Of the 600 Internet users surveyed 88% reported no change, 6% reported increased time and only 6% reported decreased time spent with friends and family. Internet use supplemented rather than replaced off-line social connections.

Earlier papers by Kraut and colleagues (Kraut, Mukophadhyay, Szczypula, Kiesler, & Scherlis, 1998; Kraut, Scherlis, Mukophadhyay, Manning, & Kiesler, 1996) based on the same longitudinal study reported on Internet use over time. Internet use was initially strong, then fluctuated over time with declines during school vacations and increases during the school year (Kraut et al., 1996). Participants used email more frequently than the Web, usually accessed email before accessing the WWW, but spent longer per session on the Web than using email. Email use was more stable than WWW use. Research participants who used email more than the WWW were more likely to continue using the Internet throughout their first year, with low email users typically dropping out during their first three months on-line (Kraut et al., 1998). These findings highlight the primary role of communication in home Internet use.

This program of research has been criticised on a number of grounds. Shapiro (1999) contended that a major methodological flaw in Kraut et al's (1998) study was

the selection of research participants who were likely to experience a decline in social contacts over the course of the study. One group of research participants were graduating high school students and their families, who were likely to experience reduced social contact as a result of the individual leaving home and school to attend university. The other group of research participants was the families of individuals selected on the basis of their board membership of local community development organisations. Given their selection on the basis of a very high level of community activity, a regression to the mean effect was likely over the period of the study. In response, Kiesler and Kraut (1999) argued that while these factors may explain group differences, they do not explain why individuals who used the Internet most experienced the greatest declines.

Rierdan (1999) argued that the measure of depression used (15 items from the Center for Epidemiological Studies Depression Scale, CES-D; Radloff, 1977) may not measure depression so much as undifferentiated psychological distress. Group scores for both pre- and post-tests indicated low levels of distress. Rierdan calculated the effect size for the relationship between hours of Internet use and post-test CES-D scores. The effect size of .15 indicated that Internet use accounted for little of the change in distress. In response, Kiesler and Kraut (1999) accepted that depression did not reach clinical levels based on group scores, but argued that even a small negative change in psychological well being was socially significant.

Given the conflicting findings of the longitudinal studies conducted to date, further research is clearly indicated. Small sample sizes and the use of convenience sampling also hamper the generalisation of the studies' findings to the general Internet population. In addition, research participants in these studies cannot be considered typical of Internet users. First, they were specifically selected because they did not have Internet access. Second, in at least two of the studies (Bier et al., 1996; Dunham et al., 1998) the research participants did not have the economic means to purchase the equipment necessary for Internet access. Third, research participants in Kraut et al.'s (1998) study reported very low connection times (on average less than 3 hours per week). Research using new Internet users who have connected to the Internet through their own choice and means may obtain different results.

- *How does Internet use change over time?*
- *What effect does Internet use have on psychological well-being?*

2.6 Summary

Why is CMC being used for social interaction, the formation of relationships and socioemotional communication when it lacks the social cues considered of primary importance in theories of relationship development and media use? This literature review has highlighted the failure of these theories to account for the high level of socioemotional interaction in text-based virtual environments reported in field studies. With the exception of research into 'Internet Addiction', notably absent in research to date has been any exploration of the relationship between personal characteristics of users and characteristics of text-based virtual environments in explaining socioemotional communication.

The overall aim of the research presented in this thesis is to examine how characteristics of the individual interact with characteristics of the CMC medium to enable socioemotional communication and behaviour in social text-based virtual environments. As a first step towards meeting this aim, social interaction within two text-based virtual environments will be examined.

Two genres of virtual environments, IRC and MOOs, were selected as the contexts for this research. Both provide synchronous communication in social text-based environments, but differ in the degree to which the user can modify the environment. IRC provides a transient environment that is not permanently modifiable by the user. An individual can create a channel and select a nickname to use, but these changes exist only for the period that the user is logged in. In contrast, MOOs provide virtual environments that are permanently modifiable by the user. Individuals can create, name, gender and describe identities and objects that will continue to exist even when their creators are not logged into the MOO. The next chapter outlines the methodology to be adopted in conducting this research.

CHAPTER 3. RESEARCH METHODOLOGY I

3.1 Introduction

As an emerging area of psychological research, there are no established methods for the study of social interaction in virtual environments. This chapter addresses issues relating to the selection of research settings and methodologies for conducting such research. Grounded Theory (Glaser & Strauss, 1967) methodology with the researcher as participant observer was selected as the optimal methodology for use in Studies One and Two.

3.2 Conducting research on virtual environments

The study of social interaction in virtual environments is a new area of psychological research. In the absence of established methods for studying the phenomenon the first question that arises is whether research into social interaction in virtual environments should be conducted on- or off-line. That is, should research be conducted using computer-mediated communication (CMC) within the virtual environments where the social interaction occurs, or should it be conducted using traditional media in off-line settings? This section starts by describing how the research could be conducted in on- and off-line settings. The potential advantages, disadvantages and issues of conducting this research in on- and off-line settings is explored. The section concludes by proposing a mix of research settings for the research conducted in this thesis.

3.2.1 On-line versus off-line research

The primary focus of this research is to examine social computer-mediated interaction. When researching social interaction in on-line settings, most stages of the research process can be conducted either on- or off-line. Research participants can be recruited through traditional media, such as articles or advertisements in newspapers, radio, or on notice boards. Alternatively, they can be recruited on-line through postings to newsgroups, discussion lists, web pages, or through direct contact in synchronous virtual environments. Once research participants have been recruited, data collection can also take place on- or off-line. In off-line settings interviews can

be conducted face-to-face (FTF) or over the telephone. Surveys and questionnaires can be administered in person or through the post. On-line, interviews can be conducted using CMC in text, audio or audio-visual settings. Given the choice of settings available for conducting social computer-mediated communication research, it is useful to examine the advantages, disadvantages and issues associated with the use of each setting.

3.2.1.1 Conducting research on-line

Limited psychological research has been conducted within on-line settings. Using the Internet to conduct psychological research is a recent phenomenon. As such, there are few established 'rules' and many areas of uncertainty. The advantages and disadvantages of conducting research within on-line settings are outlined below. Issues that need to be addressed when conducting research on-line are highlighted.

3.2.1.1.1 Advantages

The first advantage of conducting research on-line is the ease of sampling and recruiting research participants from the population of interest. On-line communities such as MUDs and MOOs consist of programmable databases where all members are identified by unique object numbers. Random sampling can be conducted by writing computing programs that interrogate the database (see for example, Parks & Roberts, 1998; Roberts & Parks, 1999). Within MUDs and MOOs internal electronic mail systems and discussion lists enable researchers to directly contact potential research participants individually or in groups.

Other possible Internet forums for recruitment are newsgroups, links from meta-pages, and paid advertisements on busy sites (Batinic, 1997). The large population of Internet users makes it especially useful for recruiting members of specialized populations (e.g., people with rare psychological or medical conditions), as the hierarchical organization of newsgroups enables easy access to specific populations of interest (Hewson, Laurent & Vogel, 1996; Smith & Leigh, 1997).

A major advantage of conducting CMC research in on-line settings is that the research is conducted within the behavioural setting of interest. Conducting research using CMC within the setting of interest increases researchers' exposure to the phenomenon of interest, contextualises their understanding, and provides first hand experience of the opportunities and constraints imposed by the communication medium. Conducting research in on-line settings enables research participants to take part in research within an environment in which they are comfortable. If being

interviewed on-line by a researcher who appears proficient in using CMC and knowledgeable about the virtual environment of interest, the research participant will not be required to 'interpret' what they have to say, given the base-line of shared knowledge of the context and communication medium.

Another major advantage of Internet research is that it can be time, resource and cost-effective. The dispatch and turn around time in electronic research is faster than that for off-line research (Kiesler & Sproull, 1986; Mitchell, Paprzycki & Duckett, 1994; Thach, 1995). The requirements for physical space, resources and paper are diminished. Internet research removes the need for a physical laboratory and the continued presence of researchers. The time, resources and human error associated with data-entry are reduced or removed (Batinic, 1997). There are no transcription costs for interviews conducted on-line in text and logged, and the logs are in a format suitable for entry into qualitative analysis programs with minimal editing. The reduction in resources, time, cost and human error associated with conducting research over the Internet is a major advantage of conducting research on-line.

A further advantage of text-based on-line research is the reduction of demand characteristics associated with off-line research. This is achieved through increasing both research participant and experimenter anonymity. The physical absence of the researcher from the research environment can reduce experimenter bias. The voluntary nature of participation is enhanced in on-line research. Removed from the demand characteristics associated with the researcher's presence, individuals are free to decide whether or not they wish to participate, and can participate at their own leisure. It is far easier for a research participant to withdraw consent and discontinue an experiment when sitting alone in front of their computer, than it is to walk out of an experiment in front of an experimenter and possibly peers. This has the potential to improve the quality of data collected as 'forced' research participation is removed (Foster, 1994; Hewson, et al, 1996; Reips, 1996; Smith & Leigh, 1997).

The visual anonymity of Internet survey responding may also decrease social desirability responding and increase self-disclosure. Joinson (1999) compared social desirability responding on WWW and pen-and-paper surveys in anonymous and non-anonymous conditions. WWW surveys yielded lower social desirability scores than pen-and paper surveys, with WWW surveys completed anonymously yielding the lowest social desirability scores.

While there is currently limited published research on social desirability responding in Internet research, there is a body of research that has examined the effect of computer administration of surveys on impression management. While some research has found no differences in social desirability responding between paper-and-pencil and computer administered surveys (Booth-Kewley, Edwards & Rosenfeld, 1992; Finegan & Allen, 1994), others have noted less socially-desirable responding on computer administered surveys (Kiesler & Sproull, 1986). Rosenfeld et al. (1991) noted that it was high self-monitors who gave more socially desirable responses on pen-and-paper questionnaires than on computer surveys, with computer surveys eliciting higher candor in areas of greater sensitivity. Computer administration also increased self-disclosure, although the size of this effect was found to be declining over time, a factor attributed to the public's growing acceptance of, and knowledge about, computers (Weisband & Kiesler, 1996).

3.2.1.1.2 Disadvantages

While the advantages of conducting research on-line make it an attractive proposition, there are also disadvantages to using on-line research settings. Research using the Internet is subject to a number of technical limitations imposed by the technology. Research in a networked environment such as the Internet occurs in an environment of inherent instability. A connection to all points on the network can never be guaranteed. Even where connections are successfully made, 'lag' time can sometimes make the completion of research infeasible. In addition research participants may have time or response limited Internet accounts, affecting their ability to remain on-line for long periods of time for research purposes. Software applications place constraints on the layout and content of on-line research measures. Internet users vary in the software they use, and this may not always be compatible with the software used by the researcher.

In addition to limitations imposed by the technology, human factors can constrain the efficacy of on-line research. Research is reliant on the cooperation and good will of server and site administrators. Participation in on-line research may be constrained by characteristics of the research participant and their environment. Responding may be affected by the research participant's typing speed, ability to express ideas in writing, and experience with the Internet and software being used. In addition, research participants may be subject to both distractions in their off-line environment (e.g., interruptions, phone calls) and distractions in their virtual

environment (e.g., messages or emails from other users). The research participant may choose to engage in other activities while completing research, diminishing their attention to the completion of the research.

Further disadvantages of conducting research on-line relate to the need for researchers to have the necessary computing resources, computing skills and experience in interacting in computer-mediated environments. First, researchers must have access to suitable equipment and software. The minimum hardware requirement is a computer with a permanent connection to the Internet. If conducting WWW surveys, a bandwidth of 64 kilobits per second is recommended for predominantly text-based experiments, and access to a mirror site recommended in case of technical difficulties. Software requirements include a web-server program and Common Gateway Interface (CGI) applications (Reips, 1996). Second, researchers need the computing skills to access and interact within computer-mediated environments. The type of research undertaken determines the specific skills required. Third, researchers need to learn about, and comply with the 'netiquette' (the etiquette for Internet use) of the virtual environment concerned. Familiarity with, and adherence to, the netiquette and social norms of virtual environments increase the acceptance of the research and researcher.

3.2.1.1.3 Issues

There are a number of, as yet, unresolved issues associated with conducting research in on-line settings. A major methodological issue is the unknown effect of WWW administration on the psychometric properties of pen-and-paper measures. On-line research introduces new ethical issues inherent to the medium. Jones (1994) noted that ethical dilemmas arose when attempts were made to translate existing ethical guidelines to on-line research. Four ethical issues that require extra consideration in on-line research are the assumption of privacy, the protection of pseudonyms, processes for obtaining informed consent, and the security of data collected. Each of these issues is outlined below.

A major issue that arises in conducting survey research on-line is the effect of administering surveys over the World Wide Web on the psychometric properties of psychological measures. Limited published research addresses this issue, but early results are encouraging. Similar psychometric properties have been reported for measures of self-monitoring and self-trust using pen-and-paper and WWW administration (Buchanan & Smith, 1999; Pasveer & Ellard, 1998). Further support

for the stability of measures across modes of administration is provided by studies comparing pen-and-paper and computer administration of surveys. In a review of the literature, Rosenfeld et al. (1993) concluded that while some studies have reported differences by mode of administration, overall pen-and-paper and computer administered surveys of non-aptitude psychological measures do not produce dissimilar responses. Most differences found on personality tests such as the MMPI, EPI, 16PF, and CPI were attributable to the different response options offered, rather than the actual mode of administration. Keyboard design, screen size, screen illumination and processing speed of respondents' computers do not affect survey responses (Rosenfeld et al., 1989).

The issue of assumption of privacy revolves around the blurred distinction between public and private space in virtual environments. Various attempts have been made to distinguish between the public and the private. For example, Lessig (1995) formed a typology of forms of association in cyberspace: association in public (newsgroups and bulletin boards), association in private (private chats), and association in construction (MUDs). However, there currently exists no general agreement over what constitutes public and private space in on-line environments.

The most public form of communication on the Internet occurs in newsgroups, as anyone with Internet access can read these. Despite this, newsgroup postings can be, and frequently are, high in self-disclosure (e.g., Salem, Bogat & Reid, 1997). Posters to newsgroups have varying expectations as to the privacy of their communication. In a survey of posters to sex-related newsgroups, nearly half of the respondents (47%) believed the medium to be private, while only 35.3% perceived their postings to be public or extremely public (Witmer, 1997). Despite the varying perceptions of privacy by users of newsgroups, Bordia (1996) claimed an advantage of on-line research is that it can "allow unobtrusive observation in a setting that is ethically defensible" (p. 149) on the basis that "presumably the participants were aware that their verbalisations were public domain" (p. 150). In direct contrast, Duncan (1996) argued that obtaining data without the express permission of the individuals involved is an invasion of their privacy.

The presumption that on-line communication occurs in public space results in an anomaly in how research participants are treated in equivalent settings in on-line and off-line research. One pertinent example is psychological research on communication in support groups. Obtaining informed consent from research

participants in off-line support groups prior to the collection of data is a requirement under current ethical guidelines. In contrast, where newsgroups are set up as support groups individuals may neither be advised that their communication is being studied, nor may informed consent be obtained, on the ground that all postings are public documents (see for example Salem et al.'s 1997 study of a depression support group).

There are currently no clear guidelines for psychological researchers on what constitutes private versus public space in virtual environments, yet the distinction is important as it affects the rights of participants to be advised of the nature of the research and to give or withhold their informed consent. Given the absence of such guidelines the research presented in this thesis adopts the conservative view that consent should be obtained from the individuals involved before using material obtained in virtual environments.

Many on-line users adopt a pseudonym (or pseudonyms) for use in virtual environments, which on the surface appears to provide a high level of anonymity to the individual. It can be argued that research involving pseudonymous characters is exempt from regulations governing human subjects as 'true' or off-line identities are not known (Jacobson, 1999a). However, many factors act to decrease the level of anonymity a pseudonym provides. In some cases, individuals use pseudonyms that are nicknames and may be recognizable by others who know them off-line. In on-line settings identifying information about off-line identities may be self-disclosed or actively sought (Allen, 1996; Jacobson, 1996). The same pseudonym may be used in a range of on-line environments that vary in their requirements for off-line identification details (Jacobson, 1999a). The combination of these factors means that researchers cannot assume that pseudonyms provide adequate protection for off-line identities.

Attempts to verify the off-line identities of on-line pseudonymous characters are hindered by the use of some pseudonyms by more than one individual, and the possibility that more than one person may have access to, and use, a single pseudonymous character (the 'typist problem', Jacobson, 1999a). However, given the possible linkages between pseudonymous on-line and off-line identities, the greatest protection to the identity of research participants is afforded by keeping both 'real-life' names and on-line pseudonyms confidential.

Having argued above that pseudonymous on-line identities are not exempt from human subjects' regulations, the next ethical issue revolves around methods of obtaining informed consent for on-line research participation. Obtaining informed consent in off-line settings usually involves providing potential research participants with an information sheet about the proposed research, explaining the research, answering any questions, and obtaining a signature on a consent form. In on-line research, these procedures cannot easily be followed as the researcher and research participants are frequently geographically dispersed. In addition, research participants may be reluctant to divulge details of off-line identities necessary for the posting of information and consent forms.

Jacobson (1999a) outlined three methods for obtaining informed consent for on-line research where the completion of documentation off-line is not possible. The first method involves obtaining informed consent by email. Signatures in a digitalised form can now be transmitted by email, although many research participants may not have access to the technology required to do this. A further disadvantage of this method is that research participants are required to provide their email address, constituting a link to their off-line identity. The second method involves the obtaining of implied consent. Implied consent is inferred when an individual takes part in a research activity after reading information about it. For example, surveys on the WWW can be set up so that the gateway to a survey is an information page that requires interested individuals to click on a button to indicate they have read the information and consent to taking part in the research. The third method involves the creation of an electronic document by computer logging the information supplied by the researcher and the consent of the research participant. Selection of a method for obtaining informed consent will be dependent upon the virtual environment used, the level of anonymity required by research participants, and their access to high-level computing facilities.

Maintaining confidentiality and security of data collected in computer-mediated research poses unique difficulties. In on-line research, confidentiality relies upon data-security. Confidentiality may be breached at the site of data collection, during transmission of data, or in the storage of data. Sites at which data is collected may not be secure. For example, wizards (administrators) on MOOs can monitor all activity occurring, and access data stored, within their MOO. This can include 'listening in' on interviews conducted on-line. The use of surveillance tools on

MOOs by non-wizard players is also possible. Confidentiality of data may be breached during data transmission where another party intercepts data. This may include, but is not constrained to, the service provider of the research participant or researcher. Employers may also monitor employees' email (Sipior & Ward, 1995; Weisband & Reinig, 1995). Confidentiality of data may be breached during storage of data where hackers may access files stored on unprotected or poorly protected computer systems.

On-line researchers need to provide the most secure form of communication possible, aiming to minimize the risks of unauthorized persons gaining access to research data. Care should be taken to ensure that the highest degree of privacy possible is provided. The procedures used to obtain this will differ according to the virtual medium used. For example, on IRC, Direct Client to Client contact is more secure than communication in channels. In MOOs, commands exist to 'lock' rooms, and to sweep for surveillance tools. Emails can be encrypted before transfer (although this may be difficult to implement where research participants do not have the required knowledge or equipment). Data files can be password protected. While none of these steps may deter a determined hacker, they will at least protect data from those with only a casual interest.

3.2.1.2 Conducting research off-line

While conducting psychological research off-line has a long history, conducting such research on social CMC does not. The advantages and disadvantages of such an endeavor are outlined below.

3.2.1.2.1 Advantages

The major advantage of conducting off-line research into social CMC is the long history of conducting psychological research in off-line settings. Methodologies and procedures for conducting research in off-line settings have been developed and refined. Most measures have been developed and validated for use in off-line settings only. This history provides researchers with specific guidelines for conducting their research

A further advantage of off-line research is the access to multiple cues when conducting FTF research. For example, interviewing on-line in text-based virtual environments provides only written text to analyze. In contrast, FTF interviews provide access to a range of verbal and non-verbal cues. These cues aid in the interpretation of utterances.

Finally, the study of on-line social interaction in off-line settings may aid in conceptualizing on-line social interaction as just one activity within research participants' live. As Jones (1999) argued: "The Internet does not exist in isolation. To study it as if it was somehow apart from the 'off-line' world that brought it into being would be a gross mistake. Internet users are as much a part of physical space as they are of cyberspace..." (p. xii).

3.2.1.2.2 Disadvantages

In comparison to research conducted on-line, off-line research has a number of disadvantages. First, off-line research is time and resource intensive. Off-line recruitment of research participants using post or telephone is slower and more costly than email messages and postings to newsgroups. Interviews conducted off-line need to be recorded and transcribed. Unless specifically set up for computer administration or using forms set up for optical scanning, most survey data has to be manually entered.

Second, off-line research into CMC entails removing the behaviour from the setting in which it occurs. For example, laboratory based studies may require research participants who are unknown to each other to interact in an artificially constructed computer-mediated group. Sudweeks and Simoff (1999) identified three problems with laboratory based Internet research: strong demand characteristics for completing the research, the small sample size of studies, and the use of FTF interaction for a comparison group. The development of social CMC is likely to differ as a function of the setting.

Third, conducting off-line research into computer-mediation assumes that research participants are willing and able to articulate their experiences within a different setting where social mores may be very different. Some individuals attempt to keep their on- and off-line identities separate and may refuse to take part in any research which provides a connection between these identities. Off-line research removes the anonymity highly cherished by many on-line users. When interviewed off-line, an individual may be too embarrassed to fully describe their on-line activities

3.2.2 Combining on- and off-line research

Research into social CMC does not have to be confined to one setting. In order to optimize the advantages and minimize the disadvantages of the two research settings, the research presented in this thesis is conducted within both on- and off-

line settings. The use of both settings enables the comparison of results in order to identify differences attributable to the media used. The next section examines the methodology to be used in conducting research within on- and off-line settings.

3.3 Selecting a methodology

The literature review in Chapter Two highlighted the paucity of psychological research to date on the use of CMC in social virtual communities. Indeed, the majority of research reviewed postdated the conceptualization and conduct of the research presented in this thesis. As a new area for psychological research, there were no established methods or measures for conducting psychological research on-line. A research design was sought that would allow for the generation and testing of hypotheses for this new area of study.

Researchers have recommended the use of qualitative methods for early research into non-place based communities (Chavis & Pretty, 1999; Fernback, 1999, Thompsen, Straubhaar & Bolyard, 1998). Chavis and Pretty suggested the use of participant observation and qualitative methods to examine sense of community within communities that are not based on physical community. Thompsen et al. recommended the use of multiple methods and sources when researching virtual environments, including participant observation, qualitative interviews, and text and discourse analysis. Fernback recommended a Grounded Theory (Glaser & Strauss, 1967) approach be adopted for research into on-line communities. What these approaches share in common is the requirement for the immersion of the researcher within the community of interest.

Grounded Theory is a qualitative research methodology that uses systematic procedures to develop inductively derived theory grounded in the data collected about the phenomena of interest, resulting in the development of testable hypotheses. Grounded Theory differs from other forms of qualitative research in its emphasis on conceptualization and theory development rather than just description (Strauss & Corbin, 1990). Grounded Theory is most suited to the development of theory in new areas of study, for which there is little research literature available. Hypotheses developed during a Grounded Theory study can later be tested using quantitative or qualitative research (Glaser, 1992; Glaser & Strauss, 1967; Olshansky, 1996).

As noted in the literature review the social use of CMC in text-based virtual environments is a new research area that has received little attention from

psychological researchers. As such, it is an area ideally suited to the use of Grounded Theory methodology for the development of theory and testable hypotheses. Consistent with the recommendations for the adoption of qualitative research methods for studying on-line communities above, Grounded Theory methodology was selected for use in the first two studies examining social interaction in MOOs and IRC.

3.4 Grounded Theory

Grounded Theory provides a methodology for developing inductively derived theory. The research process begins when the researcher identifies an area of interest about which little is known. A variety of techniques ranging from interviews to field observation can be used to collect data. Theoretical sampling (explained below) is used to select research participants who are good sources of information on the phenomena of interest. In Grounded Theory research, the processes of data collection, data analysis and theory development are closely tied. Coding, using the constant comparative method, begins as soon as data is collected. From the coded data categories are developed and refined. Memos and diagrams are used throughout the coding process to aid in the analytic process. A core category is selected and forms the central theme of the research. The theory emerges from, and is grounded in, the data (Glaser & Strauss, 1967).

3.4.1 Approaches to Grounded Theory research

The Grounded Theory approach was developed by two American academics: Barney Glaser and Anselm Strauss. Since the publication of their seminal work on Grounded Theory: "The discovery of Grounded Theory: Strategies for qualitative research" (Glaser & Strauss, 1967), two streams of Grounded Theory have emerged representing the divergent approaches of Glaser (Glaser, 1978, 1992, 1998) and Strauss (Strauss & Corbin, 1990, 1998). The growing differences between the Glaser and Strauss schools of Grounded Theory have been widely commented on (see for example Melia, 1996; Kendall, 1999; Robrecht, 1995; Stern, 1994). The differences culminated in an acrimonious book by Glaser (1992) that stated that Strauss was no longer using Grounded Theory, but had developed a new methodology altogether. The similarities and differences between the two streams of Grounded Theory methodology are outlined below.

3.4.1.1 Similarities in approaches

Both approaches to Grounded Theory share the fundamental techniques of methodology developed by Glaser and Strauss (1967). These are the use of theoretical sampling, constant comparative data analysis, theoretical saturation, memo writing, identification of a core category and theoretical sensitivity (Annells, 1997b). Each of these techniques is discussed below.

Grounded Theory methodology uses theoretical sampling for the selection of research participants. Theoretical sampling is based on the assumption that members of the population of interest vary in their knowledge of, and experiences in, the topic of interest, and in their ability and willingness to reflect upon and articulate their knowledge and experiences (Morse, 1986; 1989). The selection of research participants using theoretical sampling is driven by the stage of research and the emerging theory. As theoretical sampling is driven by the emerging theory, it cannot be predetermined (Becker, 1993). The first research participants selected are chosen for their apparent representativeness of the population, in order to identify the central elements of interest. Further cases are selected according to categories of interest that arise from the constant comparative analysis of data. Negative cases (individuals who have had experiences different from the norm) are purposefully sought in order to determine the full range of experiences (Green, 1998; Morse, 1986; 1989).

In Grounded Theory research, the processes of data collection and data analysis are intertwined. As soon as the first piece of data is collected, the coding process begins. The coding of data is a continuous process that uses constant comparative analysis. Constant comparative analysis involves the constant comparison of data, the continual categorization of data as it is collected, and the continual development and refinement of categories (Glaser & Strauss, 1967). The search for negative cases using the constant comparative method aids in theory development (Green, 1998). Theoretical sampling on a category ends when saturation occurs, and the category is fully described and integrated into the developing theory (Glaser & Strauss, 1967; Glaser, 1978). Saturation is said to occur when consistent patterns emerge from the data and continuing data collection reveals no new information (Morse, 1995).

Memos and diagrams are created and edited throughout the coding process to aid in the analytic process. Memos provide a written record of the development of thinking about codes, categories and the emerging theory. Diagrams graphically

depict thinking about the relationships between categories (Strauss & Corbin, 1990). The process of coding, writing memos and creating diagrams results in theory development that is grounded in the data.

Identification of a core, or central category represents the first step in integrating a theory. The core category represents the main theme of the research findings, and can explain much of the variation in the data. All other categories are subsumed by the core category (Glaser, 1978; Strauss & Corbin, 1998).

One type of core category is a Basic Social Process (BSP; Glaser, 1978). A BSP is a core category that delineates a process of at least two stages that emerge from the data. There are two subgroups of BSPs, Basic Social Psychological Processes (BSPP's) and Basic Social Structural Processes (BSSP's). BSPP's represent social psychological processes and aid in understanding behaviour. In contrast, BSSP's refer to social structure processes (e.g., bureaucratization).

The quality of the emergent theory is dependent on the theoretical sensitivity of the researcher. Strauss and Corbin (1990) defined theoretical sensitivity as the "ability to recognize what is important in data and to give it meaning" (p. 46). In Grounded Theory methodology, theoretical sensitivity to nuances of meaning in the data is a product of knowledge of the relevant literature, related professional and personal experiences, and adherence to the analytic process. Technical and non-technical literature can be used to inform theoretical sensitivity by providing a theoretical framework, guiding theoretical sampling and the questions asked, providing secondary sources of data, and providing a form of validation for research findings (Strauss & Corbin, 1990).

Using Grounded Theory methodology, different levels of theory can be developed. A substantive theory can emerge from Grounded Theory research within one specific context. Where the research expands to cover new populations, settings and situations a formal theory can be developed (Glaser & Strauss, 1967; Strauss & Corbin, 1990). The level of theory developed will vary according to the needs of the researcher.

3.4.1.2 Differences between approaches

Melia (1996) identified four main differences in the Glaser and Strauss approaches to Grounded Theory. First, the nature of the research question differs. For Glaser, the research question emerges from the data. In contrast, Strauss states the research question is a statement of the phenomenon to be studied and is identified

prior to data collection beginning. Second, the approaches vary in the way initial coding of data begins. Using the Strauss approach data is conceptualised at the unit level as the first step in the process, while the Glaser approach argues that the conceptualizing comes from comparing data, not from individual observations. Third, the approaches vary in their positions on the emergence of theory from data. Glaser claimed that Strauss and Corbin (1990) have moved away from the original conception of allowing the theory to emerge from the data, and now operate from preconception and verification procedures rather than discovery. Finally, Strauss and Corbin (1990) have dropped the notions of the saturation of categories and basic social processes, central components of the original Grounded Theory methodology.

The two streams of Grounded Theory adopt different philosophical positions. Grounded Theory has its roots in the philosophy of symbolic interactionism, the ontology of critical realism, and the epistemology of the post-positivist inquiry paradigm. As such, classic Grounded Theory focused on the systematic generation of Grounded Theory aimed at discovering “true meaning” (Glaser, 1992, p. 55). Hypotheses generated from the grounded theory were subject to verification in future quantitative or qualitative research.

With the recent changes and reconceptualization suggested by Strauss and Corbin (1990), Grounded Theory is moving towards a constructivist inquiry paradigm, a relativist ontology, and subjectivist epistemology. From this perspective, a grounded theory aims to interpret reality through the eyes and experiences of the researcher. The grounded theory is both created and verified during the research process, rather than requiring verification from later research (Annells, 1996, 1997a).

3.4.2 Selecting a mode of Grounded Theory

Annells (1997b) recommended that in selecting the mode of Grounded Theory to be used, the researcher consider a range of issues. These include the researcher’s ontological and epistemological beliefs, the proposed outcome of the enquiry (e.g., the generation of grounded hypotheses or verified theory), the theoretical framework of the research, and how postmodern concerns relating to the representation of the ‘other’ and legitimation will be addressed. The mode of Grounded Theory used should be compatible with each of these issues.

Annells (1997b) presented five options for the mode of Grounded Theory that can be used. Researchers may use either of the two published versions of Grounded Theory (classic Grounded Theory, Glaser & Strauss, 1967 or the reformulation

offered by Strauss & Corbin, 1990). Alternatively researchers may adapt either version of Grounded Theory based upon their research paradigm, mix procedures from both versions, or adopt new procedures altogether.

The research in this thesis adopts the first option identified by Annells (1997b) and adheres to the premises of classic Grounded Theory as outlined by Glaser and Strauss (1967). The research questions emerged from the data, rather than being preordained. The notions of basic social processes and saturation of categories were retained. The focus of the research was on theory generation rather than theory verification.

3.4.3 Using Grounded Theory methodology in virtual environments

Two genres of social text-based virtual environments, MOOs and IRC, were selected as the research settings for Studies One and Two. Data collection for a grounded theory study of virtual environments on MOOs and IRC can take the form of passive or active data collection. Passive data collection techniques do not require the researcher to be actively involved within the community. Sources of passive data include discussion lists, newsgroups, help files, literature and other documentation. Active data collection techniques include interviewing and participant observation. A combination of passive and active data collection was used in this research. Both MOOs and IRC support synchronous CMC, enabling the use of on-line interviewing and participant observation. Active data collection within the communities of interest is consistent with recommendations by community researchers (Fernback, 1999; Thompsen et al., 1998) to conduct research within, rather than on, virtual environments.

Interviewing is a common method of data collection in grounded theory studies. Unstructured and semi-structured interviews are suited to research that aims to understand, describe and develop theory (Morse, 1986), and provide the opportunity for the emergence of new material (Bauman & Greenberg, 1992). Interviewing in text-based virtual environments differs from other modes of interviewing in that the interview takes place in text. For this research, unstructured and semi-structured interviews were conducted on-line in MOOs and IRC in text.

3.4.3.1 Researcher as participant observer

The role of participant-observer was adopted for this research. Jorgensen (1989) recommended the use of participant observation when a phenomenon is relatively unknown, when insiders' views differ from outsiders and when the

phenomenon is not easily accessible by outsiders. The proposed research on social aspects of CMC meets all these criteria. Very limited psychological research had been conducted in MOOs and IRC prior to the research beginning. Anecdotal reports from users suggested that they have difficulty in explaining their on-line lives to outsiders, and that they feel that someone outside of the environment 'just can't understand' what they are experiencing. In addition, frequent sensationalist media attention to pornography and sexual activity on the Internet makes users wary of outsiders' motives in conducting research.

An insider's viewpoint is important in gaining an understanding of the culture, language and reality of the participants. One way of achieving this is for the researcher to experience the phenomenon directly. Participant observation decreases the likelihood of miscomprehension and inaccurate observations resulting from failure to understand the culture (Jorgensen, 1989). As MUDs and IRC have developed their own specific cultures, immersion in these cultures was essential to understanding the nuances of behaviour.

The role of participant-observer can vary according to the degree and type of participation in the community studied, and the covert/overt nature of the participation (Spradley, 1980). For this research the role of 'participant as observer' (Gold, 1969) was adopted where the researcher is clearly identified to research participants. My presence on MOOs and IRC as a researcher was overt. I was clearly identified as a researcher by the pseudonym used ('Questioner'). Informed consent was obtained from all research participants prior to interviews. My degree of participation was 'complete participation' as categorized by Spradley (1980). That is, I was researching in situations in which I was already accepted as an 'ordinary participant'.

The roles of participant and observer are potentially conflicting. Conflict between the roles can result in research that lacks objectivity, is subjective, and influenced by personal feelings (Jorgensen, 1989). To maintain a level of objectivity and to further separate the roles of participant and researcher, personal involvement in the virtual communities studied was limited for the duration of the research. Separate research identities were created, clearly identified, and used for research purposes only.

Given the identity deception possible on MOOs and the strong negative reaction many MOOers have when they feel they have been deceived, a decision was

made to adopt an open approach, linking personal and research identities. Where a social character already existed on a MOO, the research identity was created as a morph for that character. This meant that both social and research identities were listed as aliases on that character. New characters (with research identities only) were set up on MOOs where no social character existed. When requesting interviews with MOOers that had previously interacted with one of my social MOO identities, the MOOer was directly advised of my non-research identities.

The combination of active (participant-observation and interviewing) and passive (collection of postings to newsgroups and mailing lists) data collection techniques were used to strengthen the research. The use of multiple sources of data and methods is referred to as 'triangulation' and increases the reliability and validity of Grounded Theory research (Glaser, 1992).

In order to address the ethical issues of conducting research in virtual environments (see section 3.2.1.1.3 above) a number of measures were taken. To meet the requirement of informed consent all research participants were provided with an electronic version of an information sheet when invited to participate in this research. Details of how to contact the researcher for further information before, during or after the research were provided. Given the questionable anonymity provided by net pseudonyms, the decision was made to protect both off- and on-line identities. Measures put in place to protect the confidentiality of research participants during data collection, transmission and storage are outlined in the methodology section of each study.

3.4.4 Judging Grounded Theory

A Grounded Theory can be judged on a number of grounds. Glaser and Strauss (1967) outlined four criteria for judging a Grounded Theory labeled fitness, understanding, generality and control. The fitness of a Grounded Theory refers to the fit between the theory and the substantive area. The theory developed must closely fit the data, and not be biased by the researcher's own ideals and values, or the application of other theories. The criterion of understanding refers to the theory making sense to people involved in the substantive area. The generality criterion refers to the ability of the theory to be applied to a range of situations within the substantive area. The control criterion relies on the explanatory power of a theory. The theory must be able to explain and predict change in the substantive area. Glaser

(1978) added a further criterion, that of modifiability. The theory must be modifiable to fit variations that occur.

The sample used in a Grounded Theory study can be judged in terms of its adequacy. Samples in qualitative research can be judged on both appropriateness and informational adequacy. The appropriateness criterion refers to the fit between the selection process, the research participants and the purpose of the research. The appropriateness of a sample can be evaluated by examining the methods of sampling and determining if the methods used and sample obtained facilitate understanding of the research problem. The informational adequacy of a Grounded Theory sample refers to the quality, relevance, completeness and amount of information obtained. Informational adequacy is achieved by saturation of the data (Morse, 1986, 1989).

To meet the criteria of informational adequacy and appropriateness of the sample, the researcher needs to have control over both the primary and secondary selection of research participants. That is, the researcher must be able to both select suitable informants for interviews (based on their knowledge of the research setting), and control decisions over the continuation/discontinuation of interviews and follow-up interviews with these informants, and the inclusion or otherwise of the material obtained in the research reports (Morse, 1986; 1989).

Theoretical sampling is a form of non-probability sampling. Common criticisms of non-probability sampling are the potential for sampling error, bias, and non-representativeness. Bias in theoretical sampling can be controlled by pursuing negative cases, providing details of variation as part of the description of concepts and categories, using constant comparison of data, using secondary samples to test early hypotheses, and obtaining feedback on the research findings from research participants and other members of the research setting (Morse, 1989). However, even given these procedures for minimizing bias, theoretical sampling, as a form of non-probability sampling, is not suited to answering quantitative research questions, or for making generalizations to other research settings.

3.4.4.1 Does Grounded Theory research produce theory?

Can Grounded Theory research produce a 'theory'? Miller and Fredericks (1999) noted the failure of Grounded Theory creators to analyze the structure of theory produced by Grounded Theory research. Based on Strauss and Corbin's formulation of Grounded Theory, they argued that grounded theories fit better within an accommodationist than a predictive framework. Using an accommodationist

framework, a theory can be judged as adequate when it accommodates the data. Grounded theories interpret rather than explain. Theories are grounded in the data because they use a form of inductive argument. Miller and Fredericks (1999) argued that if situated within a predictive framework, a Grounded Theory would be seen as inadequate because its failure to make predictions means the theory cannot be evaluated.

However, using the original formulation of Grounded Theory (Glaser & Strauss, 1967), the theory produced does make predictions. Glaser (1992, p. 16) specifically stated “The research product constitutes a theoretical formulation or integrated set of conceptual hypotheses about the substantive area under study. That is all, the yield is just hypotheses!” (underlined in original). As such, the theory developed fits within the predictive framework, and is subject to falsification by further research.

The term ‘theory’ implies a degree of generalisation. In Grounded Theory research two types of theories are differentiated. ‘Formal’ theories are developed and tested using a range of settings, situations or populations and as such theory may be generalizable across new settings, situations and populations. In contrast, ‘substantive’ theories emerge from Grounded Theory research within a specific context (Glaser & Strauss, 1967; Strauss & Corbin, 1990). The degree of generalisability remains an unknown factor until the theory is tested using different settings, situations or populations.

The Grounded Theory research in this thesis is based upon the traditional formulation of Grounded Theory as outlined by Glaser and Strauss (1967). Substantive theories were independently developed in two virtual domains. These theories provide thick descriptions of social interaction processes within the two computer-mediated settings. The theories developed generated a range of hypotheses that are testable in further research. The findings from each Grounded Theory are not intended to be generalised to other situations. Further research using different settings, situations or populations would be required to meet the requirements of a formal theory.

3.5 Summary

This chapter provided a broad overview of some of the issues that need to be considered in conducting research on virtual environments. A rationale was presented for selecting Grounded Theory methodology for the initial research presented in this thesis. Techniques for conducting a Grounded Theory were outlined, and diverging views on Grounded Theory explored. Criteria for judging a Grounded Theory were provided. Building on the overview of Grounded Theory research outlined in this chapter, the specific methodological procedures adopted for the studies are outlined in Chapter 4 (Study One: MOOs) and Chapter 5 (Study Two: IRC).

CHAPTER 4.

STUDY ONE: SOCIAL INTERACTION IN MOOS

...there were few MOOers who had not, upon their first visits as anonymous "guest" characters, mistaken the place for a vast playpen in which they might act out their wildest fantasies without fear of censure. Only with time and the acquisition of a fixed character do players tend to make the critical passage from anonymity to pseudonymity, developing the concern for their character's reputation that marks the attainment of virtual adulthood. (Dibbell, 1998).

4.1 Introduction

In this chapter a Grounded Theory (Glaser & Strauss, 1967) study of social interaction in MOOs is presented. The theory details the stages an individual passes through in the process of integrating MOOing into their lives as they come to terms with what initially appears to be an alternative reality. A description is provided of how individuals represented by virtual personae engage in social interaction within the MOO environment, and the effect this has on their off-line lives.

An introduction to MOOs was provided in Chapter 2. This material will be briefly recapped and expanded upon to further describe technical features that affect communication in MOOs.

MOOs are socially oriented MUDs based on object oriented programming that provide a database of rooms, characters and objects that are usable and extendable (Curtis, 1992, Curtis & Nicholls, 1993). Individuals from disparate geographic locations can connect simultaneously to a MOO to engage in real time text-based (typed) communication with one another. MOOs are accessible to anyone with a computer, modem and telnet access. A range of MUD clients have been developed for use in Unix, Windows and Mac environments that provide a more sophisticated interface to MOOs than direct telnet. Lists of MOOs and their telnet addresses are readily available on the Internet. For example, the MUD Connector (<http://www.mudconnector.com/index.html>) currently lists over 100 MOOs, providing details such as location, themes, and language.

Upon connecting to a MOO an individual is greeted with a welcome screen that provides an introduction to the MOO and details for obtaining guest and permanent characters for use on the MOO. Typically, a newcomer is provided with a

temporary character for use during the session that identifies them to other MOO users as a 'guest'. Guest characters are by default assigned the gender 'neuter' and have only basic descriptions. For example, on Lambda MOO guest characters are assigned a colour name (e.g. Crimson Guest, Fawn Guest). Crimson Guest's default description reads:

```
Crimson_Guest
By definition, guests appear nondescript.
This one sparkles with the color of Christmas, though.
It is awake and looks alert. (Lambda MOO, 14/04/2000)
```

Upon connecting as a guest, the individual is invited to complete a tutorial that provides information on MOOing and covers basic commands. A guest may request a permanent character on a MOO by using the @request command and providing their email address and the name they wish to use for their character.

To illustrate the process of setting up a character, I will describe the steps involved in creating a character, 'Questioner'. First, to obtain the character named Questioner the following command is used:

```
@request Questioner for L.Roberts@psychology.curtin.edu.au
```

The permanent character assigned is by default a neuter, and needs to be gendered and described. Gender is assigned using the @gender command. For example, by typing:

```
@gender female
```

the gender of the character 'Questioner' is set to female, pronouns assigned and the following message is displayed:

```
Gender set to female.
Your pronouns: she, her, her, hers, herself, She, Her, Her, Hers, Herself
```

The character description is set using the @describe command. For example by typing:

```
@describe me as "Questioner raises her head from the keyboard to
smile at you. She is probably going to ask you lots of questions
about your MOOing experiences..."
```

the description for Questioner is set. Now when anyone types 'Look Questioner' they will see:

```
Questioner
Questioner raises her head from the keyboard to smile at you. She
is probably going to ask you lots of questions about your MOOing
experiences...
She is awake and looks alert.
```

The character can be modified to suit the individual's requirement. Character names, descriptions and gender can be changed at will. In addition to the primary character many MOOs support the creation of 'morphs', alternative characters that also must be gendered and described.

Having created a character, the next step is to create a 'home' for the character. This is done by creating a room using the @dig command, describing it using the @describe command, and setting the room as home using the @sethome command. The result is a basic room that can later be 'furnished' (by creating and describing objects), linked to other rooms (by creating exits) and 'redecorated' (by changing the description) or renamed at will.

Set with a character and home, the new MOOer needs to learn to move around the MOO. A MOO character can 'walk' through the MOO using compass point directions or teleport from one room to another using the @go command. Moving about the MOO the 'look' and @examine commands can be used to inspect rooms, objects and characters.

While exploring the MOO, new users need to learn how to communicate with characters they meet. There are several ways of communicating on the MOO. The 'say' and 'whisper' commands can be used to communicate with characters who are present in the same room. If using the character Questioner I type "Say hello", everyone in the room sees on their screen:

```
Questioner says, "Hello"
```

If instead I wish to communicate only with a particular character called 'X' I can type: "whisper X "Hello"", and X will see on their screen

```
Questioner whispers, "Hello" to you.
```

For conveying emotions or expressing actions the 'emote' command can be used. If I type "emote thumps the keyboard in anger", everyone in the room sees on their screen:

```
Questioner thumps the keyboard in anger.
```

To communicate with characters who are currently logged into the MOO but are not in the same 'room', paging (using the @page command) and remote emoting can be used.

These text-based MOO worlds where all communication takes place in ASCII text provide the context for this first study.

4.2 Method

This study is conducted using Grounded Theory (Glaser & Strauss, 1967) methodology.

4.2.1 Research Participants

Fifty-eight past or present users of MOOs were interviewed for this research. All research participants were volunteers and were not paid for their participation in this research. The following statistics are designed to provide a demographic picture of the off-line and MOO lives of the research participants.

The demographics of MOO users' off-line lives are based on self-reports. No identifying information such as name or address was sought and no attempt was made to verify the information received. This was an intentional strategy designed to increase the likelihood of obtaining 'truthful' answers by reducing the fear of reports of MOO activities having repercussions on MOO users' off-line lives.

The MOO users interviewed ranged in self-reported age from 14 to 50 years (Mdn = 23 years), with more than 70% aged under thirty. Forty (69%) of the MOO users interviewed stated their biological sex was male, sixteen (23%) female, and two (3%) described their sex as 'spivak' (indeterminate). While 64% of research participants resided in the United States of America, nine different countries were represented in the sample. All but four (93%) of the interviewees had completed, or were currently enrolled in, tertiary education. Of the four that had not, two were currently in secondary school and had plans to continue their education at university. Twelve of the respondents had post-graduate qualifications, or were enrolled in postgraduate studies.

The demographics of MOO characters are also based on self-reports. Sixty-two percent of MOO users interviewed gendered their main character male, 21% female, and 17% had adopted an alternative MOO gender (spivak, plural or neuter). Eight MOO users (13.8%) had gendered their main character differently to their off-line gender. Of these, one male had gendered their MOO character as female. The rest adopted alternative genders. The number of different characters a MOOer used ranged from none (guests awaiting the creation of their first character) to thirty-five (mode = 1, Mdn = 2). MOO users interviewed varied in their MOOing history and current MOOing behaviour. The length of time since first MOOed (i.e., the 'MOO age' of the character) ranged from one day to five years (M = 17 months, SD = 12

months). The average stated time spent MOOing each week ranged from nil (an ex-MOOr) to 75 hours per week ($M = 25$ hours per week, $SD = 18$ hours per week). The number of MOOs frequented by an individual ranged from one to fifty-four MOOs ($Mdn, mode = 3$).

4.2.2 Procedure

A master list of MOOs was created from the various list of MOOs available on the Internet. MOOs whose primary purpose was other than social (e.g. educational MOOs) were excluded. The MOOs selected were accessible from Australia without long 'lag' times (this excluded MOOs in Europe) and had active participants around the clock. The wizards of the selected MOOs were contacted and permission sought and obtained to approach and interview users within the MOO environment. A MOO identity called 'Questioner' and a virtual interviewing room called 'Questioner's Retreat' was set up on each MOO (see Appendix 2).

4.2.2.1 Theoretical Sampling

In accordance with Grounded Theory methodology, theoretical sampling was used to select the MOO users interviewed. The first MOO users interviewed were selected for their availability. Categories that emerged from the coding of early interviews guided the selection of further research participants. In order to develop a thick description of categories MOO users were selected for their experiences with a particular phenomenon of interest. For example, in developing the romance sub-category of the MOO relationships category, MOO users were selected who had experienced MOO-marriage. Similarly, in developing the gender sub-category of the MOO identities category MOO users were selected who used alternatively-gendered MOO characters and morphs. Negative cases were sought in order to determine the full range of variation within a category. Finally, as the basic social psychological process emerged, sampling focussed on new MOO users, and on long term MOO users who were able to reflect on their MOOing history. MOO users who met the theoretical sampling requirements for a particular category were identified through monitoring mailing lists, suggestions by key informants, and visiting 'places' on MOOs frequented by particular groups.

In addition to the theoretical sampling on MOOs, local MOO users were sought to interview face-to-face (FTF). A posting to a university newsgroup resulted in FTF interviews with four MOO users.

4.2.2.2 Interviewing

In total, fifty-eight individuals were interviewed about their MOOing experiences. Fifty-four interviews were conducted on eight social MOOs using typed CMC. MOO users were contacted individually and asked if they would like to be interviewed about their MOOing experiences. Interviews were conducted in 'Questioner's Retreat' or the research participant's MOO room. Interviews were semi-structured (see Appendix 3) and lasted between one and three hours. All interviews were recorded using the logging facility of MUTT-Lite software (Free, 1995). An excerpt from a MOO interview log is available as Appendix 4. A further four interviews were conducted FTF with local MOO users, audio recorded and later transcribed. An excerpt from an interview conducted FTF is available as Appendix 5. There were not enough local MOO users to be able to assess the equivalence of interviews conducted on MOOs and IRC.

4.2.2.3 Data Coding and Theory Development

Data collection, data coding and analysis were conducted on an ongoing basis. Data were entered into the QSR NUD*IST (Non-numerical Unstructured Data Indexing Searching and Theorising) program (QSR NUD*IST, 1995) with an utterance (for interviews) or paragraph (for all other material) as the unit of analysis. Data were coded based on the constant comparison of data. Each utterance or paragraph was coded with as many codes as were applicable. Categories were developed through comparing and grouping of related codes into more abstract concepts. Each category was defined in terms of its properties and dimensions. Data collection and coding continued for each category until saturation was achieved.

During the coding process memos were written recording the emerging theory, development of categories, hypothesised relationships and ideas for future data collection. Diagrams were drawn to reflect the relationships between categories and properties of categories. Additions and changes were made to memos and diagrams over time to reflect information provided by new data and associated changes in thinking. The core category, a basic social psychological process (BSPP) emerged during the latter stages of data collection when the consistency of changes in thinking and behaviour over time emerged from the data collected.

Theoretical sensitivity was enhanced by conducting an exhaustive review of published and unpublished literature on MOOs, contact and discussions with other MOO researchers, and adherence to the Grounded Theory analytic process. The

resultant theory provides a rich description of social interaction in MOOs and a substantive theory of the process of MOOing over time.

Due to space limitations only the final Grounded Theory, BSPP and categories developed are presented in this thesis. The theory presented is a substantive theory developed within the specific context of social MOOs. The theory provides a thick description of social interaction processes within social MOOs. The theory is not intended to be generalised to other situations, but provides a rich source of testable hypotheses for further qualitative or quantitative research.

4.2.3 Reliability and Authenticity

Additional measures were taken to increase the reliability and authenticity of data, coding and findings. Triangulation was attained by using data from a variety of sources. The main source of data was the text-based interviews conducted in MOOs. Other sources of data were FTF interviews, MOO documentation and postings to MOO mailing lists relating to social interaction on MOOs. Large excerpts of two interviews (one conducted on a MOO and one FTF) were coded by a class of graduate students completing a Grounded Theory methodology unit. The coding accorded with that of the researcher. Three experienced MOO users were generous in their time listening to, and critiquing the developing theory at several points in the research process. Finally, all MOO users who had participated in the research were sent a MOO-mail that contained the World Wide Web address of a site containing a summary of the research findings. The address was also posted to mailing lists on MOOs. Participants and other interested MOO users were invited to provide feedback. The feedback obtained was incorporated into the research findings.

4.2.4 Ethical Issues

Ethics approval for the study was granted by Curtin University of Technology's Human Research Ethics Committee prior to the research commencing. All research participants interviewed on MOOs were provided with an information sheet (see Appendix 6), sent via MOO-mail when their participation in the study was requested. Informed consent was obtained in text prior to the interview. Signed consent forms were not feasible as most research participants resided overseas and signatures cannot be easily transmitted electronically. Parental consent was obtained before interviewing MOO users under the age of eighteen years. Research participants interviewed FTF were given an information sheet and signed consent

forms were obtained. Permission was requested and obtained from individuals for the use of all newsgroup and MOO postings included in the analysis.

The confidentiality of research participants was maintained. No research participant was asked for their off-line ('real life') name, address or contact number. The confidentiality of both individuals and their MOO characters were respected, and neither MOO nor off-line names have been used in this thesis unless specifically requested by the individual involved.

No adverse side-effects to participants from their involvement in this study were anticipated or reported. The research procedures used in this study were non-invasive, consisting of interviewing research participants and the analysis of public documents. Where research participants raised concerns about their own Internet related behaviour they were advised to contact a registered psychologist or counsellor in their local area to discuss the issue. No referrals to specific psychologists were made.

4.3 Findings

The findings of this research are presented as a substantive Grounded Theory. First, the core category, a Basic Social Psychological Process (BSPP), is described in detail. While this BSPP was developed late in the stage of data coding and analysis, it is presented first as it provides the framework to which all other central categories are related.

The theory developed is illustrated by quotes from interviews and postings to MOO-mailing lists. All quotes appear in italicised text and, unless otherwise indicated, are from interviews. To protect the anonymity of research participants the names of MOO users and MOOs have been removed. The original grammar, abbreviations and emoticons appearing in the interview text remain intact. Where necessary explanatory notes have been included in bracketed un-italicized text within quotes. A glossary containing commonly used abbreviations, emoticons and MOO-specific words is available (see Appendix 1). Minor spelling changes have been made at the request of research participants, and to enhance readability.

A common characteristic of MOO speech is to 'talk' (type) in phrases connected with ellipses. As such, ellipses (with varying numbers of 'dots') used in quotes do not indicate that material has been cut, but reflect actual 'speech' patterns

on MOOs. To clearly identify where material has been cut, the word cut in non-italicised text will appear in brackets.

4.3.1 Core Category: Coming to Terms with an Alternative Reality

The core category to emerge from this research was labeled “Coming to terms with an alternative reality”. This core category meets the requirements for a BSPP. That is, it delineates a social psychological process of at least two stages that aid in the understanding of behaviour. This BSPP represents the stages an individual passes through in their thinking about the MOO, other MOO users, and their own MOOing behaviour over time. The stages reflect a change in thinking from the MOO as a separate, alternative reality to an acceptance of MOOing as part of everyday life. The stages and transitions between stages for this BSPP are presented in the stage model of MOOing below.

The properties, dimensions and conditions of this BSPP are presented in Figure 4.1. Two properties of the BSPP emerged: the stages of the process and the speed of progressing through the stages of the process.

4.3.1.1. Property: Stage Model of MOOing

The Stage Model of MOOing presented here represents the typical stages and transitions that an individual may pass through from the time s/he first learns about the existence of MOOs until the time that s/he either ceases MOOing, or becomes an established MOO identity. The stage model of MOOing is presented as Figure 4.2.

4.3.1.1.1 Stage 1: Hearing about MOOs

Most of the general population have never heard of MOOs. Before an individual can start MOOing, they must learn of the existence of MOOs. There are three main media through which the individuals interviewed found about MOOing: written material (inanimate text), information on the World Wide Web (hypertext) and through personal contact.

The most common way to learn about MOOs was through personal contacts. Most frequently this person was a friend, family member or a student at the same institution. The individual was either told about MOOing, or observed the other person MOOing and asked questions. Less commonly, individuals learned about MOOing through classes they were taking or through virtual acquaintances. Learning about MOOing from personal contacts provided individuals with a source of information and help in getting set up if they wished to pursue MOOing for themselves.

<p style="text-align: center;">BASIC SOCIAL PSYCHOLOGICAL PROCESS IN MOOS</p>		
<p>CORE CATEGORY: Description:</p> <p style="text-align: center;">COMING TO TERMS WITH AN ALTERNATIVE REALITY The evolution of thinking from MOOs as a separate reality to an acceptance of MOOing as part of everyday life</p>		
<p>Properties</p> <p>Stages</p> <p>Progression</p>	<p>Dimensions</p> <p>Hearing about->motivation->exploration/ immersion->enchantment-> disillusionment->equilibrium->integration</p> <p>Slow<->->fast</p>	<p>Conditions</p> <p>Previous experience in virtual environments Computing skills Initial motivation to MOO Degree of self-reflection</p>

Figure 4.1. The Basic Social Psychological Process in MOOs: Category, description, properties, dimensions and conditions

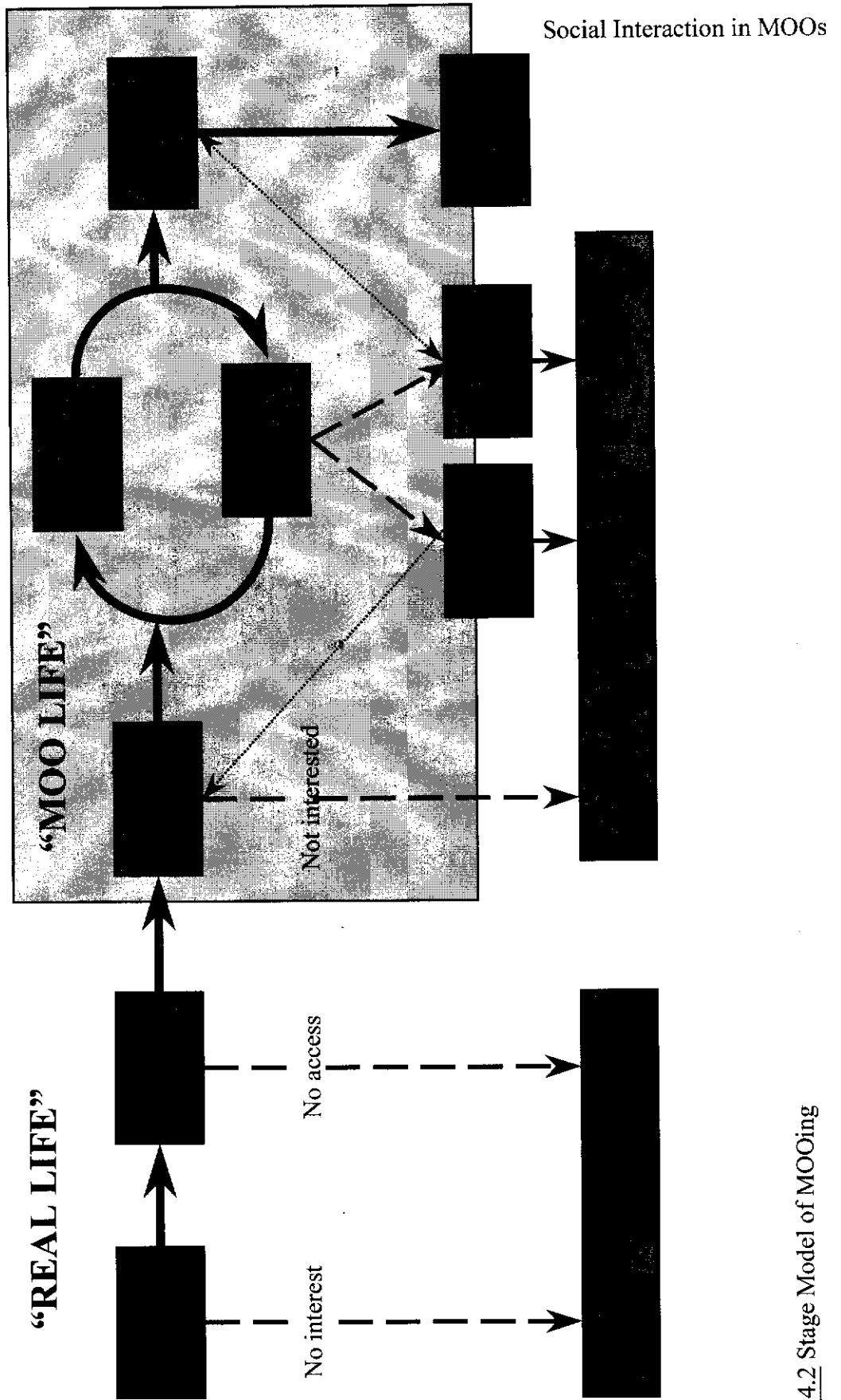


Figure 4.2 Stage Model of MOOing

The second most frequent way of finding out about MOOing was through searching or playing on the Internet. Usually this had an element of serendipity about it, with information on MOOing found while looking for something else. For example, one MOOer noted: *"my wife works at the local U. After we got this computer, she got an account. After much stumbling, I found Gopher, which led me to the "Odds and Ends" category, which led me to "Sights and Sounds" at Texas Tech, which led me to Chat with friends, which led me to MUD's, which led me to MOO's, which led me to Lambda. Great thing, this Gopher, you go in one hole, and come out on the other side of the earth."* The third most frequent way of hearing about MOOing was through print media. Sources of media included books, newspaper articles, and magazines. Learning about MOOing through the Internet or print media provided the individual with information about MOOing, but no person to help or advise on getting set up on MOOs.

Once an individual has learned about the existence of MOOs, they are in a position to decide if they want to investigate further. For many people, hearing about MOOs may generate no interest in MOOing, and no further exploration would have occurred. However, for all the individuals interviewed, regardless of their existing level of virtual experience, hearing about MOOing sparked an interest in exploring MOOing for themselves.

4.3.1.1.2 Stage 2: Motivation to MOO

Upon hearing about MOOing, the participants interviewed were motivated to explore MOOing. While the MOO users interviewed varied in their initial motivations for commencing MOOing, the opportunity to communicate with others in a social environment was the central attraction for many. The most commonly cited initial attraction of MOOing was the opportunity MOOing provided to interact socially with other people from a wide range of countries: *"ummm...The fact that you have got to speak to so many people from all these countries. The first night I was on I spoke to someone from America, from Portugal, France, Singapore and Australia. That was the first night and I just got stuck from there because there was just so many countries. You don't normally get that unless you are an international school."* MOOing to meet geographically distant others was sometimes likened to other forms of long-distance communication such as Citizen Band (CB) radio and writing letters to penpals. The MOO was seen as providing a safe, non-threatening environment

within which to meet others. In addition, the MOO was seen as a cost-effective way of maintaining contact with friends and family when they were geographically distant.

Some individuals interviewed were attracted to MOOing as a way to explore virtuality. This represented a desire to explore the concepts of virtual environments and virtual selves. The MOO was seen as providing an alternative reality, a space in which the individual could create a self and environment free from the constraints of physical reality. One MOO user commented: *"I was fascinated by the whole notion of interacting without body, without the physical, and it being so real in some ways."*

For some, the desire to MOO was motivated by a desire to escape from a difficult situation. As one MOOer commented: *"well, i'll admit that i was at a low point in my life..i felt very limited to exposure to people and how they think..and this was a dream come true really..i had the whole world in my little dorm room.."*. Difficult situations ranged from physical and mental disabilities to relationship problems. Insomniacs reported they were motivated to MOO as a means of being in contact with others and passing time while their families and friends were sleeping.

Another motivation for MOOing was the opportunity it provided to improve skills. Some MOO users viewed it as a way to improve their programming ability. Others viewed it as an opportunity to improve their writing skills. In addition to the motivations discussed above, individuals were attracted to MOOing as a fun thing to do.

Hearing about MOOs, and being motivated to MOO, is not in itself enough to predict that an individual will begin MOOing immediately. An individual may find out about MOOs and be motivated to explore MOOing, but may be prevented from doing so by lack of access to the required technology. Conversely, people who have access to the technology, and who initially lack a motivation to MOO, may begin MOOing at a later time. Where the individual hears about MOOing, is motivated to MOO, and has access to the technology, they transition to the next stage: exploration/immersion in the MOO.

4.3.1.1.3 Stage 3: Exploration/Immersion

Stage 3 represents the individual's immersion in, and exploration of, the MOO environment. During this period the individual learns the skills necessary to communicate with other MOO users and to create a virtual self and environment. When an individual first visits a MOO, they are assigned a temporary guest character

that identifies them to other MOO users as a guest. Using this guest character, the individual can explore the MOO environment, learn basic MOO commands and interact with other characters. Where the individual wishes to further their involvement in MOOing they can request a permanent character on the MOO by applying to the wizards and providing their email address.

Once a permanent character is obtained, the individual can 'create' their character and 'build' a home. This may be accompanied by a fascination with the medium and the concept of virtual existence. Both character and home may undergo many changes during this period. For example, one MOOer described their discomfort with both their character and their skills during this period: *"The persona I had didn't settle at first. I remember being really unsure of what to say at first. felt really tongue-tied. I gave myself a desc (description) as a disembodied pair of eyes, and moved around watching what others did ... when pushed for a response I would occasionally blink."* MOO commands may be difficult to understand for those with limited computing experience, and confusing for those who are transferring from other virtual environments.

When not involved in the creation and modifying of the virtual environment and virtual self, the new MOOer spends the majority of their MOO time interacting in public areas with other MOO users. Consistent with the commonly expressed motivation for trying MOOing, during this stage the individual interacts with a wide range of MOO users from different countries. New MOO users have to learn not only the commands to use the MOO effectively, but also the social etiquette and norms associated with MOOing.

Experienced MOO users often refer to individuals during this period as 'newbies'. Some MOO users likened newbies to children learning their way in a new world. For example, Traveller (personal communication, August 24, 1996) commented that: *"people at this stage often appear much like children, or at the least much younger than their age. And they are, in a way: They're having to learn an entirely new set of social customs, rituals, taboos, etc. This is compounded by the fact that the more experienced players aren't forthcoming with advice or assistance. I call it 'newbie syndrome'."*

Entering a MOO for the first time can be an 'un-real' experience. One MOOer described entering a MOO as: *"an extension of the person into a new environment...a NEW part .. not a continuation...and a hostile environment .. in the*

way of 'threatening the status quo'. For some, the strangeness of the situation limited their behaviour at first while others found the differences exhilarating. The strangeness of the situation can evoke curiosity and imagination. One MOOer, reflecting on their early fascination with the MOO commented: *"What fascinated me? Well...the fact that you were only limited by your imagination. If you could imagine it, and learn how to create it, you could do virtually anything."*

During this stage, the MOO is commonly perceived by individuals as a game, or as a separate reality from their everyday life. As one new MOOer described it *"Well, I don't think of it as if I'm a real person in this MOO, I'm a character with real personality traits to converse with others and voice my opinion"*. Other characters on the MOO may be perceived as 'not real' also: *"At first nobody was real. It was just the computer and I actually managed to delude myself that way for a whole two weeks, for a month, I kept saying it is just the computer. I didn't want to meet anyone from it cause if you met someone from it then suddenly it would become real. I didn't want to meet a single person there. Because I didn't have to feel responsible for the character that I had there, cause I wasn't permanent at that time either."*

The period of time spent in exploration and immersion varies according to an individual's existing computing/programming skills and their previous virtual experiences. Following this initial period of exploration, the individual may decide that MOOing holds little interest for them and cease MOOing. Alternatively, the MOOer may become entranced with the MOO and transition to the next stage.

4.3.1.1.4 Stage 4: Enchantment/Addiction

Following the initial exploration period, many MOO users move into a period of enchantment, characterised by long periods of MOOing and intense interest and involvement in the MOO. This period is often accompanied by a growing fascination with the MOO and virtuality. Some MOO users described their enchantment with MOOs in terms of the alternative reality they experienced: *"(MOO name) smiles...she does think now that she takes the talking-to-people-from-all-over-the-world thing for granted...now it has evolved into her alternate universe. :) ..It is where I go to make things I wish for come true...anything I can conceive...I can usually manage to create."* As an alternative reality, MOOs provided an escape from off-line life and off-line problems. During this stage some MOOers came to prefer MOO-life to 'real life', finding it easier to form relationships on the MOO than in off-line settings.

During this stage MOO users move from spending the bulk of their time in public rooms accessible to all to spending their time in private areas of the MOO. In private areas the owner of the 'space' has full control over who may enter and remain in the area. Social interaction changes from general discussion with many MOO users to conversing with a smaller number of MOO users with whom they are forming close relationships. This reflects a changing motivation from MOOing to meet new people to MOOing to maintain contact with existing MOO friends. One MOOer noted that their MOOing "...has evolved into spending time with people I have developed a close relationship with... I don't seem to meet as many new people... or spend much time seeking them out". During this stage relationships on the MOO form quickly and are characterised by high levels of self-disclosure and intimacy.

As relationships develop, other MOO users become more 'real'. As one MOOer commented "*when you start finding out about how someone's wife left them and they have kids or something happened in real life then you start realising exactly how real it is and how real these people are, especially when you hear their voice on the phone or you go and meet them*". This changing perception of the reality of other MOO users, can create confusion over what is real and what is reality: "*I then went through this whole major dilemma as to whether the computer was real and the affections that I had on the computer were real, or was it really a figment of my imagination...* ".

In addition to forming intense relationships, MOO users increase their involvement in the MOO community during this period. They may become involved in MOO politics or other community activities. The MOOer may use their skills to fine-tune their own character(s) and environment. They may also begin programming objects for their own and others' use.

Frequently, MOOing during this period is described by MOO users as an 'addiction' that consumes large chunks of their time. MOO addiction was described by some MOO users in terms of drug addiction. These MOO users reported a compulsion to log into the MOO to find out what was happening. Taken to an extreme, this compulsion can result in a desire to be logged on continuously: "*that was like an intense 3 month period ... umm ... and I would get up in the morning and I'd log on before I'd got out of bed ... like to see what had happened overnight while I was getting some sleep*".

Self-described MOO addicts were asked what it was they were addicted to on MOOs. While the level of self-insight varied greatly in the responses given, a common theme to answers was the real time interaction within an environment that was perceived as safe. Some MOO users described the 'addicting' component of MOOing as the opportunity to communicate in a less inhibited way than in their off-line lives. One MOOer stated: *"Well, this place serves my needs, so I like it. Maybe not addiction in a bad sense, but just that life is worse without it. For instance, I can tell anyone anything on here. You don't have to worry much about that. It passes the time, when I have only a few close friends in RL."*

For the majority of MOO users, the feeling of being addicted to MOOing may simply be a passing stage. With time, a balance between MOOing and other activities may be attained: *"i think i have observed something like an addiction/exploration phase that hits newbies of all ages, and may last a few months of very high connection times. after that, or after the first severe heartburn, who knows, usage may drop."* Time devoted to thinking about MOOing while not actually MOOing diminished over time.

Some MOO users took active steps to cut back their MOOing time in order to regain a balance in their activities. Some MOO users viewed cutting back as simply a matter of self-control. However, not all MOO users who described themselves as addicted were actively trying to cut back the hours they spent MOOing. Some MOO users were ambivalent about cutting back while others did not have problems with the amount of time they were MOOing, and had no plans or desire to cut back their hours.

It should be noted that the concept of MOOing as an addiction was not shared by all. As one MOOer commented: *"Some seem to view mooing as an addiction in to which they are constantly seduced, rather than a place they consciously choose to be, and can choose to be less of the time if need be...there seems to be a fear of the moo, as something that will possess and devour one. I don't know why"*.

The period of enchantment and self-described addiction is frequently followed by a period of disillusionment with MOOing and MOO users. Movement into the disillusionment stage can be a gradual process. With time, MOOing loses its novelty value, and MOOers become increasingly aware of the negative disinhibited behaviour and deception possible on MOOs. As one MOOer described: *"in my case,*

i got very tired of the repetition of patterns of behaviour, or the hopelessness i feel about civility or politeness. i got more and more tired of rude people... if you consistently go to places like (public area on a MOO), you would notice that the same two or three topics are being discussed there morning til night, invariably. it is annoying. not to a newbie, though".

Alternatively, disillusionment can be precipitated by an event. Events likely to lead to disillusionment include virtual harassment, virtual stalking, flaming (extreme public ridicule or put-downs) or the breakdown of a relationship with a MOO significant other. Whether induced by a specific event or a gradual awareness, movement into disillusionment reflects marked changes in thoughts about MOOing.

4.3.1.1.5 Stage 5: Disillusionment

The stage of disillusionment involves a re-evaluation of MOOs, MOO users and one's own MOOing behaviour. One disillusioned MOOer commented "*i have the feeling that it's becoming a giant sex room for many, yes, or just a place to vent frustrations. i used to be more optimistic about this being a place where to meet writers, cultivated people. these are the exceptions, or (sadly, as I do) interesting people hide in their rooms".* Disillusionment with MOOs and MOO users may be accompanied by a changing notion of the reality of MOOs. One MOOer, who stated that "*when i started i took it (MOOing) a lot more seriously"* went on to describe how they had become "*old and hardened"* attributing this to "*actually, i think i got a grip on reality. when the initial enchantment died, i started to put things into perspective a little bit better".*

Several pathways out of disillusionment emerged in this research: the MOOer may commit 'MOOicide', gradually withdraw from MOOing, or engage in repeated cycling through the stages of enchantment/addiction and disillusionment.

MOOicide represents the death of the MOO character. It involves 'recycling' the MOO character and all MOO 'possessions' (i.e.: the character and all objects created/owned by the character are removed from the database). MOOicide is an active repudiation of MOOing and MOO users. It is often accompanied by a statement to other MOO users of intention to leave, and frequently expressing hurt or disappointment in aspects of the MOO or other MOO users. Reasons for MOOicide cited by MOO users during interviews and in MOO-postings were dissatisfaction with wizards' control over others' behaviour, harassment by other MOO users and guests, conflict with other MOO users, 'real life' pressures, and the desire to make a

go of 'real life'. MOOicide acts as a rite of passage, symbolising the end of the virtual self.

MOOicide is actively discouraged by MOOs. For example, Lambda MOO Help Files state:

We discourage suicide, as it rarely actually solves any problems you may be having with the MOO. However, some people choose to suicide (recycle their characters) if they have some insurmountable personal problem with MOOing or with other players who are present on the MOO.

MOOicide does not, however, necessarily end an individual's involvement with the MOO. A MOO may have a policy of 'reincarnation'. For example, Lambda MOO Help Files outline the following policy on reincarnation:

If you wish to be reinstated, please supply us with a short statement of how, using your new character, you are going to avoid the problems which led to your committing suicide. Only one reincarnation per person. That is why it is important that you have a plan of how to avoid the problems.

An individual may continue to MOO using guest characters. They also have the option of obtaining characters on other MOOs. Where this occurs, the MOOer moves back into the exploration/immersion stage (Stage 3) on the new MOO(s).

Rather than commit MOOicide, individuals may simply cut back on the hours that they spend MOOing. This reduction in MOOing may be associated with increased off-line demands, or interest in non-MOO activities. Logging into the MOO may become more infrequent and eventually cease. MOO relationships important to the individual may move to other media. If an individual does not use their MOO character for a specified period of time the character will be 'reaped' (recycled) by the wizards on the MOO.

For some MOO users, a period of disillusionment is followed by a re-enchancement with MOOing. A pattern may be set up where the individual moves repeatedly through periods of enchantment/addiction followed by periods of disillusionment. This may reflect their involvement in, and the dissolution of, significant MOO relationships.

4.3.1.1.6 Stage 6: Equilibrium

Stage 6 represents a breaking out of the cycle of enchantment and disillusionment. This occurs when the individual reaches a stage of acceptance of the MOO with all its advantages and limitations. The MOOer may still use the MOO in

ways that differ from their off-line interactions. For instance, some MOO users may consciously choose to maintain a separation between MOO and 'real life'. For others, MOO and 'real life' may begin to overlap. As one MOOer noted "*The first few months were pretty addictive, but after that it has been more integrated and I spend less time on it.*" This stage is characterised by the MOOer having gained some perspective of the MOO and their personal involvement in it. The MOOer becomes an established member of the MOO community, and may choose to take on an active role within the community (e.g. take on a role as help staff, or wizard). The amount of time spent MOOing may fluctuate according to the demands of other aspects of the individual's life.

Transition between stages 6 and 7 occurs as the individual integrates more of their virtual and off-line relationships and lives. Frequently this occurs as relationships formed on MOOs transfer out of the virtual environment.

4.3.1.1.7 Stage 7: Integration

Stage 7 represents the integration of virtual and off-line life. Some of the MOO users interviewed had integrated their off-line and virtual lives to the extent that MOOing was merely part of their life. MOOing had become a part of their everyday reality. For this group of MOO users, behaviour on the MOO reflected their behaviour in off-line settings. Distinctions between MOO friends and off-line friends had blurred or disappeared altogether. The MOO had become primarily a communication device. "*It is just part of my every day reality. It's just like talking to somebody on the phone except it is the only way that I can talk to them.*"

The stage based model presented represents a generalised model of the MOOing process. As with all stage based models, not everybody will experience all stages, or move through the stages at the same pace. Those with existing computer skills, particularly programming skills, will be technically competent in MOOs long before those with little or no skills. Previous experience in other virtual environments may mean that many of the stages are skipped or passed through quickly. The initial motivation for MOOing may also affect the progression of stages. For instance, those who commence MOOing to maintain contact with family and friends, or to interact with colleagues, may not experience virtual life as a separate reality to the same degree as MOO users who interact with strangers. The degree of self-reflection may also affect progression through the stages. Individuals who introspect on their social

interactions in MOOs are likely to move through the process more quickly than those who do not.

This model is intended to give a general indication of the stages that social MOO users may pass through in coming to terms with what may initially appear to be an alternative reality. Key categories that relate to the basic social psychological process are further developed and presented below in four sections: the context (Section 4.3.2), the individual (Section 4.3.3), social interaction (Section 4.3.4) and off-line lives (Section 4.3.5).

4.3.2 The Context

The individual, represented by a pseudonymous character, interacts within the MOO with geographically distant others who are also represented by pseudonymous characters. This section examines the effect of the text-based environment on behaviour within MOOs. The category 'perception of the MOO environment' and sub-categories of 'telepresence' and 'sense of community' are developed in this section, and their relationship to the stage model of MOOing explicated.

4.3.2.1 Category: Perception of the MOO environment

This category represents MOO users' perceptions of the effect of the text-based MOO environment on social interaction. The properties, dimensions and conditions of this category are presented in Figure 4.3.

A common theme arising from the interviews conducted with MOO users was the perception of the MOO as a safe place in which to socially interact with others. The combination of anonymity, geographically dispersed users, control over self-presentation, disembodiment and absence of eye contact provides the perception of a safe environment with limited off-line consequences for actions. This results in high levels of self disclosure, disinhibited behaviour, and a sense of non-obligation, and lack of accountability to other MOO users. Together, these factors combine to provide the MOOer with the perception of a safe environment for social interaction. A diagram represented the effect of the perception of the text-based MOO environment on behaviour in MOOs is presented as Figure 4.4. Each element of the diagram is expanded upon below the diagram.

THE CONTEXT		
PERCEPTION OF MOO ENVIRONMENT		
Category Description: The individual's perception of the effect of interacting in a text-based environment		
Properties	Dimensions	Conditions
Safety	High<->low	Perceived safety of environment declines over time as anonymity erodes
Telepresence	(developed below as sub-category)	
Sense of community	(developed below as sub-category)	
SENSE OF COMMUNITY		
Sub-Category Description: The feeling of belonging to a MOO community		
Properties	Dimensions	Conditions
Existence of	Absence <-> presence	
Experience of	Absence <-> presence	Sense of community experienced more strongly on home MOO
Level at which experienced	Group <- MOO --> across MOOs	Number of MOOs individual has characters on Size of MOO
TELEPRESENCE		
Sub-Category Description: The extent to which the individual feels present in the MOO, rather than in their immediate physical environment		
Properties	Dimensions	Conditions
Perceived location of self	Keyboard <-fluctuating -->MOO	Distinction not valid for those who do not distinguish between self and MOO identity Affected by environmental and personal factors
Visualization	Text only <-> full imagery	Aided by well-written descriptions of people and places Individual differences in visualization ability
Consciousness of typing and reading	Fully conscious <-> unaware	Dependent upon typing ability and effort required

Figure 4.3 The MOO context: Category, sub-categories, descriptions, properties, dimensions and conditions.

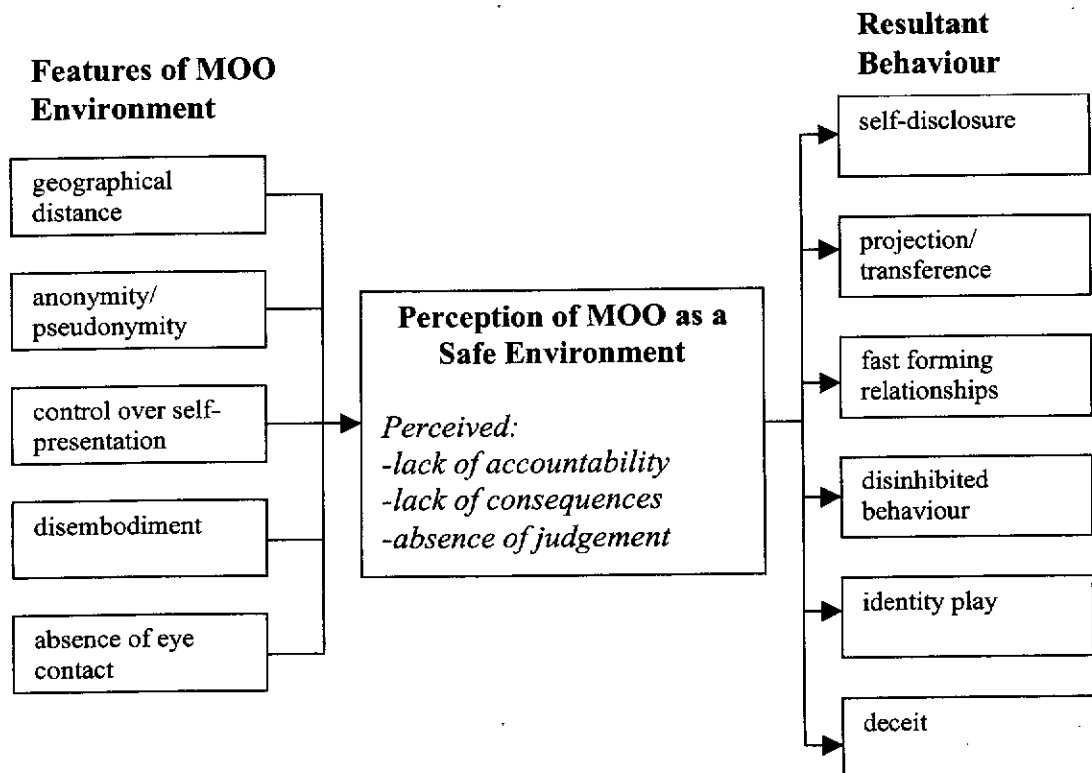


Figure 4.4 The effect of the text-based MOO environment on behaviour in MOOs

Five features were identified as contributing to the perception of the MOO as a safe environment. First, MOO users are frequently geographically and physically isolated from each other. MOO users from all parts of the world can access the same MOO. Even when MOO users are from the same geographical location, they are usually physically isolated from each other while MOOing (unless in a computer laboratory). This geographical and physical separation encourages the 'stranger on the train' phenomenon: *"Actually, there is a distance factor. Why is it we talk to people on airplanes - people we'll never see again - more deeply than others?"* (posting to a newsgroup).

Second, MOO characters can provide both anonymity and pseudonymity. When an individual applies for a character on a social MOO they must provide their email address. Only wizards (the administrators of the MOO) have legitimate access to this email address. The individual is free to name, gender and describe their MOO character as they desire. The anonymity provided by having a MOO character affects the communication process by freeing individuals from the perceived boundaries and limitations of their off-line lives. For example, one MOOer commented how *"the*

anonymity of the moo allows people to be less conservative.. perhaps more like the people they wish they could be but aren't IPL (in physical life)..".

Behaviour on MOOs becomes less inhibited as anonymity increases. MOO characters can be seen as providing pseudonymity as the character itself develops a reputation over time. A further degree of anonymity can be provided by the use of guest characters with a resultant increase in disinhibited behaviour. Hate mail sent by guest characters to MOO users resulted in legislation at LambdaMOO in 1996 to trace the connection site of offenders (petition #63904 at LambdaMOO), and a petition to attach connection site information to guest descriptions (petition #22540 at LambdaMOO). Similarly, MOO-mailing lists that provide for anonymous postings receive postings with high levels of expressed negative affectivity.

Third, in MOOs the representation of the self in the form of a character is entirely under the control of the individual. Each individual is responsible for naming, gendering and describing their character, and describing the environment of their character. Not faced with the restrictions imposed by physical life, the individual can try out other selves or aspects of self. MOO users recognise that other MOO users also control their self-presentation: *"You see what people wish to present...it can be more comfortable that way. And you can give people in return what you wish to give them. People can take this WAY too seriously and you never know if you're being scammed or not...the flip side of being given what people wish to present"*

Fourth, the absence of bodies on MOOs means that there are no physical distractions to the communication process. Initial judgements of a person based on their physical appearance, age, tone of voice, socioeconomic status etc cannot be made. As one MOOer commented, you can *"meet and really get to know people all over the world without having the biases of physical appearance, race or gender to bias you...you meet the person inside (or in a lot of cases, the person they try to project) without forming opinions unfairly due to the three factors I mentioned."*

Fifth, there is no eye contact on MOOs. When 'conversing' on a MOO, attention is focused on the computer screen. Communication partners cannot see each other unless they are physically co-located (for example, in the same computer laboratory). Several MOO users commented that not having to look the other in the face made it easier to self-disclose.

The anonymity, geographically disperse users, control over self-presentation, disembodiment and absence of eye contact combine to provide the MOOer with the perception of a safe environment for social interaction - an environment where they perceive they will not be judged by others, where they are not accountable to others and where there will be no real life consequences for their actions. MOO users noted that activities on the MOO lack the consequences they would have in their off-line lives. It is easy to escape from a bad situation in the MOO simply by logging out: *"There's not nearly as much danger. You can do anything and get away with it since all you have to do is pull the plug.. once things get out of hand. In real life there are all sorts of other complications."* The lack of consequences is coupled with a lack of responsibility to other MOO users, and a perceived lack of judgement enabling high self-disclosure: *"iRL I'm alot less open than on the Moo. (cut) Its the lack of forced identity and the "shared hallucination" aspect. When you are pretty certain that people wont judge you [Mooers tend to the left IMO], and that they can't link you to the real world unless you want them to you feel safer."*

The perception of the MOO as a safe environment for social interaction resulted in a range of behaviours. These included high levels of self-disclosure, disinhibited behaviour, identity play, projection and transference, the fast formation of relationships, and deceit. Each of these is detailed below.

A recurrent theme in MOO interviews was the high rate of self-disclosure on MOOs. Some MOO users were able to self-disclose more to their MOO friends than they were to off-line friends as self-disclosing on-line was seen as easier. The greater degree of self-disclosure on-line may be particularly marked for those who are shy in their off-line lives: *"I think it opens the shy inhibited folks up..allows them room to breathe."*

In addition to high rates of personal disclosure, many MOO users reported that they are less inhibited on the MOO. Examples of disinhibited behaviour occurring on the MOO are flaming, sexual experimentation, and freedom to speak your mind. As one MOOer noted, MOOing *"..makes me a bit more daring I think...I am not as afraid that I might offend ppl... or as afraid of what they think of me... I am a lot less shy too..I hardly ever talk to ppl rl"*.

The anonymity and control over self-presentation in MOOs gives the individual freedom to explore aspects of the self. One MOOer described this process as an extending of the self: *"much of mooing seems to me to be based on the*

'extension of self' rather than the presentation of self .. (cut)... I guess we all have untouched or unexercised parts of our personalities...the woman in a man .. the child in a mature adult ...the high flier in the social inept...you name it .. we're full of them... and many of us are repressing those aspects either from social or personal reasons... here .. we can be what we want to be .. hence we don't need to hide our 'othernesses'.....for me, Moo is a vehicle for expression of those other selves and I don't think I can see a better medium...from observation of others this seems to be the general case".

MOO users develop images of other MOO users based on the limited information available from character descriptions, and their on-line textual interactions. The gaps may be filled in through projection and transference. As one MOOer commented: *"It's not about people getting inside OTHER peoples heads as much as it's them getting inside their own"*. Transference and projection may result in MOO users believing they are very close to one another: *"This medium, what you could call Moo-space... is very deep, some call it the closest thing to telepathy we'll ever know."* Over time, as MOO users exchange more information, a more accurate picture of communication partners may be developed. The high rates of self-disclosure and projection and transference are accompanied by the fast formation of relationships on MOOs. This is described in more detail in Section 4.3.4.1.

The very same factors that make the MOO appear to be a safe environment for social interaction also make the MOO a fertile ground for misunderstandings and deceit. Deceitful behaviour was most frequently reported in romantic relationships. Deceit reported on MOOs included having multiple lovers who were unaware of each others' existence, conducting a romance as a character of the opposite gender to biological sex, and providing false or misleading information about the off-line self. One MOOer who had been 'burned' by the deceit of others described how this can occur: *"multi-personalities .. multiple 'homes' .. the ease of secret communication .. all allow a level of deceit which is on the face of it .. as easy as in PR (physical reality) .. but in fact .. by observation .. easier to detect... and emotions can run high and fast in this environment.. there are too many people who can be one thing for you and another when you aren't around"*.

Individuals' perceptions of the perceived safety of MOOs is subject to change. Anonymity may be eroded if the individual self-discloses identifying information while on the MOO. Anonymity is also lessened, or altogether eliminated

when MOO users choose to exchange email addresses, phone numbers or meet in off-line settings. In addition, individuals may be hurt by the disinhibited behaviour or deceit of others. Over time, the combination of some or all of these factors may result in an eroded perception of safety in the MOO environment.

4.3.2.1.1 Sub-category: Telepresence

The sub-category of telepresence represents the degree to which the individual feels present on the MOO, rather than in their immediate physical environment. The properties, dimensions and conditions of the telepresence category are presented in Figure 4.3.

MOO users varied in their perceptions of the awareness of the location of themselves while MOOing. MOO users ranged from feeling totally situated in physical life in front of the computer, to feeling telepresent in the MOO environment. Where individuals do not distinguish between their physical selves and their identities on MOOs, their physical presence at the keyboard may dominate, or the distinction as to the location of self seem irrelevant. Some MOO users retained awareness of both self at computer and their character on the MOO. As one MOOer noted, *"I know I am at my keyboard typing... But in a way I am also *there* in spirit"*. Awareness may be primarily focused on the physical self, or alternatively, the awareness of the physical self may be reduced to a background presence, while attention is focused on the MOO character: *"I do feel like I am here in a large room, standing all this while (waiting for you to sit since it would be rude to sit before a lady), giving you this interview...but in the back of my mind, I am well aware that I am typing to you through a machine"*.

The level of telepresence experienced by an individual while MOOing is not constant, but fluctuates over time, both within and between MOOing sessions. One MOOer explained: *"I feel very present. As a throwback from my Role Playing days... in order to weave the story with any conviction it was necessary to project myself into the reality being created and sustained. I do it reflexively now. It overlaps and fades in and out. I can be only (MOO name) on the MOO, only (name) at the keyboard or some combination of both. Depends on what's happening around me in RL"*. The individual may be pulled back to physical reality by real life distractions, interruptions or physical needs.

Dual awareness of virtual and physical reality may shift to emphasise one reality over the other according to environmental and personal factors. The

difference in experience between non-existent and high levels of telepresence is highlighted by this extract from an interview: *"It depends on who I am talking to. If I am talking to someone who I enjoy talking to I am all there. Not here at all. But if I am busy or if there is a distraction or I can't talk to that person as easily then I am more conscious sitting at the keyboard, the more I get more distracted. I think the longest I have spoken to somebody on the computer is eight, nine hours straight. You just don't know that you are on the computer at all. Sometimes it can be really a shock, they disconnect and then you disconnect and then suddenly you realise that they are at the end of the world"*. As this quote suggests, where telepresence is high, the interface becomes invisible.

Telepresence can also be affected by the degree of interest in what is happening on the MOO, and whom one is interacting with on the MOO. Physical life impediments to telepresence may reduce the enjoyment of some virtual activities: *"I am aware of what is going on there, but also of my rl surroundings, and my attentions can shift from one to the other without much difficulty ... though RL considerations do keep me from getting as involved as I might in MOO VR sometimes. netsex is a case in point ... orgasms in a pc lab are impractical :-0"*. Environmental and personal factors interact to determine the level of telepresence experienced by the individual at any point in time.

Most MOO users interviewed experienced high levels of absorption while MOOing, with attentional and emotional resources allocated to their MOO involvement. As one MOOer noted: *"I'm *there* man!! =) all of me! it makes me laugh more, because I picture in my mind where people are, and what they do to other people. sometimes I zone out onto the moo. once my roommate walked in, and sat down, and I didn't even notice. I mean, he had to unlock the door too! I should have heard it.."*. For these MOO users, the telepresence experienced contributes to the enjoyment of MOOing.

The extent to which the individual visualises the mediated environment can affect the degree of telepresence experienced. MOO users varied in the degree to which they were able to form mental pictures of what they encountered on the MOO. For some MOO users, visualisation was effortful and required conscious effort, while for others, the process of forming mental images occurred without thought. Some read the text and formed no images and the resultant telepresence experienced by these individuals was often low: *"I don't actually feel as if I'm in another world...I do*

feel as if I'm sitting reading text". However, one MOOer who formed no images was still able to experience telepresence: "No I don't visualise really...its more that I place myself in that reality". Some MOO users were able to visualise some things, but not everything while others consciously chose to visualise some rooms only.

In contrast, some MOO users formed images of all that they read in text. For some, imagery is a very important part of the MOOing experience *"When I look back on my afternoon mooing, I don't remember myself sitting at the keyboard...I remember what I visualised on the moo. It's very neat". Vivid imagery increases the telepresence experienced.*

In addition to visualising rooms, objects and actions, some MOO users formed visual images of other MOO users. Others do not form images of the MOO users they interact with. Again, forming images of MOO users was not a prerequisite to experiencing telepresence: *"No I don't visualise what I read unless it's a well-written description. I'm very much at home with print media (especially books) and get very immersed. But a lot of the descriptions are quite bad and don't get the reader/player involved".*

Some MOO users are fully conscious that they are typing and reading text while MOOing. This was frequently attributed to their lack of typing ability, and the consequent effort required to participate in a text-based environment. Some MOO users are conscious of typing, but not reading, some are conscious of reading, but not typing, and others have reached a stage where the typing and reading of text becomes automatic.

Individuals vary widely in the degree of telepresence experienced while MOOing. While some MOO users experience no or limited telepresence, others become fully engaged in the virtual world to the extent where the computer interface to the virtual environment becomes invisible and physical reality is blocked from consciousness. Individuals who do not distinguish between their physical self and MOO character appear to be less likely to experience telepresence. Over time, the degree of telepresence experienced may decrease as the MOO character becomes more like the 'real life' self. Imagery ability may also predict the degree of telepresence experienced, although imagery does not appear to be a prerequisite for telepresence to occur. Instead, vivid imagery appears to enhance the telepresence experience.

4.3.2.1.2 Sub-Category: Sense of Community

The sub-category, sense of community, refers to MOO users' cognitions of the MOO as a community, and the feeling of belonging to that community. The properties, dimensions and conditions of the sense of community sub-category was presented in Figure 4.3.

The MOO users interviewed had varying perceptions of sense of community on MOOs. These views ranged from statements that there was no sense of community on MOOs to claims that a MOO *is* a community.

A minority of MOO users interviewed stated that they did not feel a sense of community on any of the MOOs they frequented. One MOOer felt that MOOs did not have a true sense of community, explaining *"the sense of community is actually false.. if you know what I mean. It's more like a dysfunctional family.. well there is a heck of a lot of drama behind the scenes.. like my house used to be.. I come from a Latin family so I recognise horrid useless drama when I see it"*.

Some MOO users thought that MOOs *might* have a sense of community, but seemed uncertain as to the extent of this, and whether it was more groupings of friends rather than a community: *"they should have, they should feel like small towns. In truth i think that these small towns dismember into much smaller 'friends circles', and then there is the obvious fact that most 'dedicated' MOOers have characters on just about every MOO"*.

The majority of MOO users stated that some or all MOOs did have a sense of community. MOO users tended to use their conception of community and sense of community in 'real-life' as the basis for judging sense of community on MOOs *"To me its like an electronic representation of your life. That is how I recognise it as a community. Good parallel of your life"*. MOOs were seen as meeting some, if not all, of the requirements for a community: *"I define a society/ community as a collection of individuals sharing a common social/economic environment. Apart from the economic criteria (which some MOOs qualify, not this one), we have a community, yes."*

Among those MOO users who acknowledged that MOOs have, or might have a sense of community, experiences of sense of community varied widely. At one extreme are those MOO users who experience no sense of community. For some, a sense of community developed over time: *"I think that there is a certain inherent loyalty you feel towards others after playing for so long. I think that eventually you*

do feel that you're part of the group". At the other extreme, some MOO users experience a sense of community on MOOs that is greater than that experienced in their off-line lives. Pravatiner (1996) in a posting to an on-line discussion list claimed that *"they (MOOs) have provided me with the greatest sense of community I have experienced in a long while, and some of my closest friends ever"*.

While many individuals have characters on multiple MOOs, most have a MOO that they designate as their 'home MOO' and feel a special attachment to: *"community on a moo is like IPR ... peer groups .. home groups .. whole world identity ...there's one big difference imho (in my humble opinion) ...any moo is accessible by any person ... so it takes a very strong link to become 'world associated' ... most people call one moo their 'home moo' ...but that isn't moo based .. normally there's an interpersonal reason for its choice ...the place where your love is .. where most of your friends are .. or in some cases .. the place where you built for a purpose or are proud of your work"*. Individuals experienced a greater sense of community on their home MOOs than on other MOOs they frequented.

MOO users varied in their views about the extent of sense of community within and across MOOs. Some MOO users felt that the sense of community experienced by MOO users crossed MOO boundaries. This was enhanced by individuals having characters on several MOOs. While some felt that there was a sense of community across MOOs, others felt that each MOO had its own sense of community. The differing sense of community between MOOs was often likened to the difference in sense of community between cities, *"Yes, each moo has a different feel and environment, much akin to moving from one city to another"*, or between cities and towns, *"people in small towns and large cities both have senses of community--moos are like that too ... both personal community of whatever size and identification with the larger entity"*.

Some MOO users felt that rather than communities across MOOs, there were multiple communities within a single MOO: *"I think that we want to have a sense of community but that in the long run there are too many people to have one unified community. I know there are communities there, and I know that they overlap, but I also know that some people exist who don't fit into other people's communities at all"*. Whether a MOO is seen as a single community or a group of communities depends partly on the size of the MOO. Smaller MOOs were generally seen as friendlier, with a closer sense of community than larger MOOs: *"The MOOs with a*

'small-town' atmosphere tend to be fun, lively, happening places. The huge ones like (MOO) and (MOO) are too big, there's not enough sense of community, and consequently they tend to suck, frankly". Again, physical communities were used as comparisons to describe the difference between small and large communities.

Sense of community is a subjective experience, and as these results indicate, individuals experience sense of community in different ways. The majority of the MOO users interviewed experienced at least some sense of community on at least some MOOs.

This section has outlined users' perceptions of the MOO environment, and how this affects their on-line behaviour. The telepresence experienced on a MOO contributes to the perception of the MOO as a 'place', and in the early stages of MOOing may heighten the sense that one has entered an alternative reality. The development of an individual's sense of community in MOOs is associated with the formation of relationships during enchantment (Stage 4), and may be a factor in the decision to continue MOOing despite disillusionment (Stage 5). Sense of community may increase during Stages 6 and 7 as additional community roles are taken on. The following section examines the representation of the individual within MOO communities.

4.3.3 The Individual

An individual is represented on the MOO by means of a character or characters. Each character is classed as an 'object' on the MOO and has a unique object number. A MOOer may choose to develop one or more alternative identities for their character, commonly known as 'morphs'. The individual can switch instantly between their identities by the use of a single command (called 'morphing'). MOO users may have characters and morphs on a range of MOOs. The generic term 'identities' is used in this section to refer to unspecified or multiple characters and morphs, 'character' is used when referring to the individual's main MOO identity, and 'morphs' used when referring to secondary identities of the object number.

4.3.3.1 Category: MOO Identities

The category 'MOO identities' represents the creation, transformation, and maintenance of characters and morphs by MOO users. Figure 4.5 presents the properties, dimensions and conditions that emerged for the category of MOO identities.

THE INDIVIDUAL		
CATEGORY: MOO IDENTITIES		
Description: The creation, transformation and maintenance of characters and morphs on the MOO by the individual.		
Properties	Dimensions	Conditions
Number of identities	One <--> many	Where identity is viewed as a representation of "real" self tend to have one identity Those exploring aspects of identity may have many characters and morphs Number of identities tends to diminish over time
Names	Real-life <--> created Meaningless <--> meaningful	Real life name likely to be chosen if MOO identity is viewed as self
Gender	Biological <-- neuter -- other--> opposite	Alternative genders may be adopted for experimentation or as a gender statement
Description	Real-life <--caricature-->fantasy Chosen by self <--> chosen by others Text <--> ASCII art	
Identification	None <-- aspect of self --> total	Identification with character increases over time

Figure 4.5. The individual in MOOs: Category, description, properties, dimensions and conditions

MOO users vary in the number of distinct identities they maintain. Most MOOs restrict individuals to one character (object number) but do not place limits on the number of morphs. Within a MOO, in addition to their primary character and any morphs created, an individual may have a separate character for their role on the MOO (e.g. a wizard may have both a wizard character and a non-wizard character), a registered second character for role-playing purposes, and/or illegal 'second' characters. The separation of identities becomes particularly important when activities are undertaken with one character that the individual does not wish to be associated with another character. One individual described his motivation for maintaining separate characters as: *"Keeps things separate ...A few people know I'm both, but most don't..My gf (girlfriend) doesn't approve of BDSM (bondage, discipline, sadism and masochism). Well, one of my characters I almost never use. I'm thinking of giving it up. My other character has a 'dom' morph"*.

Many MOO users choose to have just one main character or identity, and create the same character on all the MOOs they use (i.e., they assign the same character name, and use an identical description on each MOO). On any MOO, a name can be used by only one character. This means that even where an individual wishes to create the same character across MOOs, they may be forced to adopt different names where their preferred name is not available. In many cases, the individual regards this one character as a representation of their 'real' self. They may have made a conscious decision to be themselves, or have experimented with alternatives initially, but settled upon the one character that best reflects them. The character may change over time to represent the changing individual. This character (and name) may be used in other cyberspace domains also.

Other MOO users choose to have a variety of identities, using different characters and morphs on each MOO. One person interviewed had 35 distinct identities (morphs) on one MOO alone, in addition to characters and morphs on other MOOs. However, even where many distinct identities are used by the one individual, the desire to be recognised by other MOO users sometimes means that all character and morph names used are listed as aliases on each character. The effort and time required to maintain multiple identities means that some MOO users choose to reduce the number of identities over time.

Individuals create multiple identities for a number of reasons. For some, multiple identities are acts of creation or artistic ability. For others, multiple

identities provide the opportunity to explore aspects of their personal identity, or to reflect changing moods. Other MOO users do not always appreciate the use of multiple identities, even those who have multiple identities themselves. As one MOOer commented: *"some people say that morphs allow them to free parts of their personalities, let them live and learn about themselves. i tend to think that this is an excuse, that morphs allow people to hide, as if behind different clothes. as if it were a way to let one's schizophrenia go free, or actually cultivate it. i find it a bit sick in those who look like having a multiple personality disorder. to me a morph is only a way to change my name. some people use it to change sex and to actually feel particular emotions. i cannot really speak for others. among my friends, morphs are name changing tricks, to stress their moods, or to play games with the people they are with"*.

Each individual chooses the names for their character, morphs and aliases by which they wish to be known. Inspiration for naming characters comes from a number of sources. Some choose to use their off-line name, a nickname or a character name from a role-playing game the individual is involved in. Alternatively, the name selected may reflect a hobby or interest. Sometimes a name is selected to portray a particular image to others: *"One of them's a fairly common Irish name. My ancestry's mostly Irish, and in thinking about points of identity for a character I came up with that, and it stuck. It's a fairly simple name, as is it's description, which I kind of like as a contrast to the flashy fantasies many people present. It stands out more."*

Not all MOO character names have personal meaning to the individual. Some names are selected seemingly at random. Alternatively, the name may not be chosen by the individual, but conferred by a friend, or another MOOer. Still others use the MOO itself for inspiration. The name chosen may be a word related to the MOO, to other characters on the MOO, the role held on the MOO, or to things currently happening on the MOO. Individuals who have multiple identities may use a range of sources for choosing names for their MOO identities: *"it's different everytime ..sometimes i've chose names i've liked..others for humor or satire..or just what i thought fit..and also what hasn't been taken heh"*.

Most MOO users choose to retain the same MOO names over time, with new names being used only when new identities are created. The major exception to this is individuals who switch to using their off-line names. Another exception was

provided by a MOOer who is frequently involved in disagreements with other MOO users. He explained: *"when people hate my usual one, I pick a new one and people treat me better"*.

The individual assigns a gender to each of their MOO identities. Gender choice on MOOs extends beyond the biological. In addition to male and female, MOO users can choose to assign the following genders: neuter, either, spivak, splat, plural, egotistical, royal or second. Pronouns are automatically assigned according to the gender selected. A MOOer can change the gender of their character/morph at any time by use of a simple command. Morphs of the same character may have different genders.

Neuter is the default gender for MOO characters. An individual must write a command to change the gender of a MOO identity to anything other than neuter. Some MOO users choose to have their identities gendered as neuters. Others leave their gender as neuter by default. One MOOer who remained neuter by default until she learned it was possible to assign a gender noted: *"if you don't have a gender, you don't get as much of attention. The girls hate you less, so they don't pay attention to you. The guys don't pay as much attention to you cause they don't know that you are a girl and if you come on as a guy, then the girls will talk to you more and vice versa."* Identifying one's character as a neuter leaves others with the impression that the character is not a sexual character, or not open to sexual advance.

The majority of MOO characters are gendered male or female. For some MOO users, the choice of gender is simple and the biological sex of the individual is assigned to the MOO character. The majority of MOO users interviewed for this study gendered their MOO character in accordance with their biological sex. MOO users may also choose to gender one or more identities as the opposite of their biological sex. For some, the process of switching genders is easily accomplished: *"I just close down the man in me...and let the other parts become dominant...we all have male and female characteristics"*. Others find it a difficult process and are unable to carry it off successfully: *"I've tried a couple of times to adopt a female character.. but I could never do it.. I just couldn't get into it.. in every case, I ended up changing the gender of the character to male."*

Some MOO users assign alternative genders to their MOO identities. Where MOO users adopt a different gender from their biological sex, they have to adjust to

using different pronouns in relationship to their MOO identities. The use of a different set of pronouns may become automated with practice.

MOO users may choose to adopt alternative genders for a range of reasons. It may be used as an expression of the individual's perception of their gender. One MOOer, when questioned why they found male morphs limiting commented: *"well I tie myself down to the mundane immediately. It grounds me back into the physical form. Also the way I think of setting out my gender as male contradicts who I am irl. I'm vaguely androgynous and I don't really fit in with the typical gender associations for male."* Alternative genders may be used to signify that the individual does not wish to be 'labeled' based on gender: *"It means a metaphorically freeing space for me. I've had friends describe it as 'at the same time a gender and a lack of gender'. For me it moves the focus in identifying me from my gender to things that are more flexible - that I have more power over... that people will give me more power over."* Some MOO users use their alternative gender as a form of gender activism, to force others to think about the social construction of gender. One MOOer had taken gender play to an extreme, by choosing to maintain the same character, but changing genders frequently.

MOO users who adopt alternative genders are frequently asked their biological sex: *"People now pretty much accept me as a (alternative gender). Strangers and newbies sometimes will try to 'pin me down' and demand a 'real' gender from me. I have various ways of telling them to go to hell, some of them making them look stupid, to boot - depending on how insulting they are and how tired of the question I am at the time."* Presenting oneself as an alternative gender can lead to insinuations about sexuality and may even result in abuse from other MOO users: *"I was a guest (alternative gender) and it created me all kinds of hassles.. got called names I haven't even the rage to repeat..raped..you name it.. just cause I refused to give out my RL gender. "*

On a more positive note, adopting an alternative gender can be one way of meeting other people. It can be a discussion point for other MOO users: *"....being in a position to watch ppl (people) get flustered at our non M/F-ness can be fun...and I've actually had folks I've become Moofriends with tell me (later) that they struck up conversations with me because they wanted to see if they could figure out my RL gender from talking to me ..so sometimes the (alternative gender) has helped me meet folks I might not have met (or not met in the same way) otherwise".* It may also serve

as an introduction to other MOO users who use alternative genders. However, the opposite can also occur. Some alternatively gendered MOO users noted that there was little interest in them, particularly sexual interest.

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Figure 4.6 Simple ASCII art MOO character description (used anonymously with permission of the individual)

Individuals create descriptions for each of their MOO identities. The description may be typed text, or a picture created from ASCII text (see Figure 4.6). Character descriptions vary in length and complexity.

Some MOO users choose to provide accurate physical descriptions of themselves. These MOO users tend to use the same description across MOOs. MOO users who have realistically described their characters often prefer to interact with others who do likewise: *"well, I try to keep as true to life as I can...most of the people I have become good friends with do too."*

Other MOO users use a description that has a basis in real-life with added enhancing components. As with the choice of name, the choice of description may be used to represent the self that the individual wishes others to see *"I describe myself fairly accurately here and elsemoo...why hide behind a facade any worse than the actual anonymity here? I'll admit, the only part I fudged on were the breasts...but that's okay. 20/20 did a special on the American obsession with breasts...it's very irrational...How people describe themselves here is how they want to be seen, for whatever reason. I chose to look like I do when I crawl out of bed and stagger down to the lovely community bathrooms at my school...minus the pillow marks and squinty eyes...It's just a personal thing...nothing to do with sex either"* (posting to a newsgroup).

Some MOO users create descriptions that present a caricature of the self *"it was more a projection of what I imagined i'd be like if I took my interests to the extreme, mixed in with the sensational things that fitted in...that I was interested in at the time..."*. Other MOO users create descriptions that are pure fantasy, sometimes

driven by the character name chosen. Character descriptions may be seen as works of creation, and time and effort put into them: *"I described new characters with meticulous attention to the thing I wanted to evoke ...descs, messages, the works ...clothes .. and personalities"*.

Some MOO users create overtly physically attractive or sexual descriptions. The motivations for doing this are frequently questioned. Kooky of Id MOO started a discussion on a moo-mailing list with this question: *"Hmm.. I was just thinking... why do all the women on this moo, (and all moos for that matter) have sexy desc? and if they arent sexy, then they are cute. and they always describe their flowing hair and bodies... I mean, thats cool to be proud of your body, but this is moo! "*. The ensuing discussion presented a range of views of the motivation of the individual. One view offered was that these descriptions were adopted by those who were not physically attractive. Others disputed this, claiming MOO descriptions were a creative outlet: *"Let me tell y'all that a creative and/or sexy description on the MOO doesn't necessarily mean that a person is 'ugly' or 'desperate' or even a male disguised as a female. I know that I simply enjoy writing descriptive prose that's mildly erotic (or VERY erotic, with the proper incentive ;)). Making assumptions about a persons physical appearance based on their MOO description is downright silly, IMHO (in my humble opinion)."*

The process of creating a description can be ongoing. A description may not be created until the individual is familiar with the environment. Alternatively, a temporary description may be created: *"(MOO name) hmmm...she agonized over it for weeks...for the first little while she went around with a paper bag over her head..."*. Descriptions can be changed at any time, or alternatively an individual may choose to change clothing and possessions while living the main description intact.

Even when a description has been written, it may be changed at will, to reflect the current reality of the individual: *"I've had a lot....I change it whenever I feel like it's getting old...I just say whatever comes to mind...so you can kind of tell what mood I'm in week to week by my desc.. :)"*. As descriptions change, other MOO users responses to the MOO character may also change.

The only information one MOOer has about another when first encountering them on the MOO is the name and description of their current identity. As such, it provides the first impression. In the absence of other information, the description allows other MOO users to get a glimpse of the person behind the character. Even

where descriptions are not factual they provide information on another: *"i like to see how people describe themselves.. or how they describe they're alter ego/fantasy"*. Descriptions can form the basis for hypotheses about the other and in some cases lead to the formation of relationships when MOO users are attracted to each others descriptions.

The description used can affect the amount of attention a MOOer receives. One MOOer commented on the different people attracted depending upon the identity and description adopted. One morph attracts attention from homosexual males: *"i have a blatantly gay male morph ..i find more gay men talk to me in it.. "*. However, this attention declines when 'real life' details emerge: *"but should they find out i am not definitely a male or gay,..they tend to be less interested in me."* In contrast, when a female Asian morph is used *"..it tends to get more attention from men..."* This was attributed to *"oh the whole asian stereotype..there alot of asian fetishist about..who would like a submissive cute woman..etc etc"*. However, as another MOOer noted, just assigning a female gender to an identity is enough to increase attention: *"well, women have a far easier time attracting attention..no matter what the morph"*.

MOO users vary in the degree to which they identify with their MOO identities. Some MOO users feel no personal identification with their MOO identities. For example, one MOOer, when asked how much he identified with his MOO character responded *"not much at all"*, stating he thought of his character *"as some 1's and 0's on a disk"*. Some MOO users regard their MOO identities as role-plays: *"I see them as costumes. But they all have different personalities.."*. However, even where characters are developed purely for role-play purposes, a level of identification may occur: *"I intended for her to be pure character roleplay but it is difficult not to let the writer in. She assuredly isn't just me though"*. Other individuals may feel a limited identification with their MOO identities. For example, one MOOer described her character as lacking depth, but could identify areas in which her off-line self and MOO character overlapped. For other MOO users, the MOO character represented an idealised self.: *"...she feels a lot like her...she looks a lot like her...but (MOO character) is a bit taller...and more self-confident."*

For many individuals, MOO identities represented aspects of the self, with different identities representing different aspects of the individual. In some cases, the use of multiple MOO identities were used to actively explore aspects of the self. For

some MOO users, multiple MOO identities allow the representation of all aspects of the self, something which may not be possible off-line: *"i have many selves..i show how i think i really am here..i feel different all the time."*

Many MOO users identified strongly with their MOO characters, making no distinction between their off-line and MOO selves: *"(MOO name) is ME. I do not lie or play headgames..her reactions and statements are the typists....when I smile here, the my typist is smiling IRL "*. Some viewed their MOO identities as the virtual equivalent of their off-line selves. This identification could be so complete that the notion of a separate MOO character was rejected: *"And (MOO name) is not a character to me...it is me with a different name..."*

MOO users have more than one identity, and may identify more strongly with one identity than others. The character most identified with was frequently the original character. Other identities may be set up for specific roles or purposes. Alternatively, they may simply represent creative expression. While most MOO users identified most strongly with one identity, one MOOer noted they identified with a combination of identities.

The level of identification with a MOO identity may change over time. Some MOO users commented that their MOO identities had become more like their off-line selves over time, resulting in a closer identification with the character. As one MOOer noted, *"well he now resembles me alot more then he used to..I used to keep him tightly in check and now I've become more free with the me in (MOO name) (cut) I'm more comfortable with letting myself out"*. In contrast, other MOO users noted that the off-line self became more like their MOO identities over time. One MOOer described the confusion that having on-line and off-line identities created: *"I went through a whole identity crisis thing at the beginning because you are not sure whether you are the same on the computer and off the computer (cut) I was beginning to wonder if I had three different personalities and since I am doing Psych I was beginning to convince myself that I had multiple personality disorder."* However, rather than the MOO identity becoming more like the off-line self, the opposite occurred: *"So then you think that the character on the computer will become more like your character in real life, but my character in real life became more like the character from the computer because on the computer you tend to worry less about what people think and be more relaxed and that was coming through to my character in real life."*

The development of, and changes to, MOO identities over time are an important aspect of the stage model of MOOing. Identities are created and transformed during the immersion stage, sometimes bearing little resemblance to the off-line self. Identity play engages the individual in the exploration of possible selves. As the individual progresses through the stages the number of MOO identities may decline and identification with the primary identity intensify. By the final stage, identification with the primary identity is complete. The next section examines the ways in which individuals, represented by their MOO identities, engage in social interaction.

4.3.4 Social Interaction

Social interaction in MOOs is entirely text-based. This has a number of effects on social interaction. First, the text only nature of MOOs means that social interaction is based on communication rather than shared physical activities: *"...and one's f2f RL (face-to-face real-life) interactions are invariably different than they are on MOO....one can't go to the movies here. or down the street for a cup of coffee or a beer. as much as there are VR attempts to duplicate such spaces, the effect isn't the same at all."*

Second, greater importance is attached to each message. The absence of shared activities combined with the lack of a common geographical and social environment outside of the MOO can also mean that conversation is relatively devoid of small-talk. In MOO communication, greater emphasis is placed on each message in a conversation. The time taken to type textual messages means that the sender has thinking time in which to edit the content of the message. As one MOOer noted in a posting to a MOO mailing list: *"This place is great for me coz I can delete the stupid stuff I usually spout before I hit return. Just the deep and funny stuff tends to make it through this filter"*. The message receiver also has more time to contemplate the content of messages received: *"And because all you have is text, I think it's more intense in some ways. Intense because you are waiting to see what the other person will type, you think of your words and of what they might say, of how they took what you said. then you've all the time ya need to formulate thoughts very carefully...you don't have that in f2f. To me, that intensifies the effect. But only if it is a person I am on the same level with."* Thus, each message is given great thought, both in the writing and interpretation of the message, and assigned a greater importance than a similar message in a FTF situation.

Third, the absence of non-textual cues on a MOO means that the typed message is the whole message. It does not have to be reinterpreted in light of body language, tone of voice or facial expression. *"It's easy to misunderstand a statement, when you're missing the audible signals.. , Irony is hard... dry humor is impossible.. Visual clues are also important... a smirk, a quick smile.. etc."* However, despite the lack of non-textual cues MOO users note that they can express emotions and understand other's emotions: *"That is one thing that really surprised us, how someone cannot say anything and you can know they are distracted or know that they are upset. Even if you just looked at the words and it was exactly the same, you can still get the emotions through the computer. It is really strange cause everyone always assumes that you get it from body language or through eye contact, and then you get it through the computer and you just can't figure out how that happens."*

Emoticons, paralanguage, timing and the text itself can be used to convey emotions. These linguistic cues are substituted for the non-verbal cues present in FTF communication. MOO users adapt to the lack of non-verbal cues and over time learn to compensate for their absence: *"what happens here is .. you remove all the non-verbal signs and stimuli and replace them with extremely crude social verbs (programs that allow the use of short-cut keys) and an emote capability (to express emotions and actions in text-format)... so you're tuning peoples 'verbal' response systems to a level they never used before... after a while .. you can read as much into punctuation, phrasing, silences, as you can into words... you can 'see' the subconscious hand across the mouth before answering .. in a silence .. or an ellipsis... a chuckle or a grin well places can disturb someone's confidence... it becomes very acutely tuned .. and extremely accurate...with experience".* MOO users adapt their style of interaction to suit the text-based environment of the MOO.

Three categories relating to social interaction in MOOs; dispersed attention, programmed communication, and relationships; are developed in the following sections. The properties, dimensions and conditions for each category are displayed in Figure 4.7.

4.3.4.1 Category: Dispersed Attention

The attention of MOO users can be dispersed across multiple conversations and multiple activities. Space is a social construction on MOOs. The MOO is a database that may be programmed to give the appearance of rooms. 'Being' in a room on the MOO simply means the user is accessing a particular segment of the

SOCIAL INTERACTION		
CATEGORY: DISPERSED ATTENTION		
Description: The dispersion of attention across multiple conversations, multiple MOOs and other activities		
Properties	Dimensions	Conditions
Focus	One<-->many	Number of MOOs used simultaneously Number of conversations held simultaneously Other activities engaged in
Attitude towards	Positive<--neutral-->negative	
CATEGORY: PROGRAMMED COMMUNICATION		
Description: The use of programmed communication such as feature objects		
Properties	Dimensions	Conditions
Frequency of use	Never<-->constant	Affected by programming ability and typing skills Use declines over time
Attitude towards	Positive<--neutral-->negative	
CATEGORY: RELATIONSHIPS		
Description: Ongoing interactions between MOOers that are perceived by the MOOers involved to form a relationship		
Properties	Dimensions	Conditions
Types	Acquaintances <--> significant others	Dependent upon definition of relationship MOOing history and time spent MOOing each week
Number	None <--> many	Where depth of relationships exceeds that of off-line relationships, individual may develop preference for interacting on-line
Depth	Casual <--> deep	Where separation of lives maintained, relationships may have virtual importance only
Importance	Limited <--> extreme	Distinction blurs when relationships move off-line
Status	Virtual <--> "real life"	Relational partners may be viewed as people or as "characters"

Figure 4.7. Social interaction in MOOs: Categories, descriptions, properties, dimensions and conditions.

database. Because physical presence is not required to communicate with others on MOOs, MOO users can engage in multiple conversations simultaneously, both within and across MOOs. While logged into one MOO, a MOOer may be engaged simultaneously in a discussion with players in the 'room' where their character is located (using the say command); whispering with one or more characters within that room (using the whisper command), paging other players anywhere on the MOO (using the page command), and remote paging MOO users on other connected MOOs. In addition, the MOOer can be logged into other MOOs and engaged in one or more conversations. MOO users vary in the number of conversations and number of MOOs they wish to be involved in at the one time.

In addition to holding multiple conversations, MOO users may also be involved in other MOO activities such as programming, or off-MOO activities such as work or study simultaneously. Multiple conversations, multi-MOOing and engaging in multiple tasks all require the splitting of attention. One effect of this is that a MOOer never knows for sure how many other people their communication partner is conversing with, or how many other activities they are involved in.

MOO users vary in their attitudes towards multiple conversations. Some MOO users do not like the concept of multiple conversations conducted simultaneously, and prefer to focus their attention on one discussion: *"I suppose I just try to be completely present for the people I'm with -- here or in person. That's partly why I have trouble with the idea of multimooing"*. Other MOO users report that for them multiMOOing is the norm and an acceptable practice.

4.3.4.2. Category: Programmed Communication

MOOs are programmable environments. As such, any individual with Object-Oriented programming skills can program their own objects. Once objects are created, they can be copied and modified by other users for their own use. One class of objects known as feature objects (or fo's) enable the user to type a short command which results in a longer output on their own, and others' screens. This output can range from a simple sentence to multiple screens of information.

Feature objects affect the communication process on MOOs. The use of feature objects cuts down the amount of time required to type in a message. Descriptive feature objects can increase the telepresence experienced. However, the use of feature objects can also 'stereotype' communication where many users use the same feature object.

The frequency of use, and attitudes toward, feature objects varies among MOO users. Some use them as a matter of course, others avoid using them altogether. Over time, the use of feature objects diminishes as they lose their novelty value. One MOOer explained the effect on her of knowing that someone had communicated using a feature object rather than typing a greeting: *"Yes the fo's ...some of them are...I mean type in a simple one word command and you can hug an entire room... I guess it just doesn't mean as much to be hugged with one word as when someone has to type in a whole line..."*. In this way, messages that are recognised as being generated by feature objects may be assigned less importance by the recipient than similar sentiments expressed without the use of feature objects.

4.3.4.3 Category: MOO Relationships

MOO relationships are ongoing interactions between MOO users that are perceived by the individuals involved to form a relationship. Interacting in MOOs, most research participants had formed a variety of relationships. As one participant commented: *"I've formed about all the kinds of relationships I can think of with other MOOers: friends, lovers, friends&lovers, obsessions, lusts, hate, love, fear, etc."* While many MOO users had formed relationships with both males and females, some noted that they were more likely to form relationships with the opposite sex. The variety of relationships formed on MOOs reflect the variety of relationships that are found in off-line environments.

The number of ongoing MOO relationships formed ranged from none to many. Some of the variance in number of relationships reported may be due to differing conceptions of what constitutes an ongoing relationship. Communication style, history of MOOing and time spent MOOing each week may also affect the number of ongoing relationships an individual has.

In addition to nurturing a wide range of numbers and types of relationships, MOOs support relationships of differing depth: *"hmmmm....it varies wildly. sorta like it would IRL. We've got passing acquaintances that we'll say 'hi' and not much more to and we've got real solid friendships that have gone beyond MOO (and for which MOO is now part of how we interact, but by no means the whole schmeer) and most of the gamut in between...."*. In addition to forming casual relationships, the majority of MOO users interviewed had developed at least one close relationship they viewed as equal in depth to their physical life close relationships. In some instances, the depth of the MOO relationship was seen to exceed that of their physical life

relationships: *"Strangely enough, many moo friendships I have are closer than some of my rl friendships. Cause I know I'll never meet those moo friends, so I feel like I can tell them everything and everything. I have to live with my rl friends everyday".* This can lead to a preference for interacting with virtual friends: *"I actually prefer most of my net contacts to most of my RL ones lately...they are more interesting people. I chose them, rather than came into contact with them just because they were there..in a way, mooing is the ultimate repudiation of proximity as a sine qua non of social relationships".*

MOO users varied in the importance they placed on MOO relationships. A minority of the MOO users interviewed regarded their MOO relationships as dispensable or of little importance. For some MOO users, virtual life and physical life are compartmentalised, and MOO relationships are seen to have virtual importance only. For these MOO users, details about their personal lives may be off-limits as a topic of discussion: *"I have a few people here I would consider at least cyber friends... I don't really encourage real life questions though".*

Not knowing the appearance and off-line details of those with whom you are interacting can also affect MOO users' perceptions of the worth of relationships. For example, one MOOer commented that *"Rl friends arereal, whereas moo 'friends' are people you don't really know...they are faceless as it were".* Some MOO users expressed concern over how well you can know a person when interacting with them in text only, given the opportunity the medium provides to control self-presentation. As one MOOer stated: *"my real life friendships are deeper than the ones with the mooers. They see me not just what I choose to show. This remains mostly for fun, although I would miss it if I had to stop and I do enjoy it. I think as I know people better here and know who to trust then the moo friendships might deepen. Friendships here are precarious. You never know if you are seeing anything near the real person. So I wait and see or wait and form an opinion."*

The majority of MOO users interviewed had at least one MOO relationship that they rated as being of importance to them. However, as with off-line relationships, not all relationships were accorded equal importance. MOO users varied in whether the relationships they formed were regarded as MOO relationships, 'real life' relationships, or a hybrid. Some MOO users choose to keep their MOO friendships strictly in cyberspace and separate from their real lives, while others take the view that they are similar types of relationships that differ only in terms of

limitations imposed by the technology: *"from my perspective, there is no difference. The only significant factor is, you don't know what the other person looks/sounds like. Even their gender can be questioned sometimes... :)"*. Not only can they be similar types of relationships, but they can be with similar types of people. As time passes, the distinction between MOO and virtual friends becomes blurred for many MOO users as friendships transfer out of the MOO environment into off-line settings: *"Some of them are real life friendships now because I have actually met them, some of them I don't really care about but some of them I would be pretty upset if I didn't talk to them. After a while boundaries between the virtual world and the real world kinda merge."*

MOO users who felt their MOO relationships had become 'real life' relationships were asked at what point in the relationship this occurred. For some, the defining factor was the quality of the relationship, while for others, it was when the relationship began to impact on off-line life. A commonly mentioned turning point was when the relationship extended outside of the MOO environment: *"Well, a friendship that only exists inside this MOO is perhaps not that good. It's when it becomes more 'real' that I find it more satisfying. Such as when real names, pictures, addresses are exchanged. Or when RL visits are made."* Meeting in physical life often cements MOO relationships, with the act of meeting conferring the status of 'real' upon the relationship.

4.3.4.3.1 The development of MOO relationships

This section describes the development of relationships (acquaintances and friendships) on MOOs. The development of romantic relationships in MOOs is addressed later in the chapter.

Individuals meet other MOO users with whom they develop ongoing relationships in a number of ways. The majority of MOO users reported first meeting others in public rooms on MOOs. MOO users may also meet through postings to MOO-mailing lists, asking for or offering help, or playing scrabble. MOO users noted that conversations are easier to start up in the MOO than off-line: *"it takes away the aspect of walking up to someone on the street and starting a conversation, in RL that would be harder to start a conversation with someone, than it is here, cause that's the point to the MOO"*. Once a social circle had been established, future potential relationships were usually based on introductions by existing MOO friends.

In public rooms there may be large crowds of MOO users. What attracts one MOOer to talk to another MOOer? Some MOO users reported that they will talk to any other MOOer initially, and then make a judgement about whether they wish to continue interacting with them based on the conversation: *"i make random comments and see how they react i s'pose it's a way of choosing friends or picking out who's cool or who's got a pole up their butt"*. Other MOO users are attracted to those whose conversation is seen as personally interesting or entertaining. MOO users may also be attracted to talk to another MOOer by their name or description

When MOO users first meet in public rooms, the conversation may resemble small talk off-line. This may involve the exchange of demographic information (e.g., country, age, gender, studies) and discussion of happenings on the MOO or in cyberspace generally. While small talk on the MOO may mirror aspects of small talk in physical life, it may differ in terms of speech patterns and customs that have developed in the MOO over time.

Based on the first interaction, a judgement is made whether to interact with a particular MOOer on another occasion. This decision may be based on the perception of shared interests or on the flow of the conversation: *"there is a chemistry, just like IRL. With some players, after a couple of exchanges, you both sense a common thing, and you know that you'll get along. its when one person makes a comment, and there is an immediate response along the same lines...the dialogue never hesitates...there is no awkwardness among these strangers...remember, birds of a feather flock together cliché works here too"*.

Because MOO users have no way of judging each other on their appearance relationships are formed based on the content of interactions. This results in people forming relationships with others whom they may not consider associating with in their physical lives: *"in an environment where material attributes take second place, personality becomes important...in rl, that is often 'distracted'. (cut) I look at it this way, it offers a chance to meet and interact with folks whom you may not (for material reasons of physiognomy, income, educational background etc) get a chance to interact with otherwise. To this end, I don't think it alters anything. It enables."*

Where interest is established, a MOOer may begin to actively seek the other out by placing their name on their log-in watcher (a program that alerts the MOOer when specified individuals log into the MOO). When logging into the MOO, it is common to check for the presence of friends using the log-in watcher.

Where interactions are positive, relationships develop over time. Interaction and conversation become more personalised: *"in general the topics of conversation will get deeper...sometimes philosophical, sometimes personal...it's like meeting someone in real life and being with them for any length of time, you learn bits and pieces and get to a comfort level where deeper issues and topics come up"*. As with relationships in physical life, overtime interaction becomes less formal and more intimate, focusing on the private lives of individuals and their shared experiences on and off the MOO.

Many of the MOO users interviewed commented on how quickly MOO relationships develop. Self-disclosure is facilitated by the absence of non-verbal cues on MOOs and the uninterrupted focus of attention on the other person in MOOs: *"And as for relationships (from friendships to deeper (?) ones), there is a substantial difference on here, too: the lack of distractions. If it is true that we only receive 'text' from the other person, it is also true that since that is all we have from him/her, we tend to treasure it much more than we would do IRL... When we are alone with someone in a MOO private room we are isolating our thoughts, and all our attention reaches out to capture what the other is actually saying"* (posting to a MOO-mailing list).

In some instances, individuals reported spending more hours with their MOO friends than real life friends, as typified by this comment: *"There is a big difference in the amount of time I spend with particular individuals on the moo and irl" ..(cut) ..."I typically spend a few hours a day on the moos, in the evenings, on an almost daily basis. I typically have only 1 or two people I see regularly on the moos, so that's often something like 20 hours a week in one person's company ... irl there's not too many people I'd see more than 2 or 3 times a week, and it generally adds up to a lot less time. It's also a lot more likely irl that there'll be a larger group of people around, whereas on the moo, it's more likely to be 1 on 1"*.

As relationships develop, the question of whether to extend the relationship outside of the virtual environment arises. MOO users may choose to restrict their interaction with other MOO users to the MOO, may choose to meet selected MOO users, or may choose to meet as many MOO users as possible. The number of other MOO users met in 'real life' by those MOO users interviewed ranged from none to many.

MOO users who have not met other MOO users cited a variety of reasons why. Some had made an active decision not to meet other MOO users as a way of keeping their virtual and 'real' lives compartmentalised. Others had not met their MOO friends due to the costs, geographical distance or time involved. Some MOO users would like to meet other MOO users but have not yet had the opportunity.

There are two common ways of meeting another MOOer in a physical setting: by private arrangements or through attending a 'MOO-bash'. Meeting privately requires a decision to meet a specific MOOer (perhaps requiring a higher level of commitment or emotional investment in a relationship), while meeting MOO users at a MOO-bash requires a decision to meet MOO users, without knowing exactly whom one is to meet.

The LambdaMOO BashFAQ describes MOO-bashes as: *"A bash is a party, and a LambdaMOO bash is a LambdaMOO party. Bashes are held off-line, in RL (Real Life), and ideally without computers present in any form (cut). Bashes are wild and noisy with many old virtual friends meeting up with each other in RL for the first time"*. MOO-bashes range in size and activities. MOO-bashes in the United States of America tend to be large affairs. One MOOer described their bash experience as: *"usually we all hang out and drink or smoke up or <insert activity here>, it's like a big party except everyone's calling each other funny names. people are amazingly real. almost everyone generally gets along"*. MOO-bashes can help MOO users integrate their virtual and physical lives: MOO-bashes can also serve a number of other purposes: *"One is the overlap of community to RL... another is networking (for school and work and life)... another is just being with friends... and they're a lot like roman orgies, too... excess in drug/drink/sex, etc... a good way for these friends of mine to let off pent up steam... and the world is so stressful, sometimes it's therapeutic to just forget and seek excesses of hedonism"*. MOO-bashes form a bond between MOO users that may result in the formation of closed social circles within the MOO. *"i think the worst thing is the development of cliques. i think those form directly from rl meetings. i don't know exactly why.. but i think it's that 'shared experience' thing...we know each other and we have something in common.."*

Private meetings between two or more MOO users occur frequently. These private meetings may be spur of the moment occasions, but are more frequently the end product of a long process of transition between virtual and physical life. The decision to meet requires a degree of trust in the other MOOer as 'real life'

information will be revealed: *"Unless I meet that person at a bash (where attendance is somewhat random), I will need to trust that person a certain amount (subjective) before I will agree to meet em in RL"*.

There are stages MOO relationships commonly go through prior to MOO users meeting privately FTF. One MOOer described this transition process as conforming to a social script: *"...there's like this total moo etiquette. Exchanging emails is the next step... then maybe photos or phone calls. Then meeting. I wouldn't meet anyone if I didn't know their full name"*. In this way trust is gradually built up between the individuals, and a broader picture of the individual emerges.

The decision to meet off-line can be a difficult one as MOO users may risk losing the ease of the relationship they have developed on the MOO. First meetings between MOO users vary according to expectations and the importance accorded the event. Where the meeting is between MOO users with only a casual relationship, only limited expectations exist and little is risked by meeting. Meetings between close MOO-friends have more at stake, but the rewards can also be greater.

First meetings vary in their outcomes. Some meetings are a source of delight to both participants: *"what can I say .. its like meeting someone for the first time and knowing them for a long time already...if its good, you just dovetail like you've always known each other"*. However, not all meetings are successful. One MOOer described what she considered a disastrous meeting: *"Just that I knew as soon as I met him that he had lied to me. On here, he made it sound like he was a real ladies man or something. I just nodded and thought "Okaaayyy, whatever.. And I'll be really, really frank. When I first saw him, I thought, "HIM? A Ladies man? HA! He hadn't accurately described himself, first of all. Which, okay, I can deal with. But the fact that he lied really got to me"*. The act of meeting in real life destroys the anonymity associated with MOOing, something that may cause some MOO users distress: *"I think of all the times we were together, and try to picture them mooing and reading what I say to them. sometimes I feel exposed."* (Why?) *"Because I blow my cover when I see them. I like the fact that they don't know my gender or age or looks."*

The success of a meeting often depends on how well each person's expectations are met. Some MOO users were markedly different from expectations, while others came very close to expectations. Physical appearance was the factor most likely to differ from expectations, while personality was only occasionally

different from expected. However, some MOO users noted that MOO personae were more outgoing and less inhibited than off-line personae: *"I was gonna say that they were better on the Moo than IRL. I think it's because Mooing gives you freedom to do what you want. If you are restricted in RL that's great but then RL clashes and you end up being that restricted person..."*. With experience, expectations may decrease or become realistic: *"well..at the beginning not at all (like what I had expected)..i had formed radical ideas of what they were..always very extreme compared to what they were..but now..when i meet people i am not so shocked..i expect people to be pretty normal"*.

Relationships between MOO users are not static. Meeting another MOOer in physical life has the potential to change the relationship. The content of interaction may change after meeting. Meeting in real life can be a powerful experience, bringing to the surface emotions that were repressed: *"We fell in love.... which wasn't what I had anticipated...or her...(we fell in love) on the net most likely.. but neither of us realized it... it hit home the hardest after she left.. for both of us. we felt we were the best of friends.. and only friends.. we meet ipl as friends"*.

4.3.4.3.2 MOO romances

Romantic relationships on MOOs develop in a manner similar to other relationships on MOOs. The text-only nature of the MOO affects the way MOO users form romantic relationships, with the emphasis on personality rather than appearance: *"You see, there is no 'ugly factor' here. You must know a person through words and textual 'pictures' before you see them. It's the personality you fall for, not the look"*. As with other MOO relationships, MOO romances develop as the partners get to know each other better: *"...you meet, get to know them, and the development comes from spending time with the person, learning of their personality, their quirks, their strengths and their weaknesses, and feeling that you are good for them and vice versa...and the ability to overcome conflicts when they arise"*.

The speed of development of MOO romances was a common theme in interviews and in postings to MOO-mailing lists, with many reasons for this suggested. One reason suggested was the number of hours spent together focussing on communication rather than sharing activities. One MOOer, in comparing MOO and physical life romances noted that: *"I think it's better...well, except that we haven't met irl...but we got to know eachother really really well kinda fast...I know more about him than I've known about most of my bfs (boyfriends)...cause all we do*

is talk...we talk for at least 4 hours a day, not including phone time...in between classes we both go on the moo and at night..." With an off-line boyfriend it would be "about half that....it'd be like first date, a bit of talk...more nervous than anything...one call between dates...I mean sure, we'd get to know each other, but not nearly as fast."

Another reason suggested for MOO romances developing quickly was the high rate of personal disclosure: *"Of course, relationships seem to move MUCH faster ivr than irl. I think it's because you don't have to play the little games irl"*. (cut) *"There are certain norms to building a relationship that aren't really there on (MOO). People disclose things much more readily over the MOO. I guess the inhibitions of being stigmatized for doing something "Stupid" or faux pas are taken away"*.

MOO users described MOO romances as being compressed in time. The fast development of MOO relationships may give MOO users a false sense of knowing the other person well: *"I think that meeting on moo, things tend to progress a LOT faster than they normally would... Thus, tends to create false feelings of love for the people... Then when they meet, or when things slow down, it hits that they really aren't as close as they think, or don't know each other as much as they think..."* (cut) *"A few of mine went SO fast in the beginning, they sort of burned out from the intensity..."*

The focus on communication in MOO romances may also mean that relationships break up faster than in 'real life': *"...relationships on the MOO grow faster and deeper due to the increased number of exchanges (possible thanks to the selectivity of the medium, text only!). And yes, sadly enough: the more you dig into someone else's soul, the deeper you excavate, the sooner you are bound to reach either the bottom, or at least something you are going to dislike: whence the easier breakups"* (posting to a MOO mailing-list). In addition, there may be less outside pressure to maintain MOO relationships: *"...there's usually less pressure for two people to stay together on a MOO than there would be in real life. But I don't think it's completely absent either, especially if the two people are part of the same social MOOcircles and know the same people..."*

MOO users involved in romantic relationships may choose to publicly celebrate their love by becoming MOO-married. MOO-marriage may mean different things to different individuals. For some it holds little meaning, while for others it is

a symbolic ceremony of love. One MOOer explained that the exchange of 'rings' on the MOO signified *"That we were together..both vr and ril. I mean irl... WE couldn't be together irl at that time..but we wanted to be together. We also knew that we didn't want to be with anyone else. I think it was pretty important...seeing as though I had a reception in a reception hall afterwards. It was like planning a "real" wedding. I think it was both our ideas. We knew about other people getting MOOmarried, and we were really serious. It was the natural progression of our MOO relationship"*. For others it may occur due to pressure from the other party.

MOO users involved in romantic relationships vary in their conceptions of the personae conducting the relationships. At one extreme, some MOO users develop romances that they perceive as being between two characters rather than between two people. These relationships tend to be kept strictly to the MOO: *"..we lived in our characters and we didn't..like (MOO name) would talk about (name) in the third person and (MOO name of romantic partner) would talk about (name of romantic partner) in the third person as well. ..and she was about 40 years old and she had a husband and a kid..but we didn't let the lines cross..it was like a whole separate thing"*. At the other extreme, some MOO users perceive their relationships to be between two 'real life' people who are using the MOO as the medium in which they are conducting a 'real' romance.

The perception of a MOO romance as a relationship between characters or between people reflects the perceived reality of the relationship. A posting to a MOO mailing-list described the changes associated with a relationship moving beyond the MOO: *"When I was on the MOO only, fidelity was not an issue--the relationships, as far as I was concerned, ... were NOT real. Hence, when (MOO name) and I were considering rl seriously, and my other moothings made him uncomfortable, I was unwilling to give them up because as much as our relationship showed potential, it wasn't yet real enough for me to make those kinds of gestures. BUT, when we moved to rl, and have stayed there, we both have insisted on complete fidelity, on moo and off. "*

As with other types of MOO relationships, some MOO users choose to meet their MOO romantic partners in physical life. MOO users described their motivation to meet MOO lovers as a natural progression in the relationship: *"Because we click, we mesh. We think alike, talk alike. We tell each other everything, we're thisclose. We knew that we HAD to meet. It was the natural next step"*. The amount of time that

MOO lovers know each other prior to meeting varies, but commonly occurs after months of frequent interaction. The transitional stages to meeting FTF for romantic partners mirror those of other MOO relationships. Frequently MOO romantic partners exchange email addresses, letters and photographs and talk on the telephone prior to meeting in the flesh. One MOOer described the transition as: *"We began to talk on the phone almost daily. A month or so ago, she flew down here, and we spent about 5 days together. It was wonderful. Last week, I flew to her hometown, and we spent a week together - that was even better"*. Exchanging pictures appears to be a crucial stage in determining whether MOO romantic partners will meet face to face: *"Of course, we had to exchange pics. I mean, looks DO matter...no matter how much anyone wants to deny it. It's just natural"*. For some, the photo comes as a surprise and an adjustment has to be made to reconcile the photographic image with the image the MOOer has developed in their mind. This can affect future interaction between the MOO users: *"And I have found that when I see a photo of them ...from then on that affects how I see them...and it has even made me stop talking to them as much because they are not my 'type' but mostly I am better able to look past someone's appearance because I 'know' them..."*.

Where MOO users are romantically involved, the meeting may be viewed with great trepidation. When the first meeting in 'real life' has been arranged, MOO users experience both anticipation and nervousness. One MOOer who was about to meet a MOO romantic partner for the first time described her feelings as *"I am really excited about it but a bit nervous too...You know..will he like me when he sees me rl...and will I like him..."*.

The initial reaction upon meeting can be one of awkwardness. The degree of awkwardness may be affected by how well the other MOOer is known and the expectations for the relationship. MOO romantic partners may experience an initial period of awkwardness: *"it was strange at first. I don't know..kind of like a first date with someone. Well, we knew each other in intimate details...but we hadn't been together in person WE knew everything about one another, knew what each other looks like, but it's always a bit strange to be with them in person"*. Feelings about the other which may have been expressed freely on the MOO may no longer be so easy to impart: *"I was a little less ready to talk about my feelings. On the moo, we tell each other that we love each other all the time. But I found that its a bit harder to speak the words. But by the time the weekend was over, it was fine :)"*.

Moving from interacting in a purely text-based environment to real life requires an adjustment to the physicality of the other. During interviews, MOO users described the necessity to integrate the physical person with their conception of the text-based persona: *"well the first few days were strange...it took time for the mooperson to become a rl person in my mind...I took a few days to see them both as one person..they were a stranger and at the same time I knew him so well"*. The increased sensory input in moving from a text-only relationship to meeting in real-life can be overwhelming at first: *"well .. suddenly you have to deal with information overload ... no more sequential conversation ...no more guessing n-v-c...male or female (this is not sexually related) .. being able to touch someone..hug, shake hands, kiss .. whatever .. you can FEEL them against you and around you..you can feel the space they move in .. and how they fill it"*.

MOO users involved in romantic relationships may be distressed to find that their MOO lovers do not meet their physical expectations: *"Well, early on in my 'moo career', I got very intensely involved with a young lady.. We ultimately agreed to meet for a weekend... she flew, I drove. Now, she let me know that she did not exactly look 'waif-like'... But when I picked her up at the airport... she turned out to weigh about 300 pounds - no exaggeration. I had to spend the whole damn weekend with her.. "*.

Even where MOO users have described themselves to each other and photographs have been previously exchanged, physical appearance can be different than expected.

MOO sexual partners noted that having physical sex can reduce the appeal of MOO-sex. The relationship between MOO users may become closer: *"in some cases .. its a closer bonding .. friends become more tangible...lovers know what they only imagined...and in some cases it drives them ..the need and yearning for the touch ruins the text only experience of their partners ...the distance becomes a barrier"*.

While some relationships survive the transfer from MOO to physical life, for others meeting in real life may represent the downgrading or end of the relationship. One MOOer described her thoughts on the break up of a romantic relationship with a MOOer after meeting FTF: *"..hmm I've thought a lot why it didn't work..I've come to the conclusion...that very close friendships here on MOO sometimes turn into romances and netsex as a way to communicate warmth etc , maybe they would be only friendships irl...When we were rl together...we were like bestfriends, joined at*

the hip, we both had a great time...but that elusive factor, whatever it was wasn't there! We were like best mates sleeping together and not really lovers".

After meeting IRL, MOO users may reduce the amount of time spent together on the MOO, and increase the amount of time interacting via other media: *"Actually we slowed down alot on the moo. We seemed to want more after that and the best way was over the phone. the voice was a greater piece of her to hold on to than simply words on a screen I guess".* Interaction via the MOO may lose its appeal.

The perceived viability of MOO romances and MOO marriages differs between MOO users. One MOOer who reported having a romantic involvement on a MOO in the past doubted he would become romantically involved in a MOO again: *"I guess in this instance it was somewhat experimental, and interesting to a large extent because of it's novelty. A moo relationship is pretty constrained by lack of physical presence. There's a lot that's interesting in adapting to suit that, but I don't think I'd call that an advantage. I'm not sure how much there is to be said for moo relationships once the novelty is gone".* At the other extreme are MOO users who prefer to meet their romantic partners on-line *"I prefer them to rl. Because here, when something develops I know its my mind that has attracted them...and vice versa....I put much more value on the inside of a person...so this medium allows me to really explore their personality first and I think too that because the physical is removed....you have to communicate much more intensely....I think I talk much more than when I first get together with a rl partner...cos in rl lust gets in the way".*

Social interaction forms an integral part of the MOOing process. Casual social interaction during the immersion stage is replaced by the development of personal relationships during the enchantment stage. The breakdown of relationships often signifies the transfer to disillusionment. The transfer of MOO relationships out of the MOO environment to off-line settings aids the process of integrating MOO and off-line life. The effect of MOOing on off-line life will be explored in the next section.

4.3.5 Off-line Lives

MOOing has a range of effects on the off-line lives of the individuals involved.

4.3.5.1 Category: Effect on off-line lives

The properties, dimensions and conditions for this category are presented in Figure 4.8. The effects of MOOing on 'real life' varied greatly between individuals

OFF-LINE LIVES		
EFFECT ON OFF-LINE LIFE		
The effect of MOOing on the off-line lives of the individuals involved		
CATEGORY	Properties	Dimensions
Description:		
Degree	None<-->profound	Dependent upon time spent MOOing and interference with other activities
Valence	Positive<-->negative	Dependent upon activities replaced
Well-being	Detrimental<-->enhancing	Physical well-being endangered by long periods MOOing and lack of sleep MOOing can be an effective stress reducer
Relationships	Positive<-->negative	Detrimental effect where MOO-time replaces time spent with off-line relational partners Positive effect where MOOing results in new off-line relationships
Skills	No effect<-->increased	Marked improvement in social interaction skills for shy individuals

Figure 4.8. Effect of MOOing on off-line life. Category, description, properties, dimensions and conditions.

from none to substantial impact. As one MOOer noted: *"MOOing is central to my RL. I _do_ a lot of things here. Politics, relationships, programming, building, networking, etc. I've had job leads on (MOO), I've given job leads to others, on (MOO) and on (MOO).. when I indulge in psychoactives, MOOing is central to the universes I visit... when I dream, I sometimes MOO... sometimes I have sex dreams about MOO-sex... it's all terribly intertwined."*

Where MOOing affected off-line life, the effect could be positive, negative or a combination of both. The most commonly reported effect of MOOing on off-line life was the amount of time spent MOOing each week. Time spent MOOing displaced time previously spent on other activities. Whether this was seen as positive or negative was dependent upon the activities MOOing replaced. For some individuals, the time spent MOOing was time that would otherwise be spent on television watching, hobbies, or other leisure activities. Where MOOing was replacing leisure and social activities only, it was not seen by the individuals involved to be detrimental to their lives.

Long periods of MOOing, often combined with a lack of sleep, may affect employment, studies and other work. This can range from a minor to severe problem. Some MOO users reported being late to meetings, missing appointments and difficulty meeting deadlines. While for some this was an infrequent problem, for one individual it was an on-going concern. This MOOer commented that he was *"ashamed of not being able to pull away some nights, of missing some meetings, having to invent excuses."* Some students used MOOing as a form of procrastination to avoid study, and reported skipping classes, not getting their work completed on time, or obtaining lower grades than normal. MOOing may also affect the completion of household duties.

For many individuals, MOOing has positive effects on their life. It may be seen as a source of entertainment or a hobby, and effective in reducing stress. Some MOO users noted that their use of drink and drugs had declined over the period they had been MOOing. One MOOer stated: *"last year before discovering moo...I partied to excess....as a means of escaping probs and pressures...now moo has replaced that. I think moo is healthier...physically and psychologically....I've discovered a lot about myself from mooing"*.

MOOing may provide benefits for people with physical and mental health problems and disabilities. Physical disabilities need not be apparent on the MOO,

unless the individual wishes to self-disclose. One MOOer noted that on-line interaction was easier: *"... because basically I have a kind of speech impediment problem. I can't talk to people very well cause I stumble or stutter a lot. I have gotten better but still tend to stumble with my words so it is very hard to talk to people, and talking to people on line is pretty much easier barring the spelling mistakes and stuff!"* Some individuals used MOOs as a way of coping with depression. MOOing may provide a supportive environment for individuals undergoing a period of depression: (MOO name) *did use MOO to keep emself sane and work out a depression last year though. "It kept me feeling alive while I thought up reasons to live / do things."* As the symptoms of depression decreased, the need to MOO decreased: *"Another thing I guess is that computers and more specifically MOO was something I was good at and enjoyed. When I started, I was still dealing with big time depression, and needed something like that. As depression subsided some, I started MOOing much less. Now that I'm becoming very happy, I don't need it anymore, in a way."* However, for others, MOOing may provide only a temporary relief: *"It didn't really help, but back then it gave me something to enjoy and to look forward to."* In some instances, it may actually make the depression worse: *"it at first seemed to alleviate my depression..but now i think it is just exacerbating it."*

The amount of time spent MOOing may impact negatively on an individual's physical health through changing sleeping, eating and exercising patterns. A common theme in interviews was changes to sleeping patterns. MOO users reported late nights, often staying up until the early hours of the morning MOOing, and a resultant lack of sleep. Where long periods are spent MOOing, dreams may change to become text-based: *"i've had a few dreams in text during heavy MOO use...i mean VERY heavy...instead of 'seeing' and 'hearing' things, you see the textso you hold a conversation in text, not in words.....this occurs after 7-8 hours a day for several days...only REALLY HEAVY use induces it."* However, for insomniacs, MOOs can provide entertainment during periods of sleeplessness: *"I don't sleep much, and it's a place to go and hang out when everyone's asleep."*

MOOing can have positive and negative effects on an individual's sphere of relationships. For some individuals, MOOing had a negative effect on existing relationships. Time spent MOOing can create conflict with family, friends and household members. Where MOOing ties up the only phone line, other household members cannot make or receive calls, and others cannot contact the MOOer.

MOOing may displace socialising with off-line friends and family. Less time may be spent with family and significant others. The reduced time with family and friends reflects the increased importance of MOO relationships to the individual: *"I've left rl social functions early to come home and meet a friend on the net...because I wanted to meet them more than I wanted to be where i was"*. Involvement in MOO relationships may also reduce the interest in forming new relationships off-line: *"when I have a vr romance happening...I don't feel free to date irl ... or rather I have no interest in doing so"*.

MOOing can place strain on existing off-line relationships. Other family members and friends may not understand the attraction of MOOing and be concerned about where it may lead. One individual commented *"hee hee...my Mum just came in the room and I told her about your interview...about how you want to know about how my rl has changed or whatever because of the moo....she said I have no rl. Like she knows"*. However, MOOing can also have positive effects on existing relationships. MOOing can help MOO users keep in touch with friends who have moved away.

MOOing frequently increases the range and number of relationships an individual has. MOO users may form virtual friendships with people all over the world. Relationships formed on the MOO frequently extend outside of the MOO, and become 'real life' relationships. In addition to friendships, MOO users may form romantic attachments, which may lead to off-line involvement. One individual who was moving country to live with their MOO lover commented: *"It's turned it (my life) topsy turvey gal...I just said I'm moving half way around the world ...that's quite an effect."* MOOing can also benefit the working life of an individual through increasing contacts: *"... my networking IRL is better, because of cyber participation" (cut). "I think that I widened my sphere of contacts, of associations, because of it. "*

MOOing was credited with increasing the skills of many of the MOO users interviewed. Some MOO users noted that their programming and typing skills had improved. Others noted that MOOing had affected their creativity. MOOing may increase creativity, provide an outlet for creativity, or change the mode of creativity. The text-based nature of MOOing has resulted in improved language skills for some MOO users. However, the most notable changes were in the field of interpersonal skills.

Some MOO users noted how their interpersonal skills had improved over the period they had been MOOing. For example, one MOOer commented: *"I credit MOOing with a lot of my recent self-improvements in interpersonal skills. It's probably just pacing in my life, too - about time for me to get self-confidence, etc. - but I think MOO helped me develop those skills more quickly than I otherwise would have...having to deal with people who disagree with me, who were cruel about it, etc... helped me breed self-reliance here. I had to learn to get along with difficult people on MOO, and I brought that to RL."* Other MOOers noted their increasing awareness of nuances in social interaction and increased social confidence.

Some MOO users noted that their shyness in off-line social interactions had decreased as a result of MOOing. The formation of intimate on-line relationships provided shy individuals with the opportunity to experience intimacy in a non-threatening environment. Through experiencing successful social interactions with others in these virtual environments, some shy individuals were able to change the perception of their own interpersonal skills, resulting in decreased shyness in off-line social interactions. One MOOer described the change as *"...I used to be quite shy and awkward in RL...my experiences online have given me much more confidence and it definitely shows in RL. Now when people meet me, they have a hard time believing that I was ever really shy or awkward."* Another MOOer was using the MOO to practice romantic and sexual behaviour: *"Well I find it hard to express myself sometimes ...there are times when I just can't find the words... that (sex) is one of those times... I want to learn to say things a bit more eloquently... like in romance novels... <giggle> it forces me to find alternative ways of saying things... It helps me to overcome my shyness because it is a very awkward subject to talk about... especially to rp (real people)".*

MOOing can be used as an avenue to improve an individual's self-understanding and self-acceptance. Some MOO users commented that they used MOOs as a form of self-exploration: *"Just am learning more about myself...what I want in my life....and who I am" ..(How?)... "I'm not sure, maybe because in having to write...I have to formulate things into words....I need to think clearly how to put things in a way I don't irl. I find I discuss personal issues here that don't even come up irl".* Others may use MOOs to get in touch with their emotions: *"it kind of effects my feelings kind of. Like how I'm feeling and stuff. I use it as an outlet, to express my feelings when you are afraid of expressing them in real life."*

Through contact with others on the MOO, MOO users may be introduced to new ideas and new attitudes. This may broaden a person's outlook: *"I think its has amplified my rl appreciation of people from different places and cultures -- both our differences, but especially how much alike we all are."* Individuals may become more willing to experiment with new ideas and activities: *"it has opened me up to trying new things and perhaps revealing to me some of my inner most idea's that i wish to explore IRL"*. For some MOO users, exposure to violent, sexist and sexual behaviour on the MOO has resulted in changes to their conceptions of the relationship between males and females. One MOOer noted that their MOOing experiences *"taught me quickly that men are horrid neath it all.. that I would never know if the guy who anally raped me VR could be the nice guy I met on the bus?..that sorta sobering thought.. it has made me realize that I still need to fight against women's oppression and gender oppression IRL>..has made terribly aware of the social walls we still have ahead...heck.. when men are given freedom, they'll abuse it.. thus it is far more sexist and brutal than RL. but from VR to RL it's a tiny step...it's only a log off away...well I'm now more dubious of people than I used to be..but that's actually a good thing. I think."*

In summary, MOOing can have a range of positive and negative effects on the off-line lives of the individuals involved. One issue that arose during the interviews was a perceived need to maintain a balance between MOOing and off-line life. MOO users spoke of the danger of becoming immersed in the MOO at the expense of 'real life': *"...it hasn't completely replaced my rl though..this is one thing I am careful of...it would be easy to do ..."*. MOOing can be a form of escapism from everyday life and problems. In some cases, even when not MOOing, the individual may still be thinking about MOOing, or MOO relationships. Even when MOO users consciously choose to separate their MOO and off-line life, emotional separation may not be easy to achieve: *"(MOO name) sighs...woo, there's a tough one. She finds that she has real problems trying to keep her feelings restricted to the moo only. Emotional conflicts...I guess. But it's under control...I'm quite taken with my moo-sweetie but we've both had to accept that it will never be IRL. it's hard."*

This results section has elaborated a Grounded Theory describing the normative process of MOOing. The theory details the stages an individual passes through as they come to terms with what initially appears to be an alternative reality. Categories were presented that described how individuals (category: MOO identities)

engage in social interaction (categories: dispersed attention, programmed communication and relationships) within the MOO context (categories: perception of MOO environment, telepresence, sense of community), and the effect this has on their lives (category: effect on off-line life). The intertwining relationships between categories and the stage model provide a rich description of computer-mediated social interaction on MOOs.

4.4 Discussion

In this study Grounded Theory methodology was used to develop a substantive grounded theory of social interaction in MOOs. The core category (a BSPP) emerging from the study was the process of coming to terms with what is initially viewed as an alternative reality. The stages of this process were detailed in a stage model of MOOing. The stages reflect a change in thinking from MOOs as a separate, alternative reality to everyday life, to an acceptance of MOOing as part of everyday life.

Supporting evidence for the stage model as a process of coming to terms with what appears at first to be an alternative reality can be found in the CMC literature. Ryan (1995) noted the "cyber-realism" (p. 51) of long-term MOO users. Many long-term MOO users reported that over time their MOO descriptions had reverted to 'real life' descriptions, and their MOO behaviour to 'real life' behaviour, suggesting an integration of off-line and virtual life. Similarly, Allen (1996) presented a case study tracing the change in one MOOer's perception of LambdaMOO from a separate reality to a communication device.

The stage model predicts that not all MOO users will progress through the stages in the same order or with the same timing. This is consistent with the diversity of MOO experiences and the differing levels of connection between MOO and off-line life reported in the four case histories of MOO users presented by Allen (1996). Increasing the warrant of virtual identities (Walther, 1998) through self-disclosure and meeting within other virtual and off-line settings may hasten the process. Conversely, where individuals choose to maintain a strict divide between virtual and off-line life, they will not reach the final stage of the process representing the integration of MOO and off-line life.

Social interaction in MOOs occurs within a text-based environment. MOOs were perceived by users as providing a safe place for social interaction with limited

off-line consequences. The perception of safety, and the resultant disinhibited behaviour may reduce as individuals proceed through the stages of the model. Over time social interaction in on- and off-line settings may more closely resemble each other. Supporting this contention, Ryan (1995) reported that only 40% of long-term (two and a half years plus) MOO users felt their behaviour differed between the MOO and off-line settings.

Individuals in this study varied widely in the degree of telepresence experienced within the MOO context. While a few MOO users did not experience telepresence, the majority experienced at least a degree of telepresence. Some became fully engaged in the virtual world to the extent where the computer interface to the virtual environment became invisible and physical reality was temporarily blocked from consciousness. These findings are consistent with previous research on telepresence in MOOs (Towell & Towell, 1997) and across virtual environments (Heeter, 1995). The common experience of telepresence reported despite the low level of sensory input provides support for Mantovani and Riva's (1999) sociocultural perspective of telepresence, where telepresence emerges from social interaction within a socially co-constructed 'reality' rather than being dependent upon sensory components of the system.

What can explain the differences between individuals in the level of telepresence experienced within the same virtual reality? Three possible causes emerged from this study: the individual's relationship to their MOO character, and the individual's absorption and imagery abilities. Individuals who do not distinguish between their off-line self and MOO character appear to be less likely to experience telepresence. For those who initially adopt a different on-line persona, over time the degree of telepresence experienced may decrease as the MOO character becomes more like the off-line self. An individual's absorption ability (the ability to focus attentional resources and become deeply involved) may also predict telepresence. Where the individual can focus their attention on the MOO at the expense of off-line distractions they are more likely to experience telepresence. Visual imagery ability may also predict the degree of telepresence experienced, although imagery does not appear to be a prerequisite for telepresence to occur. Instead, vivid imagery appears to enhance the telepresence experience.

The level of telepresence experienced by an individual while MOOing is not constant, but fluctuates over time, both within and between MOOing sessions. Dual

awareness of virtual and physical reality may shift to emphasise one over the other according to environmental and personal factors. These factors interact to determine the level of telepresence experienced by the individual at any point in time.

Most of the MOO users interviewed reported experiencing some sense of community within MOOs, mirroring reports of sense of community in other types of MUDs (Clodius, 1997). The varied levels at which MOO users experience sense of community (within groups, within the MOO, across MOOs) is consistent with how we may speak of sense of community within a suburb, a city and a nation in place-based communities. The finding that not all MOO users feel part of the community parallels that of place-based communities, where not all community members feel part of a community, despite living within the community.

Are social MOOs communities? This research supports the notion of MOOs as virtual communities. They clearly meet Jones' (1997) four minimal conditions for virtual communities: providing interactive communication, multiple communicators, common public spaces for interaction, and ongoing members. Further, MOOs match Rheingold's (1994) definition of virtual communities as "social aggregations that emerge from the Net when enough people carry on public discussions long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace" (p. 5).

While MOOs clearly meet criteria for virtual communities, do they meet the requirements of community? MOOs differ from place based communities in a number of ways. First, MOOs are relatively homogeneous in terms of age, education and socioeconomic status of members. Few children or older members of society actively participate in social MOOs. Individuals, rather than families frequent MOOs. Second, MOOs represent an environment of choice, rather than an environment of necessity. MOO users can access and leave the MOO whenever they wish. If problems arise within a MOO, the individual needs only to type @quit to remove themselves from the MOO. They need never return. Third, the virtual environment within which MOOs exist combined with anonymity provide the individual with freedom to explore aspects of the self and create new identities whenever required without fear of repercussions in real life. These three factors combined produce an environment that on the surface appears to require limited commitment from users. Despite this, MOOs emerged in this research as virtual communities with the power to engender sense of community in members. Findings

from this study suggest that sense of community can exist without the need for a community to be place-based, and without the need for FTF interaction.

MOOs provide neither utopian nor dystopian communities. MOO users bring to the MOO environment their off-line beliefs and values, although they may choose to suspend these temporarily. As with place-based communities, MOOs offer both rewards and problems for members.

Within MOO communities, self-presentation is established through the creation, naming, gendering and describing of characters and morphs. Self-presentation is manipulated through the use of morphs and control over changes to character and morph names, descriptions and genders. The majority of individuals interviewed for this research predominantly used one main character that was viewed as a representation of their off-line self and was strongly identified with. The use of multiple characters or morphs reduced over time. Previous research on Lambda MOO has also found that most MOO users use only one character, adopting morphs as costumes, to role-play, to have fun, to switch genders, for sexual purposes, or to disguise the user rather than regarding them as separate identities (Ryan, 1995; Schiano, 1997). The amount of role-playing reduces over time with MOO users reverting to real-life descriptions, and interacting with others as their 'real' selves (Curtis, 1992; Ryan, 1995).

The majority of MOO users interviewed for this research gendered their characters in accordance with their biological sex. This is consistent with the low levels of gender-switching on MOOs reported by Roberts and Parks (1999). Alternative genders to the binary (male/female) were sometimes adopted as expressions of perceived 'true' gender and as a form of gender activism. This increases the range of previously reported motivations for gender-switching; gender and sexual exploration, increasing sexual opportunities, increasing attention, avoiding sexual harassment, balancing the ratio of men to women, and role-playing (Bruckman, 1993; Germain, 1993; McRae, 1996, Turkle, 1995); which has predominantly focussed on male-female gender-switching.

The high levels of social interaction reported by MOO users in this study is consistent with Schiano's (1997) findings that social interaction was the predominant activity on Lambda MOO. Similarly, the reported movement in this study from socialising in public areas of the MOO in large groups to socialising in private areas of the MOO in small intimate groups was supported by Schiano's finding that

experienced MOO users spend more time socialising, and socialise in smaller groups than new MOO users.

MOO relationships develop over time from casual conversations in public MOO spaces to close friendships and romances conducted in private MOO spaces. Consistent with later research (Parks & Roberts, 1998) the individuals interviewed in this study developed a wide range of relationships. Many MOO users described their MOO relationships as deep and intense. Contrary to the predictions of Walther's (1992) Social Information Processing theory, relationships did not take longer to form using CMC than in FTF environments. In direct contrast, MOO users reported that relationships formed more quickly, personal topics were broached early in the relationship, and that relationships were characterised by high levels of self-disclosure. In some instances relationships achieved the hyperpersonal status described by Walther (1996, 1998). This provides support for Walther's (1998) theorising that hyperpersonal communication occurs within contexts that support anonymity or pseudonymity and low warrant identities.

In total, the research findings suggest that MOOs are inherently social communication environments, providing an atmosphere that is conducive to social interaction and the formation of a wide range of relationships of varying degrees of importance to the individuals involved. This is in direct contrast to the predictions of early theoretical models of media use (e.g., Social Presence Model of Media Comparison, Short, et al., 1976; Cuelessness Model, Kemp & Rutter, 1982) that suggested CMC was unsuited to interpersonal communication. Rather than providing an impersonal communication medium suited only to informational exchange, this research depicts MOOs as supporting relational communication.

There are several factors that may reconcile the differences between theoretical predictions and findings from early media and relationship theories and this study's findings. First, the MOOs included in this study were social environments, where individuals go with the express purpose of socially interacting with others. In contrast, the bulk of previous research has been based in organisational or laboratory settings, where social interaction may be incidental to the stated purpose of CMC interaction. Second, the number of hours an individual spends socialising on the MOO over a period of a week may exceed the time spent socialising with off-line friends and acquaintances. Third, social MOOing is based on conversation, while off-line socialising is often based on shared activities. Finally,

the perception of MOOs as a safe environment with limited off-line consequences provides optimal conditions for high levels of self-disclosure. These factors combined may account for the speed of development of relationships. Contrary to the predictions of a sparse communication environment predicted by early theories of CMC, MOOs may provide an enhanced environment for interpersonal communication.

Many of the MOO relationships reported in this study had transferred out of the MOO environment into other virtual and off-line settings. This is consistent with Parks and Roberts (1998) finding that more than 90% of MOO users have used communication channels outside of the MOO to support relationship developed in MOOs. The migration of relationships from MOOs to physical life frequently followed a social script that enabled the gradual building of trust between relational partners. Relationships changed during this process and some did not survive the transition. Particularly challenging times in the transition period appeared to be the exchange of photographs and the first FTF meeting, highlighting the importance of physical appearance and presence in FTF relationships.

These findings can be viewed within Walther's (1998) warranting framework. The migration of relationships to off-line settings is accompanied by moves to increase degrees of warrant. Relationships become 'more real' as warrant increases. The warranting provided by revealing physical appearance through photographs or meeting off-line may be particularly important to individuals engaged in romantic or sexual relationships. The breakdown of relationships following the receipt of negative warranting information is consistent with Walther's (1998) application of Sunnafrank's (1986) Predicted Outcome Value theory to virtual environments. Each piece of additional information about a relational partner is evaluated, and where deemed negative (ie., unattractive appearance), the relationship is reassessed in a negative light and may result in the relationship ending.

Support was found in this research for each of Walther's (1998) proposed trajectories of relationships following increases in warranting information. Some individuals reserved judgements about communication partners until they met FTF. Others treated warranting information such as appearance as irrelevant, and merely assimilated the information. For still others, particularly those in romantic relationships, where new warranting information did not meet expectations, the relationship ended.

Almost invariably, an individual's involvement in MOOs had an effect on their off-line life. The MOO users in this study reported effects that varied in valence and strength. Negative effects centred on the time MOOing displaced from off-line activities. This was especially marked for individuals who felt they were 'addicted' to MOOing. The stage model of MOOing developed in this chapter presented 'addiction' as a normative stage of MOOing that many individuals will pass through. This is in stark contrast to other research (e.g. Young, 1996b) that posits 'Internet Addiction Disorder' as a pervasive pathology that requires treatment. This raises several issues. If the self-described feeling of addiction is a phase that the individual will pass through, should individuals be labeled as clinically disordered? Is 'treatment' necessary or desirable? Rather than a psychopathology, for many MOO users 'addiction' represents a stage of intense usage of the Internet as the individual comes to terms with what appears to be an alternative reality, and integrates the MOO experience into their lives.

Parallels can be drawn between individuals in this study who described themselves as addicted with the subgroup of computer dependents identified as 'networkers' by Shotton (1989). Both groups use the computer for social purposes. In direct contrast to the view of 'addiction' as psychopathology, Shotton argued on-line interaction had improved 'networkers' social skills and increased their range of social relationships.

Similarly, one of the more notable positive effects of MOOing arising from this study was the reported increase in interpersonal skills and self-understanding, and the related decrease in shyness. Time spent on the MOO may provide the individual with an identity moratorium period where the individual is free to experiment with aspects of self and identity. In addition the MOO may provide a practice ground for new behaviours. Shy individuals were less inhibited in their behaviour and social interaction in text-based virtual environments than in their on-line lives. This was attributed to the perception of MOOs as safe environments in which to interact. Through experiencing successful social interactions with others in these virtual environments, some shy individuals were able to change the perception of their own interpersonal skills, resulting in decreased shyness in off-line social interactions. The higher rate of cross-sex relationships in MOOs than in off-line settings (Parks & Roberts, 1998) suggests that MOO interaction may be particularly

beneficial for shy individuals who experience difficulties in communicating with members of the opposite sex.

The model presented in this chapter furthers previous research on MOOs by providing a thick description of the stages an individual passes through in coming to terms with an 'alternative reality'. Research to date, including this study, has been cross-sectional in nature (with the exception of the case studies provided by Allen, 1996). To further this research longitudinal studies are required that follow the progression of individuals over time from when they first connect to a MOO. In particular, longitudinal research will aid in the further identification of temporal and/or critical requirements for transition between stages.

In summary, this chapter has presented a substantive grounded theory of social interaction in MOOs. A stage model of social interaction in MOOs was developed that describes the process of coming to terms with what is initially viewed as an alternative reality. From examining only one type of virtual environment it is not possible to determine the aspects of the social interaction process that are affected by generic features of CMC, and those that are affected by features specific to a particular virtual environment. In order to distinguish between generic and contextual effects research is required that examines social interaction within a range of virtual environments. As a first step towards meeting this requirement, the next chapter examines social interaction within another type of social text-based virtual environment, Internet Relay Chat.

CHAPTER 5.

STUDY TWO: SOCIAL INTERACTION ON IRC

IRC, at its best, is a chance to trade obscenities and pirated software in real time while inflating one's own ego with other losers in faraway dark rooms with even less of a life than you, if that's possible. At its worst and in its most commonplace form, it's nonstop banter about where you're from and if anyone would like to pretend that they're female. (Beau Nose, 1996)

5.1 Introduction

In this chapter a Grounded Theory study of social interaction on IRC is presented. The theory developed is centred on the ease of communication experienced by users, and details the stages an individual passes through in their use of IRC. A thick description is provided of how individuals engage in social interaction within IRC and the effect this has on their off-line lives.

An introduction to IRC was provided in Chapter 2. This material will be briefly recapped and expanded to further describe technical features of the program that affect communication on IRC.

IRC provides a simple text-based virtual environment for synchronous typed communication between multiple users. An individual connects to an Internet Relay Chat server using a software client. IRC users can set up their IRC client to meet their personal preferences. For example, using the mIRC client (Mardem-Bay, 2000) colours, fonts and line spacing can be changed, a background set, and flashing icons or beeps to alert the user when new messages arrive can be turned on or off. The IRC session can be logged and messages time-stamped.

Multiple clients can connect to an IRC server simultaneously. Servers in turn are linked together to provide an IRC network (Randall, 1997). There are more than 30 IRC networks in existence with hundreds of thousands of individuals connected across the globe at any point in time.

On connecting to an IRC network, an individual selects the name (commonly referred to as a 'nick') they wish to be known by. The command /NICK is used to set a nickname and can be used to change the nickname at any time. Unlike MOOs, there is no facility on IRC to gender or describe a character. Choice of nick is the

primary means of self-presentation, from which others may infer gender and character attributes.

Once connected to an IRC network, an individual needs to decide which channel(s) of communication they would like to join. By using the command /LIST all public channels will be listed on the computer screen, along with the channel topic and number of occupants. Figure 5.1 presents a partial listing of the 1766 channels in operation on the Australian IRC network at the time the screen dump was taken. Channels are identified by the hash symbol (#). Reading across, we can see that the channel called 'melbourne' had 317 users and the listed channel topic related to advertising homepages on the Melbourne channel web-site.

Upon selecting a channel of interest, the individual can use the command /JOIN to join the specified channel. The computer screen will display the current occupants of the channel (see Figure 5.2). More information about a channel occupant can be obtained using the /WHOIS command. This lists information on how long on-line, period of time idle for, channels they are currently on, IRC server and personal details such as name and email address if the user has provided them.

Channel operators are identified by the symbol @ before their name. Channel operators have a level of control over both channel and channel users. Using the /MODE command a channel operator can ban a user from a channel; make the channel invitation only, secret or private; limit the number of users in a channel; allow only channel operators to talk and change the channel topic; prohibit messages from outside the channel; and bestow channel operator status on others. The /KICK command can be used to remove someone from the channel (Mardem-Bay, 2000). Paolillo (1999) argued that access to these commands mean that channel operators effectively control social interaction within the channel, with other channel members rights and privileges dependent upon the strength of the relationships they develop with channel operators.

IRC is predominantly used for social interaction. IRC users can talk publicly in channels, privately message one another within the IRC environment, or establish a Direct Client to Client (DCC) link to interact with one person only. Talking to people within the channel simply entails typing a message and pressing the enter key. Everyone within the channel will see the message on their screen. Private messages

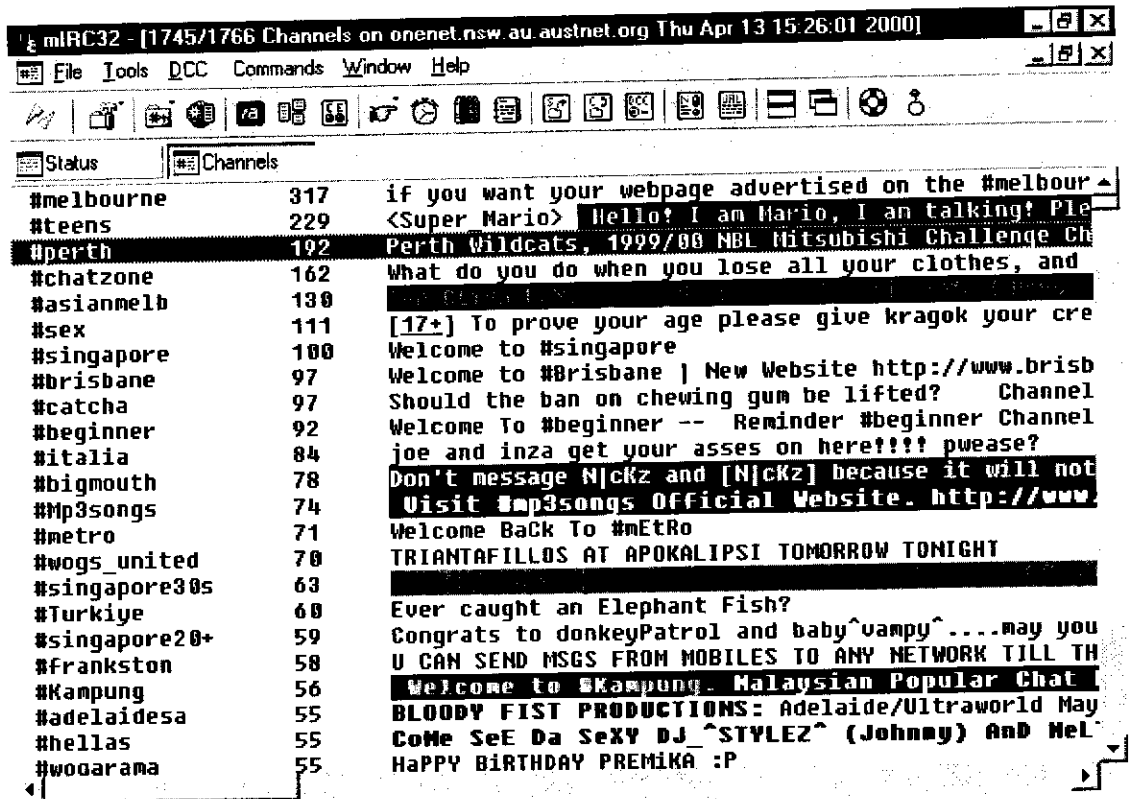


Figure 5.1. Channel listing on the Australian IRC network.

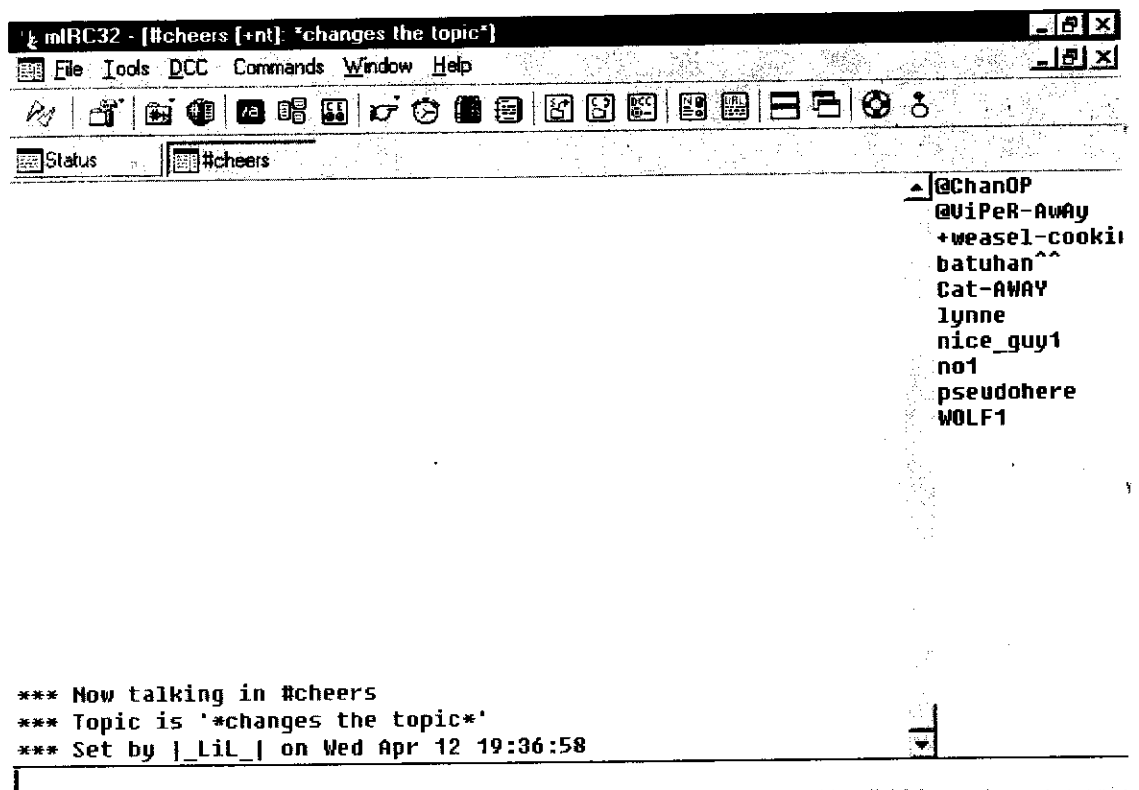


Figure 5.2. Listing of IRC user names upon entering a channel.

seen only by the individual to whom they are directed can be sent to other IRC users whether or not they are present in the channel using the /MSG command. Using DCC enables a couple to chat using a more secure connection. IRC users are not restricted in the number of channels they can join, or the number of individuals with whom they exchange private messages.

While all communication on IRC is typed, users refer to communication as 'chatting' and use typographical features (e.g. use of ellipsis, multiple punctuation, spelling, emoticons, capitalisation for emphasis) as paralinguistic and prosodic cues to imbue oral qualities to typed messages. Overtime linguistic conventions have developed (e.g. 'r' for are, 'u' for you and 'z' as a substitute for 's' to indicate plural) that may be used consistently across channels or be specific to a particular channel or channels (Paolillo, 1999; Werry, 1996).

'Actions' may be performed to provide context and a sense of presence (Bays, 1998; Gelleri, 1998; Werry, 1996). 'Actions' are performed using the /ME command followed by a typed description of an action or expression of emotion narrated in the third person singular. For example, using the nick 'Questioner' I could type

`/me rolls her eyes and fidgets impatiently`

Everyone within the channel would see on their screen:

`*Questioner rolls her eyes and fidgets impatiently`

Newcomers to IRC ('Newbies') do not initially use these typographical and action features, and the process of 'pretended orality' needs to be learned (Gelleri, 1998).

As multiple users are able to type messages to a channel without the requirement for turn-taking, the text that appears on screen frequently contains an intertwining of messages on different topics. All messages are displayed in the chronological order in which they are received by the IRC server. Newcomers have difficulty following and contributing to the intertwined messages in channels (Gelleri, 1998). With experience IRC users develop the ability to follow the intertwined conversational sequences and use conventions to aid in the management of this (Werry, 1996). One convention used is to start messages with the nick of the person to whom the message is addressed. A second convention is to abbreviate messages in order to reduce the time between conversational turns and maintain attention. Werry (1996) estimated the average message on IRC contained only 6

words, with the length of message and number of channel participants inversely related.

The multiple channels and multiple occupants of each channel make IRC a lively place. Conversation on IRC is often light, flirtatious, and sometimes sexually explicit (Reid, 1991). Randall (1997) described IRC's party-like atmosphere as "like a Usenet group on stimulants". The grounded theory study presented within this thesis is set within this frenetic context.

5.2 Method

This study is conducted using Grounded Theory (Glaser & Strauss, 1967) methodology. There are two methods by which this second grounded study could be conducted. In the first method the substantive grounded theory developed in Study One would be applied to the IRC context and its fit examined. This could be the precursor to the development of a formal theory. In the second method, a new Grounded Theory would be developed without reference to the previous theory. Using the first method, there is the potential for data to be forced into existing categories when new categories and/or a new theory may better suit the data. The second method allows for the development of theory to emerge from the data. Given the stated purpose of this study was to differentiate between generic effects and context-specific effects of CMC the second method was selected. There was no basis for an assumption that the same social processes would occur in the same way in each virtual environment. The two grounded theories produced can later be compared to identify similarities and differences (see Chapter 6).

5.2.1 Research Participants

Forty-four past and present users of IRC were interviewed for this study. Twenty-nine of the research participants were male and 14 female. The age of research participants interviewed ranged from 17 to 57 years (Mdn = 21 years). The majority (35) were tertiary educated. Seventy one percent resided in Australia, 18% in the United States of America, the remainder coming from four other countries. The period of time since first used IRC ranged from 1 day to 5 years (Mdn = 7 months). The number of hours spent on IRC each week ranged from 2 to 119 (Mdn = 14 hours). The distribution of history and hours of IRC use are graphically presented in Figures 5.3 and 5.4.

5.2.2 Procedure

This research was conducted using the procedures of Grounded Theory methodology. Four key procedures; sampling, interviewing, data coding and theory development; are detailed below.

5.2.2.1 Sampling

In this study, two forms of sampling were used.

Convenience sample to obtain local respondents

The first sampling strategy employed was to obtain a convenience sample of local IRC users who could be interviewed on IRC or FTF. This sample was required in order to assess the equivalence of on-line and off-line interviews (see Section 5.2.5 below).

The convenience sample consisted of staff and students at the local university who were using IRC during the data collection period. These individuals were identified in two ways. First, the home pages of staff and students at the university were searched for references to IRC participation. Those identified were sent an email inviting their participation in this research. Second, individuals who were accessing the Australian Undernet IRC network using Curtin University of Technology Internet Protocol addresses were identified using the IRC /who command. Those identified in this manner were sent a private message on IRC and invited to participate in the research.

Theoretical sampling

The second sampling strategy, theoretical sampling, was used in accordance with grounded theory methodology to develop a thick description of emerging categories. By combining these two sampling strategies, a grounded theory was produced that also allowed an evaluation of the equivalence of on-line and off-line interviewing.

Theoretical sampling was guided by the need to further develop categories that emerged from the coding of early interviews. Research participants were selected for their experiences with a particular phenomenon of interest, and were identified through their postings to newsgroups, or their participation in particular types of channels on the American Undernet or Dalnet IRC networks (e.g. channels specifically for newbies or for administrators). Invitations to participate were sent by email (for those identified through newsgroup postings) or private messages on IRC.

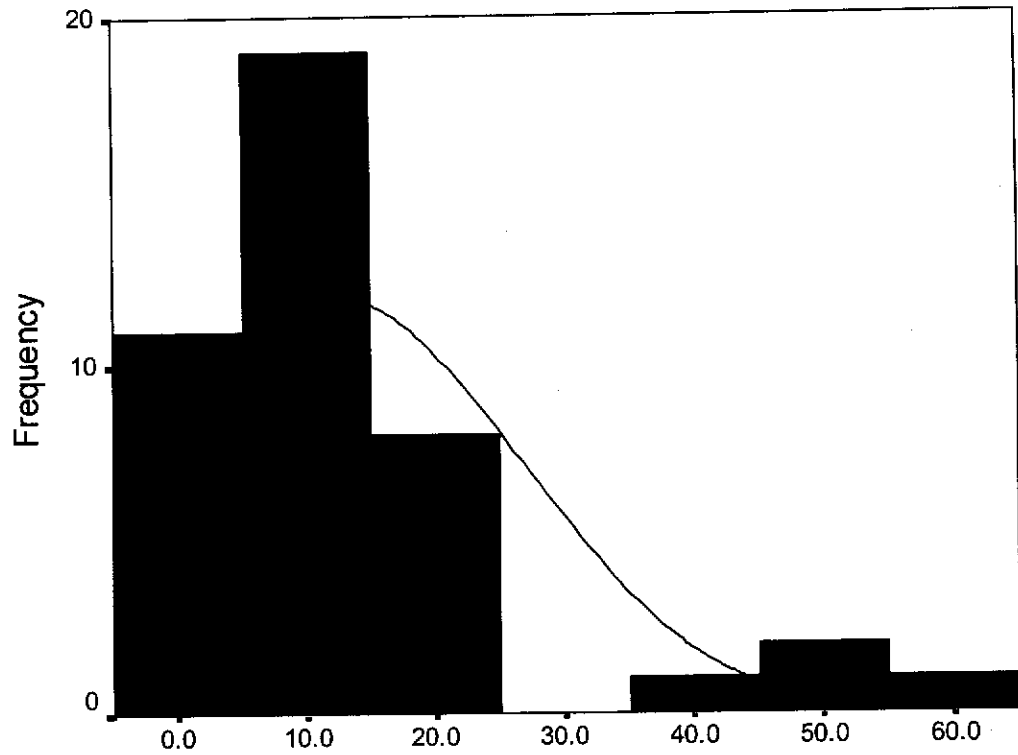


Figure 5.3. Distribution of history of IRC use.
History (months used IRC)

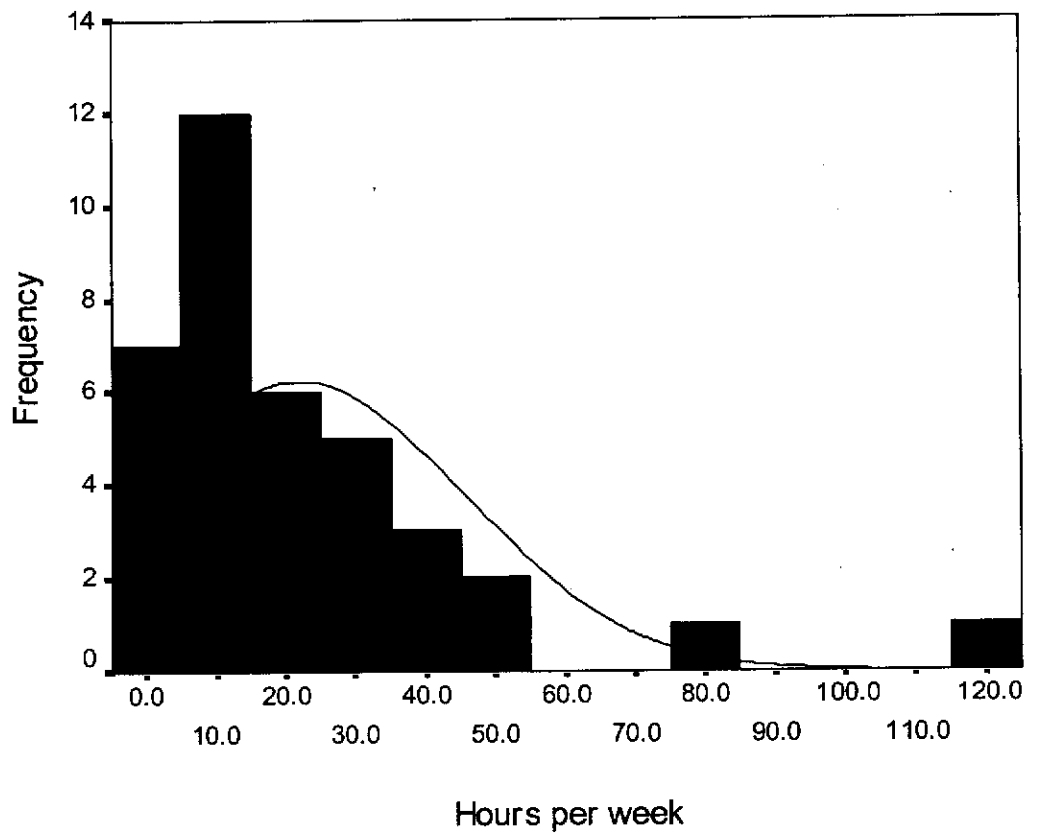


Figure 5.4. Distribution of hours of IRC use per week.

5.2.2.2 Interviewing

Interviews were conducted in a range of media. Twenty-six individual and two group interviews were conducted on IRC. Where possible, interviews on IRC were conducted using DCC CHAT (the most secure and fastest form of chat available through IRC). Other interviews were conducted using private messages, or in private channels on IRC. These interviews typically lasted between one and three hours, and were logged using the mIRC program (Mardam-Bey, 1995). Twelve interviews were conducted face-to-face, and were typically of between half and one hour duration. These interviews were audio recorded. All tapes were transcribed by a person other than the interviewer. Each transcription was then checked against the audio recording for accuracy by the interviewer. One research participant was interviewed by email as they were no longer an active participant in IRC and had made a conscious decision to avoid using IRC. Two interviews conducted on IRC were completed by email due to connection difficulties with IRC during the course of the interview. Initial interviews were semi-structured based on an interview guide (see Appendix 7), and started by asking the research participant how they began IRCing. Later interviews were also semi-structured but focussed on specific categories of the developing theory.

5.2.2.3 Data Coding and Theory Development

Transcripts and logs of interviews and newsgroup postings were coded and analysed using the NUD*IST program (QSR NUD*IST, 1995). Data were entered with an utterance (for interviews) or paragraph (for postings) as the unit of analysis. The Glaser and Strauss (1967) method of data coding, category formation and theory development procedures used in this study have been described in detail in Chapters 3 and 4.

In this study, the core category, a basic social psychological process (BSPP) emerged early in the data collection process, and was evident in all the interviews conducted. Conducting an exhaustive review of published and unpublished literature on Internet Relay Chat enhanced theoretical sensitivity. The resultant theory provides a rich description of social interaction on IRC, and a substantive theory of the process of IRC use.

5.2.3 Reliability and Authenticity

Additional measures were taken to increase the reliability and authenticity of data and findings. Triangulation was achieved by using data from a variety of

sources. The main sources of data were the interviews conducted on IRC or in person. In addition, postings to IRC related newsgroups and IRC documentation (see Appendix 8) pertaining to social interaction were used. All research participants who provided an email address were sent by email the World Wide Web address of a site containing a summary of the research findings, and were invited to provide feedback. The feedback obtained was incorporated into the research findings.

5.2.4 Ethical Issues

Ethics approval for the study was granted by Curtin University of Technology's Human Research Ethics Committee prior to the research commencing. All research participants were provided with an information sheet (see Appendix 11) outlining the research when their participation in the study was requested. For on-line interviews, the information sheet was sent using the DCC SEND function of mIRC or by email, and informed consent obtained in typed text prior to the interview commencing. Research participants interviewed face-to-face were given an information sheet and signed consent forms were obtained. Permission for the use of all newsgroup postings included in the analysis was requested and obtained directly from the authors.

The confidentiality of research participants was maintained. Research participants were not asked for their name, address or contact number. The confidentiality of the individual was respected, and neither IRC nicknames nor off-line names have been used in this dissertation, unless specifically requested by the individual involved.

No adverse side-effects to participants from their involvement in this study were anticipated or reported. The research procedures used in this study were non-invasive, consisting of interviewing research participants and the analysis of public documents. Individuals expressing concern over their Internet use were advised to seek help from a registered psychologist.

5.2.5 Equivalence of face-to-face and IRC interviews

A convenience sample of local IRC users was sought to assess the equivalence of interviews conducted on IRC and face-to-face. Fourteen interviews of local students were conducted on IRC. Research participants terminated two of these interviews. One stated a family member needed to use the telephone, and the other that their class was about to start. Thirteen face-to-face interviews were arranged. One individual did not turn up for the interview. In total, twelve individuals were

completed on IRC and a further twelve face-to-face. The 24 interview transcripts and logs were retained for the equivalence analysis (see Appendices 9 and 10 for examples of partial face-to-face interview transcript and IRC interview log).

The interviews were first compared in terms of their structure. All face-to-face interviews were completed in one session. In contrast, only half of the IRC interviews were completed in one session. Five required two sessions to complete, and one required three sessions to complete. This is reflected in the time taken to complete the interviews. The amount of time to complete face-to-face interviews ranged from 10 to 56 minutes ($M=31$ minutes, $SD=13$ minutes). In comparison, IRC interviews took approximately three times as long to complete (range 51 to 195 minutes; $M=96.67$ minutes; $SD=40.23$ minutes, $Mdn=86$ minutes).

Despite the longer time taken to complete, IRC interviews contained fewer words than face-to-face interviews. For IRC interviews, the number of words counted included utterances and actions typed by both researcher and research participant. The word length for IRC interviews ranged from 1231 to 4838 ($M=2609.75$, $SD=1122.19$, $Mdn=2467.50$). For face-to-face interviews only utterances (and not body language) were recorded. Where the audio recording was not clear, sections of dialogue were deleted from the transcript. The word length for face to face interviews ranged from 981 to 7010 ($M=3605.58$, $SD=16.435$, $Mdn=3446.50$). A one-tailed independent samples t-test confirmed that face-to-face interview transcripts contained significantly more words than IRC interview logs ($t(22)=1.762$, $p<.05$).

The number of utterances made by researcher and research participant were counted independently across settings. In face-to-face interviews an utterance was defined as a period of talking without a break. The number of utterances made by the researcher ranged from 27 to 98 ($M=53.08$, $SD=17.47$). The number of utterances made by research participants ranged from 31 to 98 ($M=53.33$, $SD=17.06$). The ratio of research participant to researcher utterances for each interview approximated 1:1. An utterance in IRC consists of all the words typed before the 'Enter' key is pressed to send information to the other party. Utterances do not include actions, which require the use of the /me command. The number of utterances made by the researcher during interviews ranged from 60 to 227 ($M=103.58$, $SD=50.72$, $Mdn=91$). The number of utterances made by research participant ranged from 63 to 327 ($M=154.08$, $SD=84.66$, $Mdn=136$). The ratio of research participant to

researcher utterances approximated 1.5:1 across interviews. Independent sample t-tests confirmed that both research participants ($t(11.89)=4.04, p<.05$) and researcher ($t(13.57)=3.261, p<.05$) made a greater number of utterances in IRC interviews than in face-to-face interviews.

In addition to utterances, IRC enables the use of actions and emoticons. Research participants used few actions (range 0 to 14, mode=0) and some emoticons (range 1 to 90, *Mdn* = 27). The different types of emoticons used within a particular interview ranged from one to five. The most commonly used emotion was the basic smiley (' :) ' or ';-') . In contrast, the researcher used few emoticons (range 1 to 13, *Mdn*=4) and many actions (range 28 to 147, *Mdn*=57.50). The greater use of actions by the researcher was attributable to the need to convey continued attention to the research participants when they were making multiple utterances in answer to a question. The most commonly used action by the researcher was nodding.

In summary, the structure of the interviews varied greatly between settings. In comparison to face-to-face interviews, IRC interviews took on average three times as long to complete resulting in many interviews being split over two or more sessions. Due to the extra time and effort involved in typing responses, the interviews were shorter in word length. IRC interviews were characterised by many brief utterances supplemented by the use of emoticons and actions. IRC logs provided a more complete record of the interview than face-to-face transcripts as all interactions (e.g. utterances, actions and emoticons) were recorded. Video recording of future face-to-face interviews may provide a more comparable format.

The interviews were next compared in terms of their content. All interviews were semi-structured and areas for discussion varied in their sequence and coverage. However, all interviews began by asking how the individual found out about IRC. Because this question was consistent in timing across interviews, it was selected for analysis of equivalence of response content. One IRC interview was excluded from this analysis because the question was not answered.

Responses to this question varied in length across interview setting. Research participants interviewed on IRC provided brief responses (range 3 to 30 words, $M=14.27, SD=10.30$), while those interviewed face-to-face provided longer responses (range 7 to 158 words, $M=79.08, SD=50.01$). An independent samples t-test confirmed that longer responses were given in the face-to-face condition ($t(12.01)=4.39, p<.005$).

Despite the difference in length of responses, the themes of responses were consistent across settings. In both settings the majority (seven) of the respondents had found out about IRC through friends. Other sources were books, the Internet and family members. The difference lay in the amount of detail provided. Research participants interviewed face-to-face tended to give more in-depth information. For example, a typical response from an IRC interview was: *"A friend showed me"*. In comparison, a typical answer from a face-to-face interview was *"I found out through a friend. I was wondering what he was doing at the computer with all these things scrolling past, that's how I started."* In some instances, extra information was provided in face-to-face interview responses that provided useful leads for questions later in the interview. For example, one research participant answered *"Well, one of my friends found out from one of his friends, then one of his friends and they gave it to me and I thought fair enough and tried it and got addicted pretty quickly like everyone else."* Later in the interview this answer was referred to as a way of broaching the subject of 'Internet addiction'.

Responses provided in IRC interviews were short and to the point. This is consistent with the style of interaction typical of IRC, where utterances are short and seldom comprise full sentences. Repetition, redundancies, waffle and 'ums and ahs' that are common in speech are seldom used on IRC, unless for effect. Contributing to this brief direct style is the greater effort required to type than to speak an answer. In addition, some IRC software programs work to actively discourage lengthy answers by providing only a small area (one or two lines) for entering text. Responses are also likely to be affected by the individual's technical and communication skills within the text-based medium.

Salient features of the research setting may have influenced the content of responses to questions. Some research participants interviewed face-to-face expressed nervousness associated with the audio recording of the interview. For example, during the first question one research participant stopped mid-sentence to say *"... and umm ... like I said before I am very conscious of the taperecorder!"*. While IRC interviews were also recorded (logged) and research participants advised of this, there was no visible reminder throughout the interview and recording elicited no negative comments.

The absence of the physical presence of the researcher for interviews conducted on IRC may have reduced social desirability responding. Embarrassment

was not evidenced in responses or actions to sensitive topics broached in IRC interviews. However, in face-to-face interviews some respondents were notably embarrassed when talking about IRC romances and this may have affected self-disclosure. For example, one research participant stated: *"I'm ashamed to say, but yeah, I did have an IRC girl friend for a while, but it fell apart, and i thought back and went, it was stupid."*

An additional factor that may have affected self-disclosure was the erosion of the anonymity that is normally associated with on-line use. All individuals selected for this comparison were selected on the basis of their status as staff or students using the university's server to connect to IRC. The university bans the use of IRC. Some research participants were concerned that I was able to locate them (using the /who command with a wild card and the server address). Those interviewed face-to-face had their anonymity further eroded by presenting for an interview.

In summary, the content of interviews across settings varied in length and detail. However, the emergence of the same themes across the two settings suggests the two forms of interviews are, if not equivalent, at least complementary.

5.3 Findings

The findings of this research are presented as a grounded theory. The core category, a Basic Social Psychological Process (BSPP), is described in detail and other central categories are related to it. The theory developed is illustrated by quotes from interviews and postings to newsgroups. All quotes appear in italicized text and unless otherwise indicated are from interviews. To protect the anonymity of research participants, IRC nicks and channels names have been removed. The original grammar, abbreviations and emoticons appearing in the interview text remain intact. Where necessary explanatory notes have been included in bracketed unitalicized text within quotes.

5.3.1 Core Category: Ease of Communication

The core category (a BSPP) to emerge from this research was labeled 'Ease of Communication'. The properties, dimensions and conditions of this BSPP are presented in Figure 5.5. This BSPP represents the stages an individual passes through over time in their chatting behaviour. The stages reflect a change in use of the IRC medium. The stages and transition between stages for this BSPP are presented in the stage model of IRC use in Section 5.3.1.1 below.

<h2 style="text-align: center;">BASIC SOCIAL PSYCHOLOGICAL PROCESS IN IRC</h2>		
<p>CORE CATEGORY: EASE OF COMMUNICATION Description: The ease of communication experienced on IRC in comparison to off-line settings</p>		
Properties	Dimensions	Conditions
<p>Stages</p> <p>Contributing factors</p>	<p>Finding out->motivation->novelty->relationships->communication device</p> <p>Availability of people to chat to</p> <p>Ease of starting a conversation</p> <p>Ease of locating people with common interests</p> <p>Reduced complexity of communication</p> <p>Off-line barriers to communication not apparent</p>	<p>Affected by computing skills, previous experience in virtual environments, and willingness to integrate on- and off-line lives</p>
<p>Progression</p>	<p>Slow<-->fast</p>	

Figure 5.5. The Basic Social Psychological Process in IRC: Category, properties, dimensions and conditions.

The ease of communication on IRC in comparison to off-line settings was a theme that consistently appeared in interviews. A typical comment was: *"People do change considerably from IRC to real life. As far as I am concerned I have noticed I am much more at ease about what I say on IRC, in real life it is kind of more complicated. (On IRC) you say what you think."*

The ease of communication on IRC was attributed to a range of factors. These included the availability of communication partners, the ease of starting up a conversation, the ease of locating people who share common interests, the reduced complexity of communication, and that off-line barriers to communication were not apparent. Each of these factors is detailed below.

There are always people logged into IRC network, any time of the day or night. One IRC user expressed her delight in *"being able to find people to chat to instantly"*, explaining that *"You can do it at any time of the day cause you know that someone is going to be up. You get attention."* The constant availability of potential communication partners was a major attraction for many IRC users, making IRC a convenient place to hang out.

Individuals noted that it was easier to approach people and strike up a conversation on IRC than it was in off-line life. One IRC user commented that: *"it's much easier/simpler on irc. there is no pressure I'm not the most confident person I guess in real life ... on here it is much easier to approach ppl. in RL there is always the way a person looks to attract another on here there is no 'looks' (apart from the nick I guess. Some ppl talk to others because of their nick)"*. The absence of physical appearance and status cues reduce these barriers to initiating communication.

IRC channels are frequently given names that reflect the interests of channel members, making it easy to locate people with similar interests. The large numbers of potential communication partners on IRC, and the division of people into channels increases the likelihood of locating people who share a common interest.

Because most communication on IRC occurs in text, attention can be focussed on the typed communication, rather than on other aspects of the communication process in off-line life. IRC reduces the complexity of the communication: *"Don't have to worry about your appearance, don't have to worry about meeting the person in real life and have to interact with the person on a daily basis. The person you met on the net could be on the other side of the world, across the state, anywhere. Don't have to worry about gender variables. About culture."*

Don't really have to worry about how rich you are. It is just what you say, you don't have to worry about how you say, your words, you don't have to worry about your voice. Everything other than what you type".

On IRC, some off-line barriers to communication are not apparent. Some IRC users noted that their disabilities were not readily apparent to other users. For example, IRC users noted that deafness and physical disabilities went unnoticed. Individuals who experience speech difficulties may find communicating on IRC far easier and more rewarding. As one IRC user commented: *"I suppose it is a release. When I am down, in the other mood, I realise if I am stuck in a rut, for some reason on confrontation I stutter and mumble or something, don't sound particularly articulate, I realise if I go on the net I can sound reasonably intelligent, if i put the effort into it."*

In addition to being easy to initiate, IRC conversations can be easily broken off. IRC removes the etiquette for leaving conversations associated with off-line settings. As one IRC user explained: *"I like talking in the mornings, I like talking to people, but I get to the stage where I get bored and want to switch off, but when you are face to face, you can't say, well sorry I am bored with you now, so I am going to go. I can do that on the IRC."*

5.3.1.1 Stage Model of IRC use

From the interviews with past and present users of IRC a common pattern of IRC usage emerged. The stage model presented here represents the stages individuals typically experience in their communication and use of IRC. It should be noted that not all individuals will experience all stages of the model, or necessarily pass through the stages in the order presented here. The stage model of IRC use is presented as Figure 5.6.

5.3.1.1.1 Stage 1: Finding out about IRC

There were four main ways in which the individuals interviewed found out about the existence of IRC. The most commonly reported way of finding out about IRC was to be introduced to IRC by another person. This person could be a family member, friend, class-mate, colleague, room-mate or virtual acquaintance. Second, some research participants found out about IRC from watching others use the program, typically in a computing laboratory. Third, some research participants found information about IRC while using a computer. In some cases, an IRC

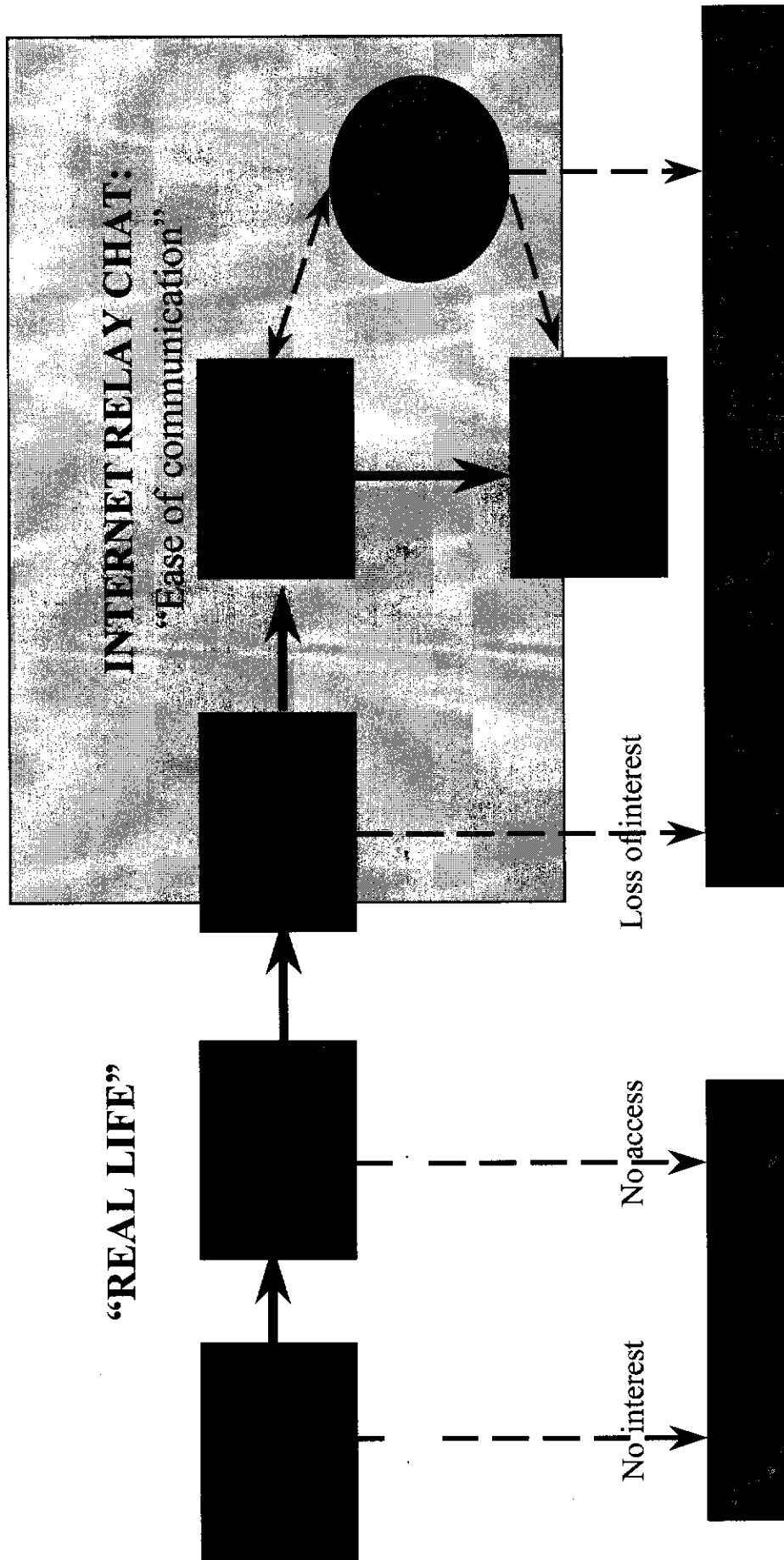


Figure 5.6 Stage model of Internet Relay Chat use.

program was already installed on the computer, and IRC found through experimentation. For others, information about IRC was found while using the Internet. A final way of learning about IRC was through reading resource books or manuals.

Finding out about IRC is not enough to ensure that an individual will use IRC. Where an individual finds out about IRC, but has no real interest in it, they are unlikely to proceed to the next stage. Where an individual finds out about IRC and it sparks their interest, they move on to Stage 2.

5.3.1.1.2 Stage 2: Motivation to IRC

Most of the IRC users interviewed were motivated to use IRC for the opportunity it provided for social interaction. For the majority of people attracted by the opportunity for social interaction, the major drawback was the opportunity to interact with others from all around the world. Others were attracted by the opportunity to interact with people within their own country, or to interact with people from their homeland if living overseas. In addition to meeting new people, some were attracted by the opportunity to maintain contact with geographically distant friends. While for some individuals IRC use was motivated by the opportunity to meet a wide range of people, others were motivated by the opportunity to meet a specific type of person. For some, the interest was in meeting people with similar interests. For others it was meeting members of the opposite sex.

A further motivation to IRC was the opportunity for instant communication and companionship: *"Easy way to chat to people without having a reason to chat with people. It's a little hard to encounter someone in a cafe and just talk to them..if you feel like talking everyone is looking at you strange and thinking what the hell is he doing. They think you must have some sort of ulterior motive. Even if it is just like a questionnaire or something they are thinking, why are you choosing me?"* For people who were confined to home for periods of time, IRC provided a means of socialisation.

Some people had come to IRC after experiencing computer-mediated communication on other types of systems such as web-based chats and bulletin boards. For this group, IRC provided a larger group of diverse people with whom to interact using real time communication. The synchronicity of communication on IRC was a major drawback: *"Real time chatting. Basically the real time aspect of being able to talk to anybody anywhere in the world in real time ..and it's just cheaper than*

a telephone call because using the internet is very . very advantageous in that respect. But yeah, just the fact that I could talk to somebody that I'd never met in real time. Just strike up a conversation with somebody and talk in real time. That seemed to be very appealing and interesting. fact that i can chat to anyone in world". In addition, IRC removed the costs associated with using programs run by private service providers such as America On Line and Compuserve.

For a smaller group of IRC users, the initial motivation for using IRC was not the opportunity it provided to communicate with others. For some it was the programmable environment that was the main attraction. For others it was the opportunity IRC provided for role-playing and gaming. Others were motivated simply through curiosity.

Where an individual is motivated to try IRC, but has no access to the required technology, they will not at this point in time move to Stage 3. Where an individual is motivated to try IRC and has access to the required technology they move on to Stage 3. Where family members or friends introduced the individual to IRC, they were often provided with assistance in setting up their computers for IRC use.

5.3.1.1.3 Stage 3: IRC as Novelty

When an individual first starts using IRC it is often seen as a 'new toy' and has novelty value, providing fun and entertainment. A range of activities may be tried on IRC including basic programming, tarot readings, role-play gaming, quizzes, and netsex, but the predominant activity is communicating with others. During this stage, IRC users may interact with a wide range of people at a superficial level in a number of different channels.

The major task during this period is to learn how to communicate within the IRC environment. There are three core components in this process: learning to use the IRC client, learning the jargon, and learning the etiquette associated with IRC usage.

The individual needs to familiarise themselves with the commands associated with the IRC client (program) before they can effectively communicate with others. One IRC user commented: *"At the very start there were some sessions when I was there for five or six hours just chatting to people trying to learn how to use the client. Unfortunately I'm one of these people who doesn't read the friendly manual. I like to learn from playing with the client."* For some individuals becoming proficient in the

use of the IRC client is a time-consuming process. One IRC user described their early experience of IRC as: *"OK..First off it was like "What's this? it was really wonderful to me when I started. It was amazing so I started spending hours and hours on it, it was like just 6 hours or 7 hours because I really couldn't keep up, coz I wasn't that efficient really."*

In addition to the jargon associated with the Internet generally, IRC has developed its own jargon. New IRC users need to learn the jargon in order to communicate effectively. Where friends or family members have introduced the individual to IRC, learning the jargon can be as simple as asking them for explanations as new expressions arise: *"When I met my friends I'd /msg (send a private message) them and say what the hell does this mean. You're not going to say it in public cause you will make a fool out of yourself."*

The new IRC user also has to familiarise themselves with the 'netiquette' (net etiquette) and hierarchy associated with the use of IRC. As one IRC user explained: *"When you first start off I think alot of people have more knowledge than you do and therefore more superior than you. They can kick you off channels and ban you and do all sorts of nasty things. You start off on the social rungs, there is an etiquette and you learn how to deal with people..."*

The transition from Stage 3 to Stage 4 commonly occurs when the individual finds a channel (or channels) in which they choose to spend the majority of their time. In choosing a home channel the individual seeks a place where they like the regular channel members and feel accepted. Typically, several channels will be tried before a suitable channel is located. This channel becomes their 'IRC home', and they begin to interact with other channel members on an ongoing basis.

5.3.1.1.4 Stage 4: IRC as Relationships

Stage 4 is characterised by the formation and maintenance of ongoing relationships with other members of the home channel. Typically the individual goes straight to their home channel when they log in: *"i come straight to the (channel) ... this is the only channel i use ... i visit others on occasions...but not often ... once i found it...and enjoyed the atmosphere..."*. They may also check their 'notify' list to see if any friends are currently logged in.

During this stage, IRC users develop more meaningful relationships with some members of their circle of IRC acquaintances. Many noted that their motivation to IRC changed during this period. Replacing the motivation to chat with a wide

range of people, was the desire to meet IRC friends. As one person commented: *"It's changed quite a bit, now its based on the relationships I have formed, friendships, still a bit of that (meeting new people), but mostly just keeping in touch with people i've met"* (More information on the development and importance of IRC relationships is provided in Section 5.3.4.2).

This stage is also associated with developing a sense of belonging and experiencing a sense of community within the home channel: *"At my peak, we actually...I was on channel (channel name) so much that we are very closely knit. We decided on this thing like where we would maintain our nicks, no matter where we were. So if next time, we had kids they come on IRC and they would get to know each other as well. Keep track of each other all through our lives."* More information on sense of community is provided in Section 5.3.2.2.7. With continued involvement in the channel, the individual becomes a 'regular', and may obtain 'ops' (channel operator status).

Many IRC users reported that the time spent on IRC increased markedly during this period. One IRC user explained this increase: *"because i have 'gotten to know' ppl on irc..and want to talk to them more"*. Similarly, another commented, *"because i know there will be people here that i want to talk to....but before it was very hard to kind of crack into a channel and make friends if you know what i mean?"* As relationships develop more attention may be devoted to private messaging than the conversation in the channel (see Section 5.3.2.2.5).

There were two common pathways out of Stage 4. For one group of IRC users, IRC use stabilises or decreases over time. For this group, typically communication with IRC relational partners extends to other communication media (e.g., telephone, e-mail, meeting face-to-face), and IRC serves simply as a communication device, representing movement into Stage 5.

The second pathway is into prolonged periods of intense IRC usage. The combination of increasing hours spent on IRC, the sense of belonging provided by the home channel and the support and understanding provided by IRC friends and romantic partners result in some IRC users moving into a period where they view IRC as an 'addiction'.

Stage4a: IRC as 'Addiction'

Some IRC users interviewed described themselves as being 'addicted' to IRC, or having passed through a period of being 'addicted' to IRC. This 'addiction'

was described in terms of not being able to get enough of IRC, not being able to leave IRC once logged in, and missing IRC users when not logged in. For example, one person described their period of IRC 'addiction' as *"If I could, I would have been on there all day and all night, and sometimes I was. It was like.. get up at 6am, on there...I mean its very bad.. this is very addicted, you type away, you don't get up to eat or anything."* During this period of self-described 'addiction' connection times are very high, and IRCing takes precedence over off-line life.

Periods of high IRC use may occur intermittently. For some, high periods of IRC usage were associated with periods of low activity: *"It was a sort of on/off thing I suppose it was like a binge sort of thing. You would use it for a while, then you would stop .. then use it a lot for a while- maybe a year, but a year of bursts. Sometimes during the holidays it was quite a bit, during exams and between exams, it all depended what I was doing otherwise"*. For others, IRC was used as an escape mechanism when things became difficult in off-line life: *"I think for me it was - "Oh dear, I'm not doing very well at the moment at Uni". There was one stage when I had all these troubles, and it's like, and you would log on to talk to these people about the problems, that has a snowballing effect because you are not dealing with the real world."*

Where IRC is used as a form of escapism, a cycle may be set up where off-line problems are exacerbated by time spent on IRC, resulting in an increased desire to IRC to escape from the growing problems: *"Its like I sit down on the computer thinking OK I have some work to do and so I'll just spend 30mins saying hi to everyone, the next thing you know you're there and talking about practically nothing, you're talking about rubbish, say like I can't stand how much time the Olympic games is taking on tv blah blah blah, therefore you find that just being strangers, and it's that escapism that it provides you. You don't want to think about your real life troubles...you spend hours there talking about nothing. It's amazing. I know if I go on at eight at night, I wont get off until 2 or 3am in the morning. It's shocking, and then you just think, Oh well it's time for bed now. I wake up I log in, I get off, I go to uni, I grab a quick dinner, sit in front of the terminal, log in until I sleep. That was the continuing cycle."*

Self-proclaimed 'addicts' described IRC as addictive because of the ease of communication. For example, one IRC user attributed addiction to the *"killing time" effect. and "just talking" with somebody. It's so much easier to just log in and talk*

than actually making an effort to meet people." More specifically, addictive feelings were attributed to the effortless social interaction, the opportunity to meet and interact with a wide range of interesting people, and the opportunity to talk with IRC friends.

Many IRC users had tried to cut back their hours, or to cease using IRC altogether. The decision to reduce IRC use may be triggered by an event, such as a relationship break-up or receiving poor grades, or a reassessment of the effect of time spent on IRC on off-line life. For example, one IRC user commented: *"I think what helped, I decided I wanted to get out into the real world and get myself a real girlfriend. I got myself a real girlfriend and sort of had a more normal social active life again"*. Another described the turning point as *"The realization that it's not real life. Friends on irc aren't your real friends, you often find that out. There is much gossip and such on IRC. It took too much of my time, leaving me with very little "for myself". It infected my work too much."*

Strategies used successfully by IRC users to break out of the 'addiction' shared two components. First, the individual reflected upon the amount of time they were spending on IRC, and weighed up the costs and benefits of their IRC usage. Second, the individual made a conscious decision to either cut-back or cease using IRC, and to get reinvolved in 'real life' activities. Specific strategies used by individuals to 'cure' their feelings of addiction were taking a 2 or 3 month break from IRC, having 'IRC free' days when they would not log in, scheduling specific time periods for IRC use, keeping busy in their off-line lives and arranging to go out with off-line friends during periods when they would normally be using IRC.

Symptoms experienced while trying to cut back on IRC usage included thinking constantly about IRC, longing to log in to IRC, and being on an emotional roller-coaster. One IRC user described it as: *"it's like been love sick really, you feel miserable. At one stage I was very up and down emotionally, up and down all over the place."* Symptoms were experienced in the short-term and dissipated over time. One IRC user in describing the initial period of abstinence noted that it was: *"Like losing something..I'd gotten so used to just being online that it had become so much of my social life. I had trouble thinking of things to do, because I usually just logged on and chatted..without really talking about much. Of course I missed talking with some people, but gradually found out that they didn't mean that much to me, and that the level of friendship was limited, often non-existent."*

For some IRC users, IRC lost its novelty value over time and the feeling of 'addiction' passed on its own accord. For example, one individual attributed the decline in use to an increased ability to discern the motivation of other IRC users: *"Some people are really sweet talkers in a sense and I guess the initial period of having been sweet talked like that sort of thing is really a confidence lifter so you get more and more addicted to it. Then after a while you find out that people are just saying that sort of thing so the novelty runs out."*

5.3.1.1.5 Stage 5: IRC as a Communication Device

This stage is characterised by the use of IRC as a communication device. IRC may be used to maintain contact with geographically distant others, to make arrangements to meet in real-life, or as an adjunct to other forms of communication. For IRC users in this stage, the distinction between IRC and 'real life' friends has blurred or disappeared.

During this stage friendships formed on IRC with others in the same geographical location transfer to off-line settings. IRC becomes primarily a tool for arranging further off-line interaction: *"...the new aspect of IRC, of lets go in there and see what is happening is kinda gone, now it is more for organising, going out at night, that kind of thing. Just chatting with people that you do know finding out how they are doing and that kind of thing. Rather than meeting new people."* IRC may also be used for maintaining relationships between off-line interactions.

Sense of community on IRC can spill over into physical life when channel members decide to meet regularly in physical life. One IRC user described how he combined an off-line meeting with local IRC users with an on-line meeting with geographically-distant IRC users: *"Last night, for instance I had people over for dinner, close to a dozen over for dinner, most from IRC and I had them there and IRC running and it was quite unreal..."*. He went on to describe the effect of the migration of IRC relationships to off-line settings on his perceptions of the inter-relationship of virtuality and reality: *"There have been a lot of relationships starting from IRC. Friends, lovers and everything else. It really brings the whole thing together very quickly and I can see it becoming sooner more of rather than a separate world, becoming a tool in this world"*.

The stage model presented provides an indication of the stages that individuals experience in their IRC use. The central component in each of the stages of IRC use is the ease of communication experienced. The rate of progression

through the stages is partially determined by an individual's computing skills, previous experience in virtual environments and willingness to integrate on- and off-line lives. Key categories that relate to the ease of communication and stage model are further developed and presented below in four sections: the context (Section 5.3.2), the individual (Section 5.3.3), social interaction (Section 5.3.4) and off-line lives (Section 5.3.5).

5.3.2 The Context

Individuals are 'present' in two environments while IRCing: the physical and the virtual. This section outlines three categories (the physical environment, the virtual environment, and virtuality versus reality) and two sub-categories (telepresence and sense of community) that relate to the context of IRC use. The properties, dimensions and conditions of each of these categories and sub-categories are presented in Figure 5.7. These categories and sub-categories describe the contexts in which social interaction on IRC occurs, and the participants' involvement and thoughts about the context.

5.3.2.1 Category: The Physical Environment

This category describes the physical environment of individuals while they are using IRC. The majority of research participants interviewed used IRC from home, some used computers at a university and a small number used computers at work. Most individuals IRCed alone, and preferred it this way. However, for some IRCing is done in the company of friends (each on their own computer, or sharing computers) in a shared physical location (e.g. computer lab, work environment). This was seen as providing an additional 'fun' element to IRC. One IRC user interviewed held 'net parties' that could last for up to 48 hours. The effect of events in the physical location on the telepresence experienced on IRC is presented in Section 5.3.2.2.6.

5.3.2.2 Category: The Virtual Environment

In addition to the physical environment, IRC users are also interacting within a virtual environment. The representation of this virtual environment on the computer screen may vary according to the IRC software client used, but basic features of IRC such as channels are common to all. This category describes characteristics of the virtual environment that affect the communication process on IRC.

THE CONTEXT		
PHYSICAL ENVIRONMENT		
Characteristics of the individual's physical environment when using IRC		
CATEGORY Description:	Properties Physical location of self Presence of others	Dimensions Home - university - work Alone<-->crowd
		Conditions Determined by availability of Internet access Majority prefer to use IRC alone Presence of others increases "fun" aspect
VIRTUAL ENVIRONMENT		
Characteristics of the on-line environment that affect social interaction		
CATEGORY Description:	Properties Number of channels Types of channels Role within channel Communication mode Telepresence Sense of community	Dimensions One<-->many Age - location - religion - entertainment - sport - role-playing - sex - software - newcomers - quiz Drop-in<--regular--operator-->owner Channel-private messaging-DCC chat (developed as sub-category) (developed as sub-category)
		Conditions Less channels used when activity level is high Experienced use more channels simultaneously than "Newbies" Channels chosen reflect individual's interests Individual may create own channel(s) Partially determined by frequency of use of channel Higher status and increased power with operator status Channels used for "hanging out" Messaging used for short-term private conversations DCC chat used for extended private conversations and exchange of information

THE CONTEXT (continued)		
<p>SUB-CATEGORY: TELEPRESENCE Description: The extent to which the individual feels present in IRC, rather than in their immediate physical environment</p>		
<p>Properties Perceived location of self</p> <p>Imagery</p> <p>Consciousness of typing and reading</p>	<p>Dimensions Keyboard <--fluctuating --> IRC</p> <p>Text only <--> full imagery</p> <p>Fully conscious <--> unaware</p>	<p>Conditions Telepresence less when multi-tasking Affected by environmental and personal factors</p> <p>Affected by individual differences in imagery ability</p> <p>Affected by typing ability</p>
<p>SUB-CATEGORY: SENSE OF COMMUNITY Description: The feeling of belonging within IRC channels</p>		
<p>Properties Experience of</p> <p>Level experienced</p>	<p>Dimensions Absence <--> presence</p> <p>Channel <--> IRC network</p>	<p>Conditions Develops over time as relationships form</p> <p>Most commonly experienced in "home" channel</p>
<p>CATEGORY: VIRTUALITY VERSUS REALITY Description: The relationship between IRC and off-line life</p>		
<p>Properties Perceived relationship</p>	<p>Dimensions separate realities <--> part of everyday life</p>	<p>Conditions Changes over time Some individuals may consciously choose to maintain distinction</p>

Figure 5.7 The context of IRC use: Category, sub-categories, properties, dimensions and conditions.

Most IRC users interviewed used between 1 and 3 channels at any one point in time. While most had a 'home' channel where they spent most of their time, they may supplement this with the use of other channels. Different channels may serve specific purposes for an individual. For example, one IRC user noted that *"I'm generally on about 2-3 channels.. I use (channel) as a general chat channel, (channel) is my own private chat channel and I don't like ppl joining that without a good excuse. The only other channel I'm on is (channel) which as the name suggests is all about software, who's got it and who wants its :)"*. The number of channels logged into at one time may alter depending on the level of activity in each channel. Newcomers to IRC may not be aware of the existence of multiple channels or how to access them, limiting them to the use of channels to which they have been introduced.

The types of channels on IRC vary in theme and purpose. Channels may be based on geographical location, age, religion, entertainment, sport, role-playing, sex, quizzes, help for newcomers, the exchange of software or a myriad of other interests. There are also general channels with no specified theme or purpose. In addition to using existing channels, some individuals create their own channels to reflect their interests, or because they are unhappy with the standard of behaviour on other channels. For example, one IRC user commented: *"I found that the only girls i ever liked on irc were teens so i went with that and started a channel for them ... then realized that swearing was too much used by teens on irc ... so i made it clean and registered it, and now its one of the most popular channels on the undernet"*.

A range of roles can be adopted within channels including passer-by, channel regular, channel operator, and channel owner. Regular use of a channel may be rewarded by being assigned operator status, commonly referred to as 'ops'. Channel owners automatically have operator status. Having operator status was associated by some with power and control. *"i have some (channels) i like ... and i join regularly ... and usually have autoop (automatically given operator status upon joining the channel) ..ie control! ... control the channel and the ppl in it"*. In some cases this may provide a level of power that the individual does not have in their off-line life. Generally, other channel users may treat channel operators with respect: *"Yeah, they suck up big time. As soon as they see you on channel, they say hi, what is it like here, what are you doing. You are at the upper end of the scale."* However, not all IRC

users are interested in the power aspect of being a channel operator, or of obtaining 'ops'.

The three commonly used modes of communication within IRC are communicating within a channel, private messaging, and DCC chat. Frequently a combination of these modes of communication is used simultaneously.

Channels are typically used as a place to 'hang out'. Conversation in channels tends to consist of short messages interspersed with greetings as people join and leave the channel. Conversation on channels may be general or related to the channel topic. An individual may choose to frequent a range of channels that match their interests. For example, one IRC user described their use of channels as: *"When I go to (a UK based IRC network), cause they have thousands of channels in Europe, I go to (channel) cause I like to talk about music. Just hang around in some of the (channels), people around your age talking about drinking, and sometimes I like to go into something like news and talk about sports which is my favourite one."* Where a conversation strikes up between two members of a channel they may switch to private messaging to continue the conversation outside of the channel.

The amount of time spent in private messaging varies widely. Messaging is used for private conversations, for helping others, and for trying to establish sexual relationships. Most IRC users use a mix of communicating in channels and messaging: *"I find it very difficult when there are more than a few on (a channel). I find that I talk more privately out of the channel in a personal chat. and then go back and forth, because its so typing intensive. Its a bit hard to try and digest what is being said, there is a whole lot of messages coming up one after another and they really scroll on the screen, and you can lose the thread of the conversation. If you just want to have silly fun, fine, but if you want a half-way decent chat, you go into private window."* The degree of messaging varies between individuals, and increases over time as relationships develop. This can evolve to the stage where presence in a channel is merely a signal of one's presence for private chats.

DCC chat may be used for extended private conversations. For example, one IRC user explained that: *"usually I'm not on a channel at all, i DCC chat with a friend ..umm %90...sometimes up to 8 hours a day"*. DCC may also be used for the exchange of information or for completing groupwork or homework assignments.

5.3.2.2.1 Sub-Category: Telepresence

The sub-category of telepresence represents the degree to which the individual feels present in the virtual environment of IRC, rather than in their immediate physical environment. The IRC users interviewed varied widely in their perceptions of the location of self while IRCing. This ranged from awareness of self at keyboard to awareness of nick on IRC. For a minority of IRC users interviewed, little telepresence was experienced. These individuals were more aware of the self at the keyboard than their nick on IRC. One IRC user noted: *"More that I'm sitting on the keyboard. I haven't lost my sense of sanity. My character intermingles with the other characters. To me it feels as if everyone is in a row of computers talking to each other. Not far away at all."* Where attention is shared between IRC and other activities the individual frequently retains awareness of the self at keyboard rather than the nick on IRC.

For some individuals becoming immersed in the text-based environment requires effort and time, and a conscious choice may be made not to make this effort. One IRC user described in detail their attempts to become immersed in the environment: *"I cannot if you mean, do I remove myself from that environment and stick myself in the other environment? I've tried that. When we first started people were handing out drinks and stuff and that's when I learnt how to do /me (command used for actions) and do actions and stuff. I've tried to form parties, like a cocktail party type of arrangement with music going.. that's because they were doing it and I tried to put myself into that world of sitting around and having a drink with people and really being in that environment and I guess it takes so long to do that that you end up spending ten hours on IRC if you did it that way, but it just became frustrating, it takes me too long to get into that role, especially if I am trying to do some work done in front of the computer as well."*

Some IRC users maintain a dual awareness of the self at the keyboard and their nick on IRC. Others consciously switch the focus of their attention between the two. Some IRC users noted that as they made no distinction between their off-line self and their nick, the question was irrelevant or meaningless to them. However, most of the individuals interviewed were more aware of their nick on IRC than their selves sitting at the keyboard. As one IRC user noted: *"My character for sure. I'm just tuned out, I just think about what is going on there and don't think about what I am doing. Time passes so quickly"*.

Telepresence is not a constant state, but can fluctuate over time. Changes in the physical environment or comfort level of the IRC user can reduce telepresence and refocus attention on the physical self. The level of involvement in the activity on IRC also affects the telepresence experienced. Where the level of involvement in a channel is minimal, telepresence is frequently also low. Telepresence increases as an individual's degree of activity and personal involvement in the channel increases: *"since I don't always say a lot it seems as though I'm looking in from window....I just see the conversation floating past but when I get into a good conversation I feel present"*.

Individuals varied in the degree to which they were able to form mental pictures of channels, nicks and actions performed. Because nicks and channels on IRC have no descriptions, limited cues are available to aid visualisation.

On IRC, channels are represented by a name only. There are no typed or visual descriptions of channels, although some channels provide a short sentence describing the topic of conversation for the channel. Individuals ranged in their ability to form images of channels, and in the type of images they formed. Some IRC users interviewed formed no visual images of channels at all, and perceived no need to do so.

Some IRC users formed spatial representations of channels, or the people within channels. An IRC user who formed spatial representations of channels noted: *"i can actually see all my channels in time/space... if i was to say i want to go to (Channel A) i know i have to go to the left ... and then over some ... if i want (Channel B) ... i know to go up and to the right ... its weird ... but that's just how i can imagine it... i place them within 3d space naturally ..."*.

The majority of IRC users interviewed developed images of channels as physical places. Some were able to describe in detail the mental image of their favourite channel complete with furnishings, while others gave sketchy outlines only. For example, one IRC user described their home channel as *"I picture it like a dungeon but as a happy dungeon with furniture Couch in the corner... some bean bags... chairs...table with a bunch of magazines..."*, while another simply described their home channel as *"a peaceful room full of light and love"*.

Forming mental images of a channel and its occupants often increased enjoyment in IRCing. One IRC user who described his home channel as *"a cafe area, people talking, often with tables and then the bar area with people who have met*

who are on the channel very often, behind the bar" noted that "it just makes it that much better, and knowing who it is sitting at the table also helps a lot. That is the fantastic thing about it, the freedom to be able to do that and to act it out as such in your own mind. Something that you wouldn't be able to do in real life. But something that is more of a possibility." Images may be formed of some channels and not others. Even where images are formed of channels, these may not be used consistently.

Individuals also varied in their ability to visualise other IRC users. Some IRC users developed no mental images of the IRC users they interacted with. One IRC user attributed this to the amount of attention this would require: "not typically... i am usually focused on personalities.. trying to understand them... know what motivates them... hard for me to focus on too many things at once". Another saw no point in creating visual images in a medium where physical presence was irrelevant. Some IRC users made a conscious decision not to form mental images, because these have been found to be far from reality in the past. However, as one IRC user noted, it is difficult to stop forming images subconsciously.

The majority of IRC users did form images of at least some IRC users that they interacted with on a regular basis. The type of images formed of other IRC users varied. Some images were cartoon-like, others were based on stereotypes, or gross generalisations,. Some images were formed based on an IRC user's nick or 'real life' name. For the majority, images of other IRC users are built up based on the interaction and information revealed by the person. Images varied in their vividness and completeness.

IRC enables the transmission of scanned photographs between users. Some IRC users used this facility to view photographs of IRC friends, and had the opportunity to compare their mental images to the photographs. Some claimed to be very accurate in the mental images they have formed while others noted large discrepancies. Some IRC users prefer not to 'spoil' their visual images by seeing photographs of their IRC companions. As one IRC user explained, seeing a photograph of someone "kinda kills the picture you have created....kinda like a book vs a movie...u know?" This IRC user noted that their mental images were often quite different from the actual appearance of the person. They went on to note "...and in some cases it hurt to see the racism that i have.. well one person i knew then i saw

the picture and they were asian....i was kinda disappointed ...which i'm not proud of...but thats what makes irc good...those kinda inbreed values don't exist".

On IRC, users can perform actions by using the /me command. Some IRC users do not visualise the actions performed at all. Some visualise some actions and not others. Whether an action is visualised or not can be affected by the novelty of the action, who is performing the action, and the concentration of the observer. Others are able to visualise all actions.

The vividness of the imagery varied between individuals, with some individuals forming only fleeting images while others became fully engaged in their imagery. When IRC users met each other off-line their ability to visualise the other's actions often improved: *"I watched them (friends) when we met.. and said to myself.. ahh so that's what they look like when they laugh.. or so on.. and as they type it it makes me chuckle to imagine them doing it in front of their puter"*.

The use of actions on IRC evoked mixed reactions. Some IRC users found actions tedious: *"for a time.... all the role playing and actions were really an annoyance for me.. I just couldn't get over the stupidity of people sitting around an imaginary hot tub.. having imaginary cocktails.. doing imaginary actions.... in unimaginative ways ... i finally have learned to cope with it.."*. For others, visualising actions aided the feeling of co-presence with other IRC users.

Individuals varied in their ability to hear voices for the individuals they interacted with on IRC. Some individuals simply read the text messages, and did not hear the words spoken. Some individuals heard voices some of the time, or for some IRC users, while other IRC users heard voices for all the people they interact with: *"I have a voice for everyone.. it is like the faces.... there is not noise.. but in my mind the words are spoken.. not read... and sometimes they have accents.. and tones... according to how the words are presented"*. After meeting off-line, voices were more likely to be heard.

Most interaction on IRC is conducted through the typing and reading of messages. Some IRC users lose all consciousness of typing and reading: *"no.. I don't feel the typing.. but typing comes natural to me.. I talk.. it isn't type ... grin ... it is using the fingers to talk.. like a deaf person uses the hands to speak"*. Some IRC users are partially conscious of the process of typing and reading. Others are always conscious of the process of typing and reading messages, and may attribute this to their lack of typing skills.

5.3.2.2.2 Sub-Category: Sense of Community

The sense of community category refers to the feeling of belonging to a community within IRC. Research participants ranged in the sense of community experienced on IRC from none to a very strong sense of community. For a small group of research participants no sense of community was experienced. Another acknowledged that while they did not experience a sense of community, others may do so: *"I think there might be with certain parties on there cause they are on that often. BUT I guess I am assuming. Me personally, no."*

Sense of community on IRC channels was not always seen as a positive thing. One IRC user interviewed noted that sense of community went hand in hand with 'real life' behaviour and ethics. *"i may be slightly different in this regard than some people. they probably do (experience a sense of community on their IRC channel)... but i hate that generally ... people go from being really interesting (in the way that anonymity affects them) to being very ordinary..... in that they slip into playing roles etc.. the same way they do irl. suddenly.. when you are in a room with regulars.. they feel responsible for the on line persona they have developed.. they are back into group behaviour.. which as you know.. is awfully ordinary. and often dull and they end up defending this persona of theirs..... in ways that are often tedious. well.. i go to channels to chat and talk... i just prefer channels.. where there aren't a lot of permanent fixtures.. similar to a local bar.. versus.... a city bar.... where everyone is likely to be new. walk into a local bar in a small town.. where everyone know every one..and you get very different behaviour"*.

Another small group of research participants reported their home channel had some sense of community, but felt that their channels resembled families or social groups rather than communities.

The majority of IRC users interviewed reported experiencing a sense of community within their home channel. A typical response from this group was: *"Absolutely. Possibly because we have all become fairly good friends. But definitely, I'd say so..yeah. If someone has a problem then people are generally interested in what is happening and they want to help. If anyone ever has anything, or does need help in anyway then people always want to help and try to help...so yeah..that's the basis of community..there definitely is..yeah."* The experience of sense of community develops over time as the individual forms relationship with other channel members.

Research participants who experienced a sense of community in their home channels varied in their views of sense of community in other channels. Most acknowledged that other channels may have a sense of community. As one IRC user stated: *"people are different in different channels, but they probably have the same feeling of community in their 'home' channel as I have in my 'home' channel"*. However, others felt that the sense of community may vary between channels, with some channels having no sense of community.

Sense of community can be experienced at the individual channel or network level. One research participant felt that the IRC network itself had a sense of community. However, for the majority of users interviewed, the IRC network was seen as too large to have a sense of community. Communities were seen to exist at the channel level within the larger society of the IRC network. Sense of community was usually experienced at the level of the channel, rather than the IRC network as a whole and was strongest for the home channel.

Research participants who indicated that they experienced a sense of community in their home channel were asked what gave their channel a sense of community. Structural and organisational features of an IRC channel can aid sense of community. As one IRC user noted *"a channel topic helps, and the kind of people that you put on it, for instance ... rules help too, having certain ops..."*. Channel operators were seen as important in regulating the behaviour of other users.

The major theme emerging from respondents' answers to this question related to the caring and sharing and respect between members of a channel. Caring activities included praying, listening, advising and supporting others. Events in channel members' lives are noted and celebrated within the channel. Meeting the same people in the same place on an ongoing basis provided a sense of belonging: *"I guess it is the fact that they all meet each other on a reg basis in the same place..... it becomes their place"*. Shared interests were also seen as important. The supportive atmosphere, combined with respect for other channel members induced a sense of community among channel members.

5.3.2.3 Category: Virtuality Vs Reality

The nature of the relationship between virtuality and reality (or IRC and off-line life) is one many IRC users have considered. One went so far as to describe it as *"the ultimate irc question"*. Another commented: *"sheeesh.... now that's not an easy answer.... and i've not really figured that out yet.. i doubt anyone has.. "*

Individuals varied in their perception of the relationship between IRC and off-line life. Some choose to keep their virtual and physical lives completely separate. Where a separation between reality and virtuality was maintained, IRC was seen as a psychologically freeing space. IRC may be thought of as a fantasy world, albeit an interactive fantasy: *"vr's (virtual realities) can be very consuming, like a good book, and i think that the relationship is the same in that when you put down your keyboard :) the vr ends. but its interactive, and you are part of others vr".* For some, IRC may represent an idealised version of what life should be: *"I think "virtual" as what the "real" world should be, in some ways...people accept you here more for who you are, and not for what you look like, or do... "*

Others reported a degree of overlap between IRC and off-line life, while still maintaining a distinction between the two. One individual commented that IRC and off-line life were: *"Pretty different I think. Like I'm very like withdrawn and can't think of much to say unless I know the people, where as when I'm on IRC I don't have to talk, it's just like writing a couple of letters. So I can be a lot more open on IRC. I don't see them as totally separate, but I don't think totally linked either. There is a connection and all, but I think it's two separate life styles that I think you lead, like I have a normal life, then I go home at night and go on my terminal and talk to my other life friends."*

Still others see virtuality as a subset, or part of, off-line life. One IRC user who stated that virtuality and reality are closely linked explained: *"i've thought about it a bit.... and the only thing i've come up with, is that our virtual life has significant effect on our real life.. and that it must be taken seriously.. it's not just imaginary.. our brains don't know the dif between real and imaginary anyway..".* This IRC user viewed IRC as a space in which the individual can experiment with new ideas and identities: *"the virtual life..... in some ways becomes a testing ground for new ideas etc... that might be difficult to do or pursue in real life..".*

Where interactions on IRC are perceived as 'real life' interactions, IRC becomes a communication device. One IRC user explained: *"we all manage to develop real feeling between the ppl we interact with..just like a neighbor.. or the ppl we hang out with.. part of the same thing .. I mean.. one is just a broader way to have friends.. and communicate with the world.. whenever you dress you communicate .. who you are to the ppl in the community by what you are wearing.. this is just*

another way to communicate... let ppl across the world know what you are communicating".

Views on the relationship between on- and off-line life may change over time. One IRC user described the changes in thinking he experienced: *"It is merging very very quickly. It used to be a whole different world. I would tell people this and now I cant believe I used to. When I first started I became totally addicted to it. We didn't have two phone lines at the time, I was living at my mum's house. I was on constantly and it was a different world at the time. I was in the closet, I would turn on the computer, and would turn gay and then would turn it off and be straight again. It was the release, the freedom that I couldn't get in real life. Now having lived out of the house, having got rid of my mum's influence I can relax more and be more at ease, and merge the two."*

Perhaps the range of views is best represented by this extract from a posting to alt.irc newsgroup on 15 February 1996 by Saitan: *"Irc tends to make people more brave, enabling them to act more freely, and on some occasions let's them perform actions they would normally never had dared. For some people it is fantasy, for some reality, and for others it is somewhere in the middle."*

This context section has described the physical and virtual environments in which IRC use occurs. The formation of audio and visual images while IRCing provides a heightened sensory experience and telepresence. The development of an individual's sense of community in IRC is associated with finding a home channel and forming personal relationships during Stage 4 (IRC as relationships). Sense of community may increase during periods of addiction, and spread to place-based community where relationships formed in IRC with local users transfer to off-line settings in Stage 5 (IRC as Communication Device). Over time, conceptualisation of the relationship between virtuality and reality changes as the individual progresses through the stages. What may initially be seen as an alternative reality becomes part of every-day life. The following section examines the representation of the individual within the IRC context described in this section.

5.3.3 The Individual

An individual is represented on IRC by a nickname, commonly known as a 'nick'. The nick is chosen by the individual and is usually restricted to a maximum of nine letters. No form of description accompanies the nick. The category, properties and dimensions of the individual are presented in Figure 5.8.

THE INDIVIDUAL		
<p>CATEGORY: IRC NICKS Description: The virtual representation of the individual on IRC</p>		
Properties	Dimensions	Conditions
Number of nicks	One <--> many	One nick predominantly used
Gender	Biological <--neutral--> opposite	Males may adopt female nicks for role-play, experimentation, or sexual baiting Females may adopt gender-neutral or male nicks to avoid sexual harassment
Choice of nicks	name - age - role - interests	May be selected to attract others
Identification	None <-- aspect of self --> total	Dependent on perceived relationship between IRC and off-line life Identification may increase over time

Figure 5.8. The individual on IRC: Category, properties, dimensions and conditions

5.3.3.1 Category: IRC Nicks

The category IRC nicks describes the virtual persona adopted by the individual in their use of IRC, and their level of identification with the nick. The number of nicks used by the IRC users interviewed ranged from one to eight. Even where individuals had more than one nick, one nick tended to be used most of the time. Using the same nick makes the person identifiable to others they have interacted with previously. When somebody else is using their nick, IRC users will often change to a slightly modified version of the original nick, and may ask the offending party to 'return' their nick. Alternatively, they may choose to change nicks to avoid problems: *"I usually have one (nick) that I use, but I do have six or 7 other ones I use when I'm hiding or doing something else. If there is someone I don't want to talk to then you hide, sometimes you ban people from the terminals and they don't like it and they try to find you or something like that so you change your nick and they don't know who it is."*

IRC users imply a gender to other users by their selection of nick. Perceived gender can be manipulated by changing nicks. While most of the IRC users interviewed used a nick that implied the same gender as their physical self, some IRC users had experimented with, or were currently using, nicks that implied the opposite gender or gender-neutral nicks.

Reasons for using opposite gender nicks were varied. Some male IRC users adopted a female nick as a form of role-play: *"I can't speak for everyone, but I can say this for myself and that is this: Role-playing is the art of putting yourself in another's shoes (who cares if the shoes don't fit or aren't desirable) I know of a lot of males who take on female personalities just because it's a challenging role to be something so completely different in views and passions."* (posting to newsgroup by Gothnyte).

Some males adopt female nicks as a form of sexual baiting: *"Even I occasionally take a feminine nick and join a sex channel just to mess with the mind of some unfortunate horny guy. because it is much more difficult to deceive someone in real life. and there's one born every minute."* One IRC user described men who used female nicks in order to engage in sexual acts with other men as 'posers'. He described a 'chick test' used to determine an individual's gender. The test asks questions about body type and size, clothing size, brands of make-up used, and type and brand of birth-control.

Other reasons males gave for adopting opposite gendered nicks were to experience what it was like to be the opposite gender. One male who used a secondary nick to experiment with gender-switching described the adoption of a female nick as *"curious - shows a side of males which is shameful"*. He explained: *"the female nick logs in - and then half a dozen messages straight away ... esp along the lines of "want to fuck? or want to phone?"* Using the female nick to interact with other females, he felt that he *"got to see into the females mind - which normally they would have hidden from males"*. He stated that through gender-switching he had learned that *"males are in general bastards :) ... but - it just increases my social engineering skills"*.

One male commented on the difficulty and problems of revealing biological sex when close relationships have been formed using a female nick: *"i could have kept lying ... but it was not right... we were getting too close ... but i hurt them a lot ... we were quite close"*. He described his initial motivation for changing genders as *"many womyn complained about male harassment because of female nicks so i changed mine to see what would happen and on that first night 5-6 months ago i met 2 of my really close friends who i meet nearly every night and well ... we got to know each other ... then i got auto on (channel) and well ... i just dug myself deeper and deeper ... but to be honest it was so easy and fitted so well ... i was so comfortable being who i am on here and please don't analyse that one :) :0"*. He later admitted that while his initial motivation was to assess the degree of sexual harassment, *"what i have done/am doing can be seen as harassment sort (of)"*. Overall, he felt that he had learned a little about the experience of being female: *"my wife says it has brought out my 'feminine' side ... i see things differently now ... but ... well ... and to be honest i understand women much more now :) :)"*.

Females may adopt gender neutral or male nicks to avoid sexual harassment: *"I don't admit that I am female most of the time. (nick) you don't now. Most people assume I am male most of the time. unless they really ask and then I will tell them, and it is OK, cause you have got to know them first."*

A person's nick may be chosen for one of many reasons. Some individuals choose nicks that represent first names, initials, or nicknames elsewhere. Others choose nicks that represent their age, roles or interests. Popular sources of nicks were characters from books or television shows, names of musical groups or band members, animals, and geographical locations.

With no physical appearance upon which to judge another person, IRC users may also form impressions based upon the nick an individual uses. Some IRC users consciously choose a nick that will appeal to the type of people they would like to interact with: *"(Nick) is a laidback, friendly kind of a nick so that's the kind of person that generally will respond to me. a persons mental image of you is very dependent on your nick, as a first impression anyway, because its the only piece of information that they have about you"*.

The majority of IRC users interviewed identified completely with their IRC nick, feeling there was no difference between their physical and virtual selves. These IRC users did not distinguish between their off-line and virtual selves: *"i don't see it as a character i just see it as me"*. The relationship between self and nick was often expressed in terms of 'off-line name = nick'. For example, one IRC user noted: *"there is a sign between this 2 me... RL me = Virtual me ... my principle is be real, be frank"*.

Some IRC users who identified strongly with their nicks felt that their nicks represented more extroverted or open versions of their everyday selves. For example, one IRC user noted that their nick is *"just a mirror image of myself on the net. It's still the same person but (nick) gets more choices, (nick) gets to choose when to go on, when to go off. (nick) can hide. It doesn't really matter, because people can't get hold of you or something like that."* The virtual persona represented by the nick may become more like the off-line self over time.

Others identified less strongly with their virtual personae. Some regarded their nicks as representing aspects of their off-line selves. Only one individual interviewed regarded their nicks as representing role-play characters.

Where a person has more than one nick, they may identify with one nick more strongly than others. The nick chosen at any one time may depend on the person's mood, the channel they wish to interact on, and whether they wish to be anonymous. Changes in nicks can alert others close to the individual to changes in mood. For example, one IRC user who uses a particular nick everytime she is depressed commented that this results in: *"my friends know something's up ... i get a million and one msgs 'r u ok (name)?? wats wrong??' "*. Another IRC user noted that their identification with nicks varied over time: *"I tend to identify with nicks (or not identify) based on my current mood. But over time, i've noticed that my favorite nicks become more and more important, because they seem to take form. They become*

representations of the sum of my actions whilst using that nick. In some cases people know me by only one nick. And given that specific nicks are used based on a mood, I realize, that I may appear very differently when using one nick to the other."

The nick selected by the individual during their early forays into IRC (Stage 3) typically remains with them throughout later stages of development. Most IRC users use one nick predominantly, and identify strongly with it. The next section examines the ways in which individuals, represented by their nicks, engage in social interaction within the IRC context.

5.3.4 Social Interaction

Social interaction on IRC occurs predominantly in text. While recent changes in technology mean that sound and picture files can be transmitted via IRC, these tend to be used only as supplements to text-based social interaction. This section outlines three categories pertaining to social interaction in IRC: dispersed attention, IRC relationships and disinhibited behaviour. The properties and dimensions for each category are displayed in Figure 5.9.

5.3.4.1 Category: Dispersed Attention

Most individuals are engaged in multiple conversations or multiple activities while on IRC, dispersing their attention. IRC users vary in the number of conversations they are comfortable in having at the one time. While some prefer to focus on one person, others can comfortably manage several conversations simultaneously: *"I've been in a situation where I've been in two channels, and had up to four or five different private chat sessions going at once. That really does get very frustrating, only because of my typing, ..but I do manage to maintain several of those conversations in an interesting fashion at once, but it is very difficult. Sometimes I have to tell people no, I can't talk to you now, I'll have to come back later because I've just got too many chats going on at the same time."* Major barriers to holding simultaneous conversations were typing and spelling ability. One IRC user also noted that his dyslexia created difficulties with multiple conversations.

In addition to participating in a number of conversations simultaneously, many IRC users engage in multiple tasks while on IRC. At the extreme, one IRC user noted that: *"i have 27 windows operating right now on this unix workstation. writing webpages running two bots talking to you, email on 3 accounts , root admin stuff on two windows, homework in one, graphics design in another, etc"*. Some IRC users thrived on the stimulation provided by multi-tasking.

SOCIAL INTERACTION		
<p>CATEGORY: DISPERSED ATTENTION Description: The dispersion of attention across multiple conversations and/or multiple tasks</p>		
<p>Properties Number of conversations Multi-tasking Difficulties encountered Strategies used</p>	<p>Dimensions One <--> many One activity <--> many activities Mis-sent messages - unable to keep up Tiling - minimising windows - programs and scripts - prioritising</p>	<p>Conditions Affected by typing ability, spelling ability, speed and level of interest Multi-taskers seek and enjoy a high level of stimulation Dependent on match between individual's ability and amount of activity Some individuals adopt no specific strategies</p>
<p>CATEGORY: RELATIONSHIPS Description: Ongoing interactions between IRC users that are perceived by the individuals involved to form a relationship</p>		
<p>Properties Number Types Depth Importance</p>	<p>Dimensions None <--> many Acquaintance <-friend-> romantic Casual <--> deep Limited <--> extreme</p>	<p>Conditions Affected by amount of time on IRC Some make conscious decision not to get involved An individual may have relationships of varying depth Relationships may increase in importance when relationship moves off-line IRC relationships particularly important for those without off-line friendships</p>

SOCIAL INTERACTION (continued)		
CATEGORY: DISINHIBITED BEHAVIOUR		
Description: Behaviour that is less inhibited on IRC than in off-line settings		
Properties	Dimensions	Conditions
Valence	Positive<-->negative	Young males more likely to engage in negative behaviours
Types	Self-disclosure - flirting - experimentation harassment - net.sleazing	
Contributing factors	Anonymity - disembodiment - control over self presentation	Combination of factors results in reduced consequences for actions
Methods of coping with	Polite requests - ignoring - kicking - banning - set up own channel	Dependent upon status in channel

Figure 5.9. Social interaction on IRC: Categories, properties, dimensions and conditions.

The dispersion of attention required to engage in multiple conversations and/or activities simultaneously resulted in errors for some individuals. Messages may be sent to the wrong person: *"There would be times when i would be responding to a previous question and they would give me another answer. It is a bit confusing. I send the wrong answers to the wrong person. The right answer to the wrong person or whatever, several times. that was a little confusing."* Backtracking may be required to make sense of conversations.

IRC users employ a number of strategies to manage their multiple conversations. Some use the windows environment to tile private and public channels, or minimise channels not currently in use. One IRC user had written his own program to aid the process and had also programmed scripts to answer common questions. Others manage multiple conversations by prioritising whom to talk to. Priority is frequently given to private conversations over channel conversations. However, not everyone uses a strategy. Some IRC users stated they relied on typing fast and plenty of caffeine.

5.3.4.2 Category: IRC Relationships

IRC relationships are ongoing interactions between nicks that are perceived by the individuals themselves to form a relationship. IRC users meet one another in a number of ways. The most common way of meeting people on IRC is to enter into the conversation on a channel. Specific strategies to engage others in conversation differed, from those who would offer a greeting and wait for a response to those who actively engage others in conversation. IRC users are attracted to talk to another when they share an interest or are interested in the other's conversation: *"If somebody is talking about something, ..umm... a topic that I like, and If I want to give my views, I just butt in and talk or just send something that says does anybody want to chat?, and they start just like that."* Another common way of meeting others was through providing 'newbies' with help.

Some IRC users used strategies to target a particular type of person they would like to meet. For example, one male IRC user who chooses to meet only females who live in his home city commented: *"I think IRC provides a medium where you can meet people quickly and conveniently ...well.. I can check out all the users in (home city) ... then i take educated guesses whether they are female ... it's usually quite obvious by their nickname ..."*. Once IRC users who meet his criteria are identified he sends private messages to them.

Conversations between IRC users change over time. Frequently early conversations revolve around demographic details. One individual described early topics of conversation as: *"Where they are from. How old they are, whether they study or whether they work, what their interest are and then just dribble after that."* Where a relationship is being pursued with a specific purpose in mind (typically sexual), this may be brought into the conversation at an early stage. For example, one IRC user who uses IRC to meet potential off-line sexual partners noted that his conversations begin with *"age, sex, studies or work, suburb living in"*, and then progress to *"what they chat about on IRC, do they chat about Sex.. then .. the conversation either drifts into Sex or ends. :)"*

Individuals react to behaviour and form impressions of an individual on IRC in the same way as they would react to similar behaviour and form impressions off-line. For example, one IRC user wrote that: *"When I talk on a channel, or msg people, I do that to talk. If people just bitch at me, tell me to fuck off, or just inform me i am now being ignored, I get a negative impression of that person. It's the same as in real life"* (posting by Rob J Nuata to the alt.irc newsgroup on 17 April 1996). Over time individuals developed the ability to judge others based on their interactions: *"if a person is trying too hard to be some thing they are not it comes through..i think maybe if a person is the 'cliche' of a type of person in every respect then its obvious"*.

Relationships commonly had an early stage of getting acquainted followed by a more gradual building of the relationship. As the relationship develops the boundaries of the relationship are defined and conversations change to sharing what is happening in each other's lives and discussing problems. Conversation resembles *"..more of friends meeting friends on the street type of convo...like how was your day.."*, and topics of conversation focus on *"Daily lives, worries, troubles, laughs, joking, just everyday conversations"*.

The development of IRC relationships was marked by the transfer from public to private settings. Early conversations are usually held in public channels. As the relationship develops the conversation moves to private channels. The text-based interaction on IRC may be supplemented by the exchange of photographs and sound files using the DCC protocol. For some, relationships reach a stage where there is a desire to make off-line contact. One IRC user described his position as: *"i tell people that i think i may end up being friends with ... that i will not intentionally have cyber*

friends only. i tell people, that i prefer to take it off line at some point..... even if just for a hello.. i explain that at some point i will have to talk with them on the phone. or... if they are close.. or travelling through.. that i'd like to meet. life is short.. and i prefer to only have real friends.. meaning i am not interested in casual friendships... or at least.. i don't want to spend a whole lot of time chatting with people... casually.. so... i usually explain this up front...".

Individuals vary in the importance they place on obtaining photographs of the people that they chat with. Some choose not to exchange photographs, some do so only after they have come to know a person well, and others have their photographs on web-sites available for anyone to see.

Some individuals choose to telephone their IRC relational partners. Conversing on the telephone introduces new sensory input to the relationship: *"it gives me a better sense of them.. just hearing someone's voice tells you a lot... also.. i use it as a way to test them..... people can cover themselves pretty well on line.... but in person.. or even on the phone.. there is much to see and notice... that is difficult to discern on line."* Some changed their conceptions of others after speaking on the telephone, accommodating the new information provided by the additional sensory information: *"One guy that I have known for ages now, since the beginning of last year, he has sent me birthday presents, he rings. I have never met him because he lives in Canberra. But the thing that gets me, is he rang, I had an image of the way he would sound, and he didn't sound like that at all, he was very quiet. I thought this can't be right, I thought he was a real joker."*

The accommodation process continues when face-to-face meetings are arranged. One IRC user who noted that there is *"nothing like the help of one's imagination.. to create an unrealistic expectation"*, explained that *"when you go off line.. all of the image of that person that you have conjured are altered for good.....they become more fixed in your mind..."*. The accommodation process is aided by finding out as much as possible about the other person before actually meeting.

Given the amount of time spent developing a relationship on-line, expectations for the continuing development of a relationship after meeting off-line can be strong. As one IRC user commented: *"we can find out about someone before meeting them and hopefully become comfortable with them earlier ... but that is also its downfall ... we get too comfortable, that it may make it harder when we do meet ...*

too many expectations ... and saddened if it doesn't work out because of all the time put in ... and with irc, there is a lot time put in".

The high rate of self-disclosure on IRC created difficulties for some individuals when they chose to meet their IRC relational partners in off-line settings. One IRC user described the discomfort when meeting someone for the first time off-line: *"it was very uncomfortable because when you are writing you have the tendency to write a lot more than you would if you actually knew them. Even your closest friends, you wouldn't tell them certain things about yourself, but because you feel that they can't see you, you can just hang up and never talk to them again, then you tend to be a little bit more forefront with your information, so when you meet her, you look at each other and don't know who they are and they know so much about you and you are going oh no."*

Individuals differed in the degree to which their IRC relational partners meet their expectations upon meeting face-to-face. While some found their relational partners to be exactly as they expected, others found they were not in the least as imagined. For many, expectations were partially met. While physical appearance was sometimes a surprise, personality was generally in line with expectations, or a more subdued version of the on-line persona.

While many IRC users espouse the ideology that physical attributes such as age, race, sex, physical attractiveness do not matter, when relationships move off-line prejudices come back into play. As one IRC user commented: *"some are like you expect and some aren't ...you don't know how they look, so you are surprised by that, and it may even be that you dislike them then, even though you thought they are nice, because character is not all, even if you would like it that way".* Physical appearance and mannerisms appear to strongly colour perceptions when individuals meet off-line, but over time their effect may subside: *"Immediately, at least for the first few times that I met them they were often completely off. Expectations, I don't know if I actually have expectations when I meet someone from IRC. You start to mention a person as something and often they turn out to be nothing that you expect them to be. But then as you get to know them better you do realise that there was a reason why you met them to begin with."*

As a result of meeting face-to-face, IRC users felt that they had learned more about each other. Some also noted an improvement in their ability to understand the meaning of messages on IRC: *"the relationship's changed a little bit more. I know*

when she's saying something now what she implies, whereas before I thought she might have been implying what she was implying, but now I know what she was implying." Meeting was frequently seen as just another stepping stone in the development of the relationship.

Several differences in the development of IRC and off-line relationships emerged. First, IRC relationships were seen as easier to initiate than off-line relationships. This was attributed in part to the access to a wide range of people ready to communicate. Second, relationships were seen to develop on the basis of the content of the typed social interaction, rather than a judgement based on physical appearance. Third, some individuals noted that IRC relationships developed more quickly than their off-line counterparts. Relationships were described as becoming: *"More intimate more quickly. There is a tendency to explore fantasies. There is obviously a crying need out there for deep personal relationships, because I would say many are lonely people."*

The IRC users interviewed varied in the number and range of relationships they had formed on IRC. The number of IRC relationships formed ranged from none to many, with some reporting they had as many as 50 to 100 friends on IRC. Some had formed no ongoing relationships with other IRC users, and attributed this either to the limited amount of time they had spent on IRC to date, or to a conscious decision not to get involved. Others had made acquaintances, but not more personal relationships. However, the majority of IRC users interviewed had formed ongoing friendships, or more intimate relationships.

IRC was seen as providing an opportunity to form friendships with a diverse range of people, irrespective of age, appearance, race, gender or geographical location. *"IRC has no boundaries. You can form relationships with people from different spheres, like whereas in real life you mix with same group, or a group that's not that different. Whereas on IRC you can form friendships, or relationships with people who are much older than you, much more professional, with much more knowledge. I guess that's the difference."* Some IRC users noted that they were more likely to form relationships with members of the opposite sex. In some cases this was an intentional strategy, in others, not. However, other IRC users noted that they made friends with the same type of people on IRC that they would in off-line settings.

IRC was also used to maintain off-line relationships. IRC could be used to keep in touch with family and friends where geographical distance was involved, or to maintain friendships formed in other virtual environments.

The reported depth of friendships on IRC ranged from casual acquaintances to close friendships. An individual may have relationships of varying depth. For example, one individual described the majority of the IRC relationships he had formed in terms of: *"I actually think of them as not friends or intimate friends but more as social acquaintances. More like somebody I would meet in the pub on a regular basis. When I'm down the pub and say Hi, how you going, haven't seen you for a while. More like that."* However, in addition to the casual relationships he had formed one deep friendship.

IRC friendships were frequently reported to be as close, or closer, than comparable off-line friendships. IRC users may talk more with their IRC friends than they do with off-line friends and relationships become intimate more quickly. Some IRC users noted that they could tell things to IRC friends that they couldn't tell their off-line friends, and that they knew more about the feelings and lives of their IRC friends. Some IRC users re-evaluate their off-line friendships in light of the intimacy provided by virtual friendships: *"I look at friends with new eyes... the physical has become less important and I seek the deeper soul because it is warmer"*.

IRC users varied in the degree of importance they placed on IRC friendships. Some placed little importance on the relationships they had formed on IRC. Others placed limited importance on IRC friends, distinguishing between off-line and virtual friends. Some noted that IRC friendships lacked essential qualities of friendship: *"I think they're necessarily missing some critical elements. I think physical closeness is important for friendships. on IRC one can have friends of the mind. But the physical element that is important for friendships isn't there. yes. body language. although that does tend to be compensated for by other things. the language itself. Without body language, one tends to be much more sensitive to nuances of the spoken language."*

Other IRC users felt that IRC friendships were very important, and classified their IRC friends as 'real friends'. As one IRC user stated: *"i think here these people are your real friends ... we laugh and cry together and are always there for you"*. They noted how IRC experiences affected their feelings: *"my irc time affects my moods ... it is like visiting a trusted place.. to talk to friends.. if they are sad.. it*

saddens me.. or if someone upsets me.. I get upset in r/l because nicks are real people and I am aware of this". For two of the individuals interviewed, IRC friendships were the only type of friendships they had and, thus, assumed great importance in their lives.

IRC friendships did not become 'real life' friendships in the eyes of some participants until off-line contact is made. Some IRC users noted that IRC friends became more important once they had been met off-line. Not all IRC friendships may be of equal importance.

Some of the IRC users interviewed had been, or were currently involved in, IRC romances. For some, an IRC romance was their first romantic experience *"he he he...i'm not too good on the irl side :), this is my first real romance of any kind"*. Others used IRC to actively seek off-line romantic or sexual partners. As one person commented: *"I think it's not too surprising to meet Girlfriends on the net anymore. Everyone at University has an account now..it's just part of life."* Some have off-line and IRC romances simultaneously: *"well - i have both :) ... i prefer RL gf's - just for the fact that hugs and such are tactile ... but my net lover has helped me lots through things and I her"*.

IRC romances were described as more cerebral than off-line romances, with some claiming the fantasy attained a level of perfection that could not be reached in reality: *"it can actually be better. You are connecting more on an intellectual level and you don't have to worry about all the niggly physical things that can happen. Hard to say but, I never had actual net-sex with her, everything on IRC is perfect. I never get hay fever, you can lay on a virtual beach and you don't get sunburnt - things like that."*

IRC users also reported disadvantages associated with IRC romances. The lack of physical contact on IRC was seen as a major disadvantage. As one IRC user noted *"...there should be some physical side to a relationship ;)"*. He further explained that *"physical contact does not just mean 'sex'.....it means just seeing...and being with....and using more than just the sense of sight ... the pc monitor isn't very personal :)"*. Geographical distance between romantic partners can make it expensive to maintain contact off-line. In some cases, relationships broke up over the distance involved.

One IRC user interviewed thought the ideal combination would be to interact with a romantic partner on IRC and in off-line setting: *"Actually, if it could be done, I*

would like to have an IRC romance that was actually as well a physical one. It would be great if you could meet someone, get really close to them and then naturally - because I think when people write things down they can express their feelings a lot better, more concrete. It's easier to type than it is to talk to someone. You have to be very confident and get around things like having a squeaky voice or I don't know..".

The importance assigned to IRC romances varied. Some IRC users viewed IRC romances as less committed than other romances. Others viewed IRC romances as providing the opportunity to get to know the 'real' person before meeting.

IRC romances develop in a similar way to other IRC relationships. Romantic partners commonly meet in a channel and as the individuals spent more time together the relationship developed. Romantic feelings are discussed and eventually, the relational partners needed to decide if they wished to move their romance off-line.

Some individuals restricted their net romances to IRC, while others either planned to meet their IRC romantic partners, or had already done so. As one IRC user described, the decision to meet was made *"because we had gotten so close over chat... it seemed to be the obvious step to take"*. Prior to meeting face-to-face romantic partners commonly exchanged photographs and conversed over the telephone.

Meeting face-to-face could be a stressful occurrence. For some, an immediate rapport was established and meeting was the trigger for the development of an off-line relationship. Some IRC relationships progressed to become successful off-line relationships: *"I met a woman on irc over two years ago now who touched something inside my heart. Two weeks after I first met her I knew I loved her and wanted to be with her and she felt the same. We've now been living together for the past year and a half."* (posting by Michael G. Haynes to alt.irc newsgroup on 15 Feb 1996)

However, not all meetings had happy outcomes. Some resulted in the relationships ending. One IRC user described the events that occurred for him: *"we eventually did meet. she got pregnant... and the relationship fell apart. She miscarried, though. so we're back where we started, a little wiser for it. it was real for both of us though."*

Contact between IRC relational partners was maintained in a variety of ways after face-to-face meetings. For some, IRC continued to be used, supplemented by the telephone and visits where possible. IRC was even used as a communication medium where the relationship had developed into a predominantly off-line

relationship: "we use IRC as a testing ground sort of... to see what reaction we would get in real life.... in many different ways... it is just another dimension to our relationship".

As a result of their IRC romantic experiences, some IRC users became disillusioned about romance on IRC. In some cases disillusionment was triggered by discovering the deception practiced by a romantic partner: "...but now i don't trust them. irc girls lie ;) ...i only trust girls on (religious channel) ...and even those lie. I've found they lie because they would tell what they look like and it was false ... it always came around to the truth in time ... that was the big one ... if they lied too much, then would not meet me or send real pictures ... or they would send someone else's". In other cases, disillusionment was the result of dreams that didn't eventuate: "I'm ashamed to say, but yeah, I did have an IRC girl friend for a while, but it fell apart, and i thought back and went, it was stupid. It was so stupid, it was just a dream, like nothing will ever come of it. You fool yourself into thinking like maybe somehow something will happen."

One IRC user stressed the need to meet the person off-line prior to making commitments: "an IRC romance can develop into a RL romance. but I don't think one should ever commit in an IRC romance. because there's no way to tell if it will work or not until they've spent time with each other in RL. IRC != RL. IRC life is easier. and shallower. and a good precursor to RL friendships. But it is not a substitute."

5.3.4.3 Category: Disinhibited Behaviour

The ease of communication on IRC was associated with a range of behaviours that were less inhibited than individuals' behaviour in off-line settings. A range of positive and negative disinhibited behaviours were reported in interviews. Positive disinhibited behaviours were those that allowed the individual to experience positive social interactions with others. Many individuals reported they were less inhibited in their discussions on-line, and more likely to engage in self-disclosure: "one is able to say more when it is not in person ... so i feel that you can get to know more about a person sometimes...providing they are being honest with you ... talking to a person face to face is a lot harder than reading a screen". In some cases, behaviour was less conservative. Shy individuals engaged in less inhibited social interactions. Some users also engaged in experimentation and identity play. As one IRC user noted: "people come on line.. and constantly define and redefine

themselves... in a sense.. this is experimentation. they are constantly put in a position to describe themselves either overtly, or in the self that they choose to present."

Negative disinhibited behaviours were those that impacted negatively on other individuals' on- or off-line lives. Negative disinhibited behaviour on IRC included lying, deception, harassment, and threats to the off-line lives of IRC users. Negative disinhibited behaviour on IRC may be deliberate. For example, one IRC user described how he and his friends would set out to harass users on other channels: *"well...on (child pornography channel) etc... (we) i go on and just give them straight out abuse...then im kicked and banned... on (Christian channel) (we) i go on and argue with the Christians about 'morals' and 'god' etc..and then im kicked and banned from there ;)"*. When asked why he engaged in this behaviour he explained: *"well Perverts etc are people to hate..... christians we go onto argue with to have some fun arguing against...unlike (our) my actions on (sex channels)...i argue rationally there... they don't like anyone challenging their 'religion' so i am often kicked and banned"*.

Some IRC users (predominantly young males) reported having a number of enemies on IRC. Enemies might be abused, kicked (ejected from the channel), banned (ejected and not able to re-enter the channel), flooded (sent long strings of meaningless text) or have their accounts tampered with. Frequently, enemies retaliated and the war escalated. While harassment on IRC is usually confined to the IRC environment, in some cases it is taken off-line. One IRC user reported the presence of gay-bashers who tried to lure gay IRC users to meet off-line.

Many of the females interviewed noted that when using a female nick they were frequently sexually harassed, a practice sometimes referred to as net.sleazing. One described the process as: *"If you meet a guy, the first question that they ask you is "Male/Female?", and you go female and then they say what are you wearing, do you enjoy sex, you just say oh no."* Net.sleazing is seen as a continuation of the sexual harassment prevalent off-line: *"As a woman, it bothers me to go into a channel and be hit on, even though I realize most of the guys have no bad intentions. I simply get tired of being hit on in regular life and am dismayed that it even happens when I'm sittin' home alone with my computer. I don't think men realize who tired some women are of this behavior, both on the computer and off"* (posting to newsgroup). Some females resorted to adopting gender neutral nicks in an attempt to stop the unwanted advances.

An IRC user may feel violated and have their reputation tarnished, when their nick is associated with negative behaviour instigated by other people. One IRC user described how a male friend had used her account and engaged in netsex using her nick. She stated: *"That is terrible.. and he was pretending to be a female under my character!! I might be on their notify list now.. that I have been sleeping around."*

Some IRC users find the preponderance of sex-related channels and conversation distasteful. One IRC user commented: *"Well its open to abuse, and check out some of the channel names, father daughter sex, mother son sex and bestiality..an inordinate number of homosexual channels- 10% . Some channels seem to be specifically of a sexual nature and I joined a lesbian chat session at one time..it was very explicitly sexual. Many things to avoid."*

IRC users attributed the disinhibited behaviour to a number of factors. The most commonly mentioned contributing factor was the anonymity that IRC provides: *"as you know.. this is the first time in human history... that we could talk simultaneously with others from our community and around the world.. with complete anonymity.. with out any responsibility for our words or actions. This is an awesome thing.. and ... truly tests us..makes us realize that we must decide just who we are.. we are suddenly left with no boundaries.. or rules to guide us.. or societal expectations..it's wide open.. all of this is because of anonmyty. anonymity is the lubricant"*.

Some IRC users were less shy on IRC than in off-line settings and attributed this to the anonymity provided by the medium. One individual commented: *"it's like if in real life you aren't a talkative person you can be over irc i think"*, attributing this to *"I guess because you can say what ever you like and that person don't know who you are"*. The feeling of anonymity was increased when interacting with people who were geographically distant: *"Especially if they are like overseas cause they know they will never see you."*

The anonymity provided by IRC was seen as reducing the personal consequences of disinhibited behaviour: *"I'm probably more revealing on IRC. There is still that sense of anonymity. You know that people don't really know who you are, they don't know where you live, so if someone really pisses you off, you can say something back, and you know that they can't get you, or anything like that"*. Individuals believed that there would be no consequences off-line for their behaviour on-line: *"being able to say anything you feel like ... being able to get away with*

anything :) ...because I can just disappear by quitting and IRC is not taken that seriously ...most people understand that IRC is just for fun, and wouldn't take any real life action."

The physical absence of bodies and control over self-presentation reduced individuals' concerns over their appearance, and lessened inhibitions: *"one could interact without the needlessness of physical interaction - you could not be hurt or hurt - so that was one worry out of the way... basically all the things that one worries about in RL are gone ... bad breath, clothes, lack of self image ... you can be anyone or anything - no need to hold yourself in low self esteem"*. Non-verbal feedback is not provided in text-based communication, reducing the individual's perception of being evaluated. Individuals did not feel judged by their IRC peers.

A number of strategies were engaged by individual IRC users to counteract the negative disinhibited behaviours of others. Most commonly, offenders were first asked politely to stop, or were ignored. Where this had no effect the /ignore command was used to stop messages from the offending party appearing on the individual's screen. In extreme cases channel operators removed offending individuals from the channel using the /kick command. Channel modes can be set to private or invite only so that offenders cannot return. Alternatively, where the disinhibited behaviour is widespread, individuals or small groups can set up their own channels and devise their own rules for acceptable behaviour.

During interviews, evidence of ingroup-outgroup behaviour in channels as a means of controlling negative disinhibited behaviour emerged. For example, one IRC user described the reaction of regular channel members to 'outsiders' who also used the channel: *"well...now that i am an op in there...you are looked after and sort of protected by the others as well. if you are being hassled by anyone...they set in and help you out ... i have been flooded...they get the person back so to speak if someone has stolen your nick...they get it back for you"*. Channels of a similar type may group together as a network and inform each other of persistent offenders.

Individuals represented by anonymous nicks interacting within the text-based environment of IRC engaged in a range of positive and negative disinhibited behaviours. The ease of communication on IRC was reflected in the number and diversity of relationships formed. Numerous casual conversations may occur as the individual engages in multiple conversations and/or multiple tasks simultaneously, dispersing their attention among a range of individuals and activities. Some of the

casual acquaintanceships formed in this way in Stage 3 develop into personal ongoing relationships in Stage 4. As these relationships are transferred to off-line settings the individual moves into Stage 5. The effect of this social interaction on off-line life will be examined in the next section.

5.3.5 Off-Line Life

The time spent and social interaction engaged in on IRC have a range of effects on the off-line lives of IRC users.

5.3.5.1 Category: Effect on Off-line Lives

This category outlines the range of effects IRC use has on off-line life. The properties and dimensions for this category are presented in Figure 5.10. Users varied in the effects they felt IRC had had on their off-line lives. The degree of effect ranged from none to major. The valence of the effect ranged from negative to positive, with some reporting both positive and negative effects.

One commonly reported negative effect was the time IRC displaces from off-line activities such as sleep, work, study, other leisure activities, and interacting with family and friends. For example, one IRC user described how IRC friends had displaced time spent at work and with off-line family and friends: *"in the beginning it was just fun..after awhile the only people I talked with were my irc "friends". I began spending time online while at work too, which had a major effect on my work. I didn't care much about my real life friends, and after half a year I had problems talking with them. Family and such didn't interest me much either, something that I'm working on bringing back into my life."*

Time spent on IRC can cause conflict with other household members. IRC users frequently expressed the view that members of their family and friends don't understand their attraction to spending time on IRC chatting to strangers: *"My friends in real life sometimes complain, like they think I am neglecting my friends in real life because I spend too much time on IRC, and stuff like that. They don't see the importance that IRC friends have in your real life. To them its like they're not your real friends, they say "why do you bother with them". But to me they are my real friends, we share emotions, we share hurt and all that."* Some IRC users had reached agreements with other family members over the periods they could spend on IRC that less disrupted the family schedule. Some had introduced other family members to IRC, although this could create additional difficulties with family members competing for available computer time.

OFF-LINE LIVES		
EFFECT ON OFF-LINE LIFE		
DESCRIPTION: The effect of IRC use on the off-line lives of the individuals involved		
Properties	Dimensions	Conditions
Degree	None<-->major	Affected by amount of use
Valence	Positive<-->negative	Negative effects frequently result from displacement of time from off-line activities
Interpersonal skills	No effect<-->enhanced	Gains made by those with difficulties communicating in off-line settings

Figure 5.10. The effect of IRC use on off-line life. Category, properties, dimensions and conditions.

IRC was used by some research participants as a form of escape from off-line problems. The escapism provided by IRC can have both positive and negative effects. IRC can provide an outlet for emotions that an individual is unable or unwilling to express in their off-line lives. One IRC user who frequents a support channel noted that *"I am kind of a very depressive person. (channel) it gives it an outlet. one that doesn't exist in RL. I can vent. in RL I would probably end up breaking something."* In contrast, another IRC users noted that the escapism provided by IRC is *"bad for taking (your) mind off of what really matters in life"*.

Some individuals noted their interpersonal skills had been enhanced through IRC use. Specific effects included feeling less inhibited about discussing sexual matters, an increased ability to understand others' perspectives, and a better understanding of patterns in conversations. For some, interacting on IRC had increased their confidence in their communication skills. Disinhibited behaviour on-line had carry over effects in reducing shyness in off-line situations.

Some IRC users noted that through IRC they had been exposed to different people and different ideas, and as a result had broadened their thinking. One IRC user stated: *"it has taught me a lot..I have learned a lot of computer things I never knew before..I have been able to learn about scripting and unix and so on.. it has also developed friendships that have shaped me :)... they have made me more confident in who I am .. I feel more like myself.. not being watched and judged with every movement I do..I can sit here in jogging pants my hair a mess and no one cares.."*.

IRC can provide an environment conducive to personal growth. Some noted increased self-insight as a result of their experiences *"I think it was a very good socially growing thing. I would actually recommend it because, not the binge stuff, but it helps you learn how to interact with people better. You learn a lot more about other people's problems, and I think sympathising with other people. When I was on IRC I had a very close set of close friends for a long time. You meet with like minds and you find out, and you learn about problems and stuff, so very much growing things. I experienced so much stuff that I could never have experienced in real life in such a small period of time. Like people's problems, like watching people come together and interacting, having all these social interactions like your married sort of things. Like some have kids, I think it changed my view of things. I do things now that I would never have done then."*

IRC users noted that through their time on-line they had made many new contacts and friends, some of whom they now had contact with in their off-line lives. In some cases, relationships formed on IRC resulted in a reassessment of off-line relationships: *"one of the most significant impacts the *on-line* has on our *off-line* lives is that our experiences on line are so unique and new, that we end up being exposed to many new and wondrous things, which we may not have been exposed to had we not gone on line. The practical problem with this, is that many people come and interact on line and end up setting new standards and expectation levels for themselves and their peers. They suddenly become more aware of what they don't have or are missing."*

IRcing can have a range of positive and negative effects on the off-line lives of the individuals involved. In turn, off-line life can impact on IRC use. Where IRC negatively impacts on the off-line lives of individuals they may be forced to re-evaluate their IRC use. For example, where long hours spent on IRC are affecting work or study, the individual may adopt strategies to reduce their time on-line (reflecting movement out of Stage 4a).

5.3.6 Summary

This results section has outlined a grounded theory of social interaction on IRC. The ease of communication on IRC is reflected in the stages of IRC use. Categories were presented that described how individuals (category: IRC nicks) engage in social interaction (categories: dispersed attention, IRC relationships and disinhibited behaviour) within the IRC context (categories: physical environment, virtual environment, telepresence and sense of community), and the effect this has on their off-line lives (category: effect on off-line lives). The intertwining relationships between categories and the stage model provide a rich description of computer-mediated social interaction on IRC.

5.4 Discussion

The central feature of social interaction in IRC emerging from this study was the perceived ease of communication. This was attributed to the effortless nature of meeting a wide range of potential communication partners in a social context where the communication itself was simplified to text only communication.

The stage model of social interaction on IRC developed was based on the ease of communication experienced by individuals. To date little research has

examined social interaction in IRC. That which has been conducted provides some support for the model. Previous research relating to each of the stages of the model is outlined below.

The major task of Stage 3, IRC as novelty, is to learn the client, commands, jargon and etiquette necessary to communicate on IRC. Consistent with this, Rintel and Pittam (1997) noted the difficulty newcomers may have in engaging others in conversation. This may be partially due to their difficulties in following and contributing to the intertwined messages in channels, and their failure to use the typographical and action features that contribute to 'pretended orality' (Gelleri, 1998). In addition, newcomers may lack the understanding of acronyms used and the 'netiquette' of IRC interaction.

Stage 4, IRC as Relationships, represents the formation and maintenance of ongoing relationships with other members of the home channel. Previous research has also noted the intense relationships that can form within IRC channels (Byrne, 1994; Reid, 1991). This stage is also associated with developing and maintaining a sense of community within the home channel, a finding also reported by previous researchers (Bays, 1998; Reid, 1991; Shaw, 1997; Surratt, 1996).

Stage 4a, IRC as addiction (Stage 4a) is represented in this model as a phase when individuals are connected to IRC for long periods of time, where IRC takes precedence over, and is used as an escape from, off-line life. Research on Internet addiction has proposed that IRC is one of the more addictive virtual environments (Griffiths, 1997; Young, 1996b). However, the model emerging from this research differs from that of Griffiths (1997) and Young (1996b) by proposing that 'addiction' is a stage that most individuals will pass through, rather than representing a psychopathology that requires treatment.

Stage 5: IRC as communication device, represents the use of IRC as an adjunct to other forms of communication. Once individuals have reached this stage, the distinction between IRC and off-line friends blurs or disappears, and the sense of community experienced within the channel extends to other on-line and off-line settings. No other research was able to be located that examines this stage.

The stage model of social interaction on IRC is set within the dual contexts of users' physical environments and the virtual environment of IRC. The degree of telepresence experienced varied widely between individuals. Poor typing skills, poor imagery ability and multi-tasking were associated with lower levels of telepresence.

The ability to 'hear' voices and visualise channels, individuals and actions increased telepresence. The telepresence experienced by each individual fluctuated over time with changes in physical comfort and involvement in activities on IRC.

These findings are consistent with previous research on telepresence across a range of virtual environments (Heeter, 1995). A literature search revealed no previous published research that has specifically examined the degree of telepresence experienced in IRC. Some research alluded indirectly to the degree of telepresence. For example, Reid (1991) noted how for some IRC users, 'virtuality is reality', suggesting a high degree of telepresence. This creation of presence through the use of metaphor and social interaction (Bays, 1998) provides further support for Mantovani and Riva's (1999) sociocultural perspective of telepresence.

Operating within the virtual context of IRC, individuals control their self-presentation through the selection of nicks and degree of self-disclosure to others. The majority of IRC users interviewed predominantly used one nick. Consistent with previous research, gender was found to be implied by the nick selected (Reid, 1991; Rintel & Pittam, 1997; Rodino, 1997). Individuals consciously manipulated their self presentation through their use of nicks when experimenting, gender-switching, and sexual baiting. In addition, some females adopted gender neutral nicks as a means of avoiding sexual harassment.

The majority of IRC users interviewed identified strongly with their nicks and did not distinguish between their off-line and virtual selves. This is consistent with Bechar-Israeli's (1995) conclusion that the nick chosen on IRC becomes part of the user's identity. Reid (1991) described IRC as providing a psychological environment for the construction, exploration and deconstruction of identity. While some evidence of identity play emerged in this study, it was not the wide-spread phenomenon Reid's statement would indicate.

Indeed social interaction, rather than identity play, was the major activity on IRC. The ease of communication on IRC was associated with a range of pro-social and anti-social behaviours that were less inhibited than individuals' behaviour in off-line settings. The pro-social disinhibited behaviours reported: the ease of meeting others, the high rates of self-disclosure, the discussion of personal problems, and the fast formation of relationships, are consistent with Walther's (1996) notion of hyperpersonal communication. In direct contrast to the predictions of early theoretical models of media use IRC emerged as an inherently social communication

environment, providing a virtual context that was conducive to social interaction and the formation of relationships.

The high rate of relationships reported in this study mirrors that noted by Byrne (1994) and Reid (1991). While attraction to other IRC users was not based on physical appearance or physical proximity, the development of relationships largely proceeded in accordance with social penetration and uncertainty reduction theories. Conversations changed over time to become more intimate, and communication moved from public to private channels. Uncertainty reduction occurred through the exchange of biographical information and ongoing interactions. This process was aided by the ability to exchange photographs on IRC, and the commonly reported transfer of IRC relationships to other virtual and off-line environments.

The anti-social disinhibited behaviours reported in IRC occur within virtual groups with their own norms. Across IRC channels there is a wide variation in what is deemed acceptable behaviour. Sexual discussion that is acceptable in a bondage and discipline channel is unlikely to be welcomed in a Christian channel. Cheung (1995) also noted that appropriate behaviours differ between IRC channels according to the context and norms of each channel. These findings are in direct opposition to the social cues perspective, which would predict indiscriminate disinhibited behaviours across CMC environments, but provide support for Lea and Spear's (1992) SIDE model.

The time spent engaging in social interaction on IRC has a range of effects on the off-line lives of IRC users. As previously noted by Reid (1991), IRC provides an environment that can both support the practice of new behaviours, and be used as an escape from off-line life to avoid addressing the issues there. In this study, some individuals had used IRC to practice and enhance their interpersonal skills, with some carry-over into off-line life. However, for heavy IRC users time spent on IRC displaced time previously spent on off-line activities and with family and friends.

This chapter has presented a substantive theory of social interaction on IRC based on the phenomenological reports of IRC users. The model developed as part of this theory furthers previous research on IRC by identifying the typical stages individuals pass through in their IRC use. The model was developed using a cross-sectional approach. Future research using a longitudinal design is required to test and further develop the model. In particular, longitudinal research will aid in the further identification of temporal and/or critical requirements for transition between stages.

The next chapter compares the findings of this study with the results obtained in the previous study and reported in the previous chapter (Study One: Social interaction on MOOs). By comparing the findings from two different virtual environments, generic effects of text-based synchronous CMC will be able to be distinguished from effects specific to each virtual environment.

CHAPTER 6. COMPARISON OF SOCIAL INTERACTION IN MOOS AND IRC

6.1 Introduction

In this chapter the results obtaining from the research conducted in MOOs and IRC are compared and contrasted. The views of research participants who have used both MOOs and IRC are outlined. The substantive grounded theories developed in Study One and Study Two are compared, and points of similarity and difference highlighted. The aspects of the social interaction process that are affected by generic features of synchronous text-based CMC, and those that are attributable to the specific contexts provided by structural aspects of MOOs and IRC are identified. The theoretical implications of the research findings are discussed and suggestions made for further research.

6.2 Views of research participants

Some of the research participants in Study One and Two had used both IRC and MOOs. Twenty-three individuals who were interviewed about their MOOing experience had used IRC. In contrast, only 11 individuals who were interviewed about their IRC experiences had used MOOs. This section provides an overview of the comparisons these individuals made of the two virtual environments.

6.2.1 MOO users talking about IRC

MOO users interviewed who had also used IRC were asked to compare MOOs and IRC. While many MOO users had tried IRC at least once, few were still using IRC. Those interviewed preferred to use MOOs when interacting in cyber-space. IRC was seen by some MOO users as an inferior type of MOO, offering nothing that couldn't be obtained on a MOO, and lacking many features of a MOO. As one MOO user commented: *"I've seen IRC, but never been attracted to it. It's basically a crippled MOO." ... (Why?) ... "Well, it lacks versatility, number 1. I understand it's not as programmable as MOO, or perhaps isn't programmable at all. Also, it's not really a*

virtual world. I don't think you can sort of walk around in IRC. It's just a simple chat forum".

Several MOO users noted the lack of context in IRC. The absence of a virtual 'physical' environment was seen as detracting from IRC: *"I could never relate to IRC, it discouraged me from the one or two tries I gave it. i find it utterly confusing not to have rooms. I prefer this format...I like the sense of the real physical..building type parts that MOOing gives me".* The contextual information provided by the description of rooms, characters and objects in MOOs was perceived to increase telepresence: *"it's (MOOs) more ...real. (On IRC) I can't be in a room, or sitting on a couch with the talk..I like to feel at home when I do it..that is more like just typing...not talking".* In addition to descriptions of the environment, MOOs provide commands for moving between virtual 'spaces', again increasing telepresence: *"i think it's different coz of the VR feel on MOO, the creating and movement....IRC feel more like talking on the phone...".* The limited contextual information on IRC was seen as providing an impoverished environment in comparison to MOOs.

IRC does not provide the ability to permanently alter the data-base, resulting in a lack of continuity. For example the nick chosen by an individual for use on IRC is not retained for the exclusive use of the individual. In contrast, once a character is created on a MOO, the character name selected becomes the exclusive property of the individual. MOO users interviewed felt the lack of permanent names, identities, and rooms were a drawback to IRC: *"I don't like IRC because ppl's names always change and it is a bit harder to keep up with your friends...".* Another commented that IRC was moving towards providing the continuity that it currently lacked: *"Well, irc is temporary, once you log off its gone yet I read in the current wired that they have a problem with bots who keep peoples names and channels etc. those people are yearning for the continuity of the moo".*

The lack of continuity reduces the accountability of users. As one MOO user commented: *"..I don't like it. With MOOing it is that you have a character so people tend to be less sloppy about the way that they treat others whereas with the IRC they tend to be really sleazy, the ones that I have seen. I actually got ticked off after a pretty short*

while. So now I don't like the IRC at all." Social control on IRC is reduced because of the perceived anonymity and ability to change nicknames at any time: "I think because you get a character, you get a regular character, you tend to be more of a person whereas IRC, you are more anonymous..(cut).. On the moo they know where you are from, if you have a regular character you have a possibility of being ostracised from the whole community and getting newted and booted, there is that. I guess the laws are there."

IRC was perceived as providing a more aggressive and sexual environment than MOOs. One MOO user commented: "IRC is very different from moos...more frenetic, more mean-spirited". Females noted the high level of sexual harassment: "IRC is so pathetic! For some reason, log in and I get private messages..... have some sex, are you pretty, what are you wearing. ...(cut)... On IRC if you have a female name then the next things you are getting hit on by 10,000 people or men, or girls too. I don't go on there very much, I find it to be a cesspool." Similarly, another noted that: "I found irc to be 200 channels with one person and 5 channels with 50 each...one girl 49 guys hitting on her".

The lack of continuity and sparse context also results in a lessened sense of community among users. One MOO user who commented that: "I find irc and chat boring for some reason.. there's less of a sense of community", further explained that "It lacks the flexible and multi-dimensional aspects of a MOO. here, I have a home. Others have em too. We decorate them. We try to write funny verbs. We can have netsex only if we want. i guess yes, it makes your work a part of the whole experience." Another simply noted that: "Hmm, I don't know all the commands of IRC but I don't feel the sense of community we were discussing using it." The sheer size of IRC may affect sense of community on IRC. The number of users can be off-putting for some MOO users: "I didn't like it - too big and fragmented."

The conversation on IRC was seen as more trivial, and less meaningful than conversations on MOOs. For example, one MOO user commented: "I don't like IRC, personally. I don't use it, because its ..umm.. the only thing that's ever meaningful is when there's only 2 or 3 of you in one place, and if you're in a large chat group there's

basically a whole lot of people saying "how old are you", "where are you from" over and over and over again ...nothing really gets said..its just rubbish..and if there's only 2 or 3 people you may as well be in a MUD or having a private chat session anyway, rather than being on IRC." In summary, MOO users were generally negative about IRC and greatly preferred the MOO environment.

6.2.2 IRC user's talking about MOOs

IRC users interviewed who had also used MOOs were also asked to compare MOOs and IRC. Few of the IRC user's interviewed had used MOOs, although some has used role-playing MUDs. Those that had used MUDs and MOOs preferred IRC, citing its speed and the absence of lag time as a major advantage: *"i found this is the best ... its faster....and umm u can have many chats going at once"*. Similarly, another noted that conversation on IRC resembled off-line conversations: *"i use IRC because it is relatively fast, and feels like you are having a normal conversation"*.

The contextual information provided by rooms and descriptions on MOOs was seen by these IRC users as a major limitation of MOOs. One IRC user explained they preferred IRC because *"it allows for not only interaction but sharing of information and less 'crap' involved ...if you just wanna talk - no need to suffer huge lags and excessive room descs."* IRC was seen as focussing on chatting, removing the additional factors of learning to program and move within virtual spaces associated with MOOs.

Other advantages of IRC were cited. First, IRC is always available and always busy. There are minimal commands that need to be learned to use IRC. Second, IRC channels are organised in terms of interest, making it easy to locate individuals who share an interest. Third, IRC provides the ability to transfer information (including photographs and sound files) using the DCC facility.

6.2.3 Summary

The views expressed by individuals when comparing MOOs and IRC may be largely a function of their familiarity and experience with one of the virtual environments. For example, one MOO user who tried IRC admitted that: *"i was too accustomed to moo commands to get used to it (IRC)...so, i didn't really like it."* Only one individual interviewed expressed ambivalence over which virtual environment they

preferred. When first asked they responded: *"IRC. Because of the interface. With MUDs, because my sense of orientation is bad, it's hard for me to pick where north and where south is and all that, its totally different. Like with MUDs it is mostly fantasy or it is goal orientated, IRC has no goals. MOOs, you don't kill anything, you just walk around, but that's picking up, it's really picking up."* However, later in the interview they noted that: *"Although I might now prefer MOOs now actually, coz you get to do stuff now. You are able to interface with stuff that other people have placed there. Your ability to use your creativity to make thing that other people can use as well.. Something that you can leave there. My friend took me around in his white limo. So that was fun. Creating your own verbs, it more challenging than IRC. IRC is a bit too simple, not much of a challenge."* As an individual increases their use of alternative virtual environments their preferences may change.

6.3 Comparison of grounded theories

6.3.1 Notes on Methodology

Study One and Study Two resulted in the formation of two substantive grounded theories. While the research in the two studies were completed consecutively, the grounded theories were developed independently and no attempt was made to impose the findings or stage model developed in MOOs to the study of IRC. The two theories and associated categories and stage models emerged from the data. One result of this practice is that the two stage models developed have in some instances used different labels for similar stages.

While the studies were completed independently and a conscious effort made not to try to fit the data in the second study into the substantive theory developed in the first study, it is acknowledged that the mere process of completing the first study would have influenced thinking and conceptualising in the second study. The emergence of two very different basic social psychological processes suggests that the process of completing the first study did not unduly affect the emergence of the substantive theory in the second study.

6.3.2 Basic Social Psychological Processes

The two grounded theories models differed in the core categories that emerged. In both studies the core category was a BSPP that was developed into a stage model. In MOOs, the BSPP was labelled 'coming to terms with an alternative reality', with the stages of the process reflecting the changes in thinking over time from MOOs as a separate, or alternative reality to everyday life, to an acceptance of MOOing as part of everyday life. In contrast, the BSPP for IRC was labelled 'ease of communication', with the stages representing the changes individuals typically experience in their communication and use of IRC. The differences in BSPP's are indicative of the central difference in individuals' perceptions of the two virtual environments. MOOs evoke thinking about the nature of reality and virtual reality to a greater extent than does IRC. The discrete stages in each process are compared below.

6.3.3 Learning about virtual environments

The first stage of each model (hearing about MOOs, finding out about IRC) represents the ways in which the individual learns about the virtual environment. There were marked similarities in the ways of finding out about MOOs and IRC. Individuals learned about each of the two virtual environments through other people, the Internet or written material.

6.3.4 Motivation to use virtual environments

In both models this stage (motivation to MOO, motivation to IRC) reflects the basic motivation to interact socially with new people around the world, and to maintain contact with geographically distant family members or friends. In MOOs, but infrequently in IRC, another motivation was the opportunity to explore the concept of virtuality.

6.3.5 Initial forays into virtual environments

In both models this stage (exploration/immersion in MOOs, IRC as novelty) represents individuals' initial forays into a new virtual environment. In both virtual environments this stage involves a learning component. The individual needed to learn how to use their client, the jargon, the netiquette and norms for behaviour in order to effectively communicate and socially interact within the virtual environment. In IRC,

there are few commands to learn. In MOOs this is a more time consuming, effortful process as the individual needs to develop some basic programming skills. In both environments social interaction in this stage is characterised by superficial conversations with many people in public areas (channels on IRC, public rooms on MOOs).

The first major difference between virtual environments emerges during this stage. While the focus for IRC users is on having fun playing with a new toy, in MOOs the individual needs to create a virtual self and environment, often resulting in a fascination with the medium and the concept of virtual existence, and the perception of MOOing as a separate reality.

6.3.6 Establishment and 'addiction' in virtual environments

In both MOOs and IRC the fourth stage represents increasing time spent in virtuality. Social interaction changes from the superficial conversation with many people characteristic of the previous stage to communicating in depth with a smaller number of special friends. In both environments the developing relationships are characterised by high levels of self-disclosure and intimacy. Communication moves from public to private arenas of the virtual environment. The individual develops a sense of belonging and sense of community and an intense involvement and interest in on-line life. Differences in on-line and off-line social interaction may be particularly marked for those individuals who are shy or socially anxious in their off-line lives.

For some individuals in both environments, the intense involvement in on-line life can result in a preference for on-line life over off-line life, and may be described in terms of feeling 'addicted'. The two stage models present differing pathways for 'addiction'. In IRC, 'addiction' is presented as a possible pathway from Stage 4 (IRC as relationships) to the final stage (IRC as communication device). In MOOs, the pathway is more complex, representing cycling through periods of enchantment/addiction and disillusionment until a state of equilibrium is reached. What can account for these differences? In MOOs there is a continuing fascination with the nature of virtuality. As relationships develop, other MOO users become more 'real'. The cycling process involves a re-evaluation of the reality of MOOs and other MOO users, and of one's own

on-line behaviour. This process may be more marked in MOOs than in IRC because of the initial perception of MOOs as separate realities.

6.3.7 Virtual environments as part of off-line life

The final stage for both models (integration in MOOs, IRC as communication device) reflects the integration of on-line and off-line life and identities. Transition into the final stage occurs as the individual moves towards integrating their virtual and off-line relationships and lives. Frequently this occurs as relationships formed on-line transfer to off-line settings. On-line life becomes a part of everyday reality, and distinctions between on-line and off-line friends disappear. Virtual environments are used primarily as a communication device and the sense of community developed on-line expands to off-line life.

6.4 Generic versus contextual effects

From examining the changing process of social interaction in both MOOs and IRC it is possible to determine the aspects of the social interaction process that are affected by generic features of synchronous text-based CMC, and those that are attributable to the specific contexts provided by each type of virtual environment. The comparison of the stage models revealed a number of similarities attributable to generic effects of synchronous text-based CMC. Individuals were motivated to use both types of virtual environments by the opportunity to social interact with others. In both MOOs and IRC, individuals required time to learn the social and technical skills to effectively communicate. Both environments supported self-disclosure and the development of relationships meaningful to the individuals involved. This was aided by the availability of both public and private communication 'spaces'. Users commonly developed a circle of friends and experienced a sense of community. In both environments, some individuals became so enchanted with text-based communication that they reported feelings of addiction and spent long hours on-line. In summary, generic features of text-based synchronous CMC provide environments that are conducive to social interaction and the formation of personal relationships.

The comparison of stage models, in conjunction with the comments by individuals who have used both MOOs and IRC, also highlighted differences that may be attributable to the specific contexts created by the MOO and IRC programs. These differences primarily related to ease of use and perceptions of virtual reality. Before concluding that the differences are attributable to context effects other possible explanations need to be assessed.

The first area to examine is whether the differences can be attributed to demographic or Internet use characteristics in the two samples of research participants. In both studies, the majority of research participants were male, tertiary educated and aged in their late teens or twenties. The two samples differed in terms of geographical location, with the majority of MOO users residing in the USA and the majority of IRC users residing in Australia. This difference is an artifact of the recruitment procedures used in the IRC study, where 24 local IRC users were selected on the basis of their geographical location in order to assess the equivalence of on and off-line interviewing. The two samples also varied in their Internet use patterns. The MOO users interviewed had been using their virtual environment longer and for more hours each week than IRC research participants. Again, this may be an artifact of the selection procedures, where local IRC users were selected on the basis of their locality, rather than using theoretical sampling to select those best able to provide information on the phenomena of interest. It is possible, but unlikely, that geographical and usage differences across the two studies may have contributed to variations in the stage models.

The second area to examine is whether the differing modes of interviewing contributed to the variation in findings. In Study One, the majority of interviews were conducted in MOOs using computer-mediated communication with a further four interviews conducted face-to-face. In Study Two, the majority of interviews were also conducted using CMC, but within the IRC environment. A further 12 interviews were conducted face-to-face. In the previous chapter, the assessment of the equivalence of IRC computer-mediated and face-to-face interviews revealed differences in structural aspects of interviews (time, number of sessions, word length, ratio of utterances by researcher and research participant, and the expression of emotions), but consistency in

the themes of answers given. While a formal study of the equivalence of interviews in Study One was not undertaken due to the small number of face-to-face interviews conducted, consistency of themes was also apparent. Computer-mediated interviews conducted in MOOs and on IRC were similar in structure. These findings increase our confidence that differences in the theories developed were not significantly influenced by variations in the interviewing media.

Rather than being driven by the interview context or research participant characteristics, variations in the stage models developed are driven by context effects due to the underlying media differences. Structural differences between MOO and IRC programs affect the ways in which individuals use and perceive these virtual environments.

First, there are differences in the commitment required to participate effectively in the two virtual environments. MOOs require a heavy involvement by the new user in order to learn to communicate, build, move and interact within the virtual environment. Basic programming skills need to be learned. In contrast, IRC requires little effort to learn, and can be used on a casual basis.

Second, there are differences in the programmability of the environments. MOOs provide a relatively permanent setting in terms of ongoing characters, rooms and objects. This produces a sense of permanence and continuity that is absent from IRC. IRC, in contrast produces a sense of ephemerality, where even the nicknames used have no permanence. Higher rates of disinhibited behaviour in IRC may be partially attributable to the decreased sense of accountability associated with nicknames in comparison to that associated with characters.

Third, the actual act of character and object creation in MOOs appears to invoke reflection upon the nature of identity and virtuality. Identity exploration was more prevalent in MOOs than in IRC, and is supported by the greater avenues for, and greater subtlety in, self-presentation and impression management.

In addition to differences driven by structural features of IRC and MOO programs, differences in behaviour may be attributable to specific contexts within the larger MOO or IRC setting. Differences in behaviour appear between MOOs and groups

within MOOs, and between channels on IRC. Groups vary in their norms and what is deemed as acceptable behaviour.

6.5 Theoretical implications

The substantive theories and associated models of the process of social interaction in synchronous text-based virtual environments developed here have implications for existing theories of media use, relationship development, computer-mediated communication, and Internet addiction. In addition, the research findings highlight the potential for the use of text-based virtual environments in the treatment of shyness and social anxiety. Each of these is examined below.

Extrapolation from early theoretical models of media use (e.g., Social Presence Model of Media Comparison, Short et al., 1976; Social Cues, Kemp & Rutter, 1982) resulted in predictions that computer-mediated communication would be unsuited to interpersonal communication. In direct contrast, this research depicted MOOs and IRC as inherently social communication environments that support relational communication. The reduced social cues associated with text-based computer-mediated communication enhances rather than inhibits opportunities for social communication.

The fast development of intimate relationships in MOOs and IRC also poses difficulties for theories of relationship development. In off-line settings, two frequently cited factors upon which attraction is based are physical attractiveness and physical proximity. In the on-line settings of MOOs and IRC these factors do not come into play. In this research, there was some suggestion that 'virtual appearance' (i.e. character descriptions) may serve the same role as physical attractiveness for a limited number of individuals. In IRC, no equivalence of physical attractiveness was found. In both MOOs and IRC physical proximity may be replaced by virtual propinquity. Where individuals frequent the same IRC channels or public areas on a MOO there are opportunities for attraction to develop. Social Penetration theory (Hesse et al., 1988) predicted that computer-mediated relationships were unlikely to move beyond initial stages of relationship development unless other communication channels were used. In direct contrast, users of both MOOs and IRC reported the fast development of a wide range of relationships in on-line settings.

The fast development of relationships and the high rates of self-disclosure in these virtual environments is also contrary to the predictions of Walther's (1992) Social Information Processing theory, but provide support for Walther's (1996) concept of hyperpersonal communication. MOOs and IRC are communication environments that support anonymity, pseudonymity and low warrant identities - contextual conditions that Walther (1998) theorised were conducive to hyperpersonal communication. Many of the relationships developed on-line in MOOs and IRC had transferred to off-line settings. Consistent with Walther's (1998) predictions, in both settings there was evidence of increasing warrant of identities prior to meeting face-to-face.

The experience of hyperpersonal communication may contribute to feelings of addiction and spending long periods online. In the two models developed in this research 'addiction' was posited as a normative stage of online use that many individuals will pass through. This contrasts with previous research (e.g. Young, 1996b) that described 'Internet Addiction Disorder' as a pervasive pathology that requires treatment. Further longitudinal research is required to provide baseline data on normative Internet use, against which judgements of addiction can be made.

The experience of successful social interaction on-line, including hyperpersonal communication, may be especially important to individuals who are socially anxious or shy in off-line settings. Some individuals in both MOOs and IRC reported improved communication skills and increased social circles as a result of their on-line use. Text-based virtual environments emerged in this research as safe environments in which to practice social skills, with gains made where newly developed skills are transferred to off-line settings. The transfer of on-line relationships to off-line settings may aid this process. While further empirical research is required to assess the generalisability of these findings, there are potential implications for the treatment of shyness and social anxiety. Text-based virtual environments may be suitable practice environments for social skills training.

6.6 Future research

This chapter has compared social processes in two virtual environments, IRC and MOOs. The similarities and differences in the stages of use have been highlighted, and likely causes for the differences outlined. The research findings of these two studies extend previous theories of CMC use by detailing the changes that occur over time. In addition, by studying social interaction within two different genres of text-based virtual communities the generic and context specific effects of computer-mediated communication in these environments were distinguished.

The similarities between stages of the two models suggest a formal theory of computer-mediated social interaction in text-based virtual environments could be generated based on the identification of generic and context-specific effects of computer-mediated communication identified in this research. Alternatively, given further research across a range of virtual environments that vary in synchronicity and media a formal theory of computer-mediated social interaction could be developed. This research would enable the identification of the changes in social interaction and relationship development that each extra sensory component brings. The generation of formal theories was beyond the scope of this thesis.

Thus far the research in this thesis has focussed on the effect of CMC and the characteristics of text-based synchronous virtual environments on social interaction. The next two chapters extend this research by moving the focus from the characteristics of virtual environments to the characteristics of individuals who use virtual environments. In Chapter 8 a longitudinal study of new Internet users is presented, examining the bi-directional effects of personality characteristics and Internet use. In Chapter 7 the methodology for this third and final study is overviewed.

CHAPTER 7. RESEARCH METHODOLOGY II

7.1 Introduction.

In Studies One and Two substantive grounded theories of social computer-mediated interaction in synchronous text-based virtual environments were developed. Study Three builds upon these studies by testing hypotheses developed from the substantive grounded theories. Study Three extends the range of virtual environments studied, and examines how characteristics of the individual interact with the characteristics of the computer-mediated environment to affect the type of computer-mediated environment preferred, the extent of use of these environments, and the effect of this use on personality characteristics. In this chapter, the methodology (a series of WWW surveys) for conducting this research is outlined and issues relating to the methodology addressed.

7.2 Setting the parameters for Study Three.

Studies One and Two detailed changes in on-line behaviour over time, and the effect this had on off-line life. The changes over time identified in these studies have important theoretical implications for existing theories of on-line use. For example, in Studies One and Two 'Internet addiction' emerged as a normative stage that individuals may pass through, rather than as an enduring psychopathology that requires treatment as suggested by previous research. Similarly, while shyness theorists (e.g., Carduccio & Zimbardo, 1995) have argued that on-line participation is harmful to shy individuals, Studies One and Two revealed that, over time, shy individuals may improve their social skills and become less shy in their off-line lives. There is a clear need for longitudinal research that examines on-line behaviour and resultant changes in off-line behaviour over time.

Studies One and Two examined social interaction in two synchronous text-based virtual environments: MOOs and IRC. Two issues remain to be addressed. First, are the results obtained in MOOs and IRC generalisable to other types of virtual environments that vary in terms of synchronicity and media? While CMC varies according to type of media (Waern, 2000), Postmes et al., (1998) highlighted

the need to identify underlying dimensions that are common across a range of virtual environments that account for online behaviours. Second, in practice, most people with Internet access are unlikely to use only one virtual environment (such as MOOs or IRC), but are likely to use a combination of virtual environments according to their communication and information seeking needs. How can we be sure that the results obtained (e.g. reduction in shyness) are attributable specifically to synchronous text-based virtual environments such as MOOs and IRC? To address these issues research is required that examines use of a range of virtual environments over time.

It is unknown how the use of MOOs and IRC fits into the larger picture of Internet use. What determines whether an individual uses these or other on-line environments? While off-line social and political contexts may affect who has access to the Internet (Kendall, 1999), little is known about how individuals select which virtual environments they will use once connected to the Internet. One possibility is that users of text-based virtual environments differ from other on-line users in terms of their personality characteristics. In turn, little is known about the effect of Internet use on personality characteristics and off-line life.

In summary, four parameters were identified for Study Three. Research is required that is:

- i) longitudinal in nature,
- ii) examines the range of virtual environments an individual uses,
- iii) examines the effect of personality characteristics on the types of virtual environments used and the extent of that use, and
- iv) examines the effect of on-line behaviours on off-line life.

7.3 Research Design

Using the four parameters outlined above, a research design for Study Three was developed. In order to assess changes in on-line behaviour over time, it was deemed important to recruit potential research participants soon after they had obtained access to the Internet. The decision was made to recruit research participants during their first month on-line and to follow their on-line use for a period of six months. The time period of six months was selected on the basis that it provided enough time for individuals to learn the commands, jargon, netiquette and norms required to interact and become competent users of the virtual environments

of their choice. Changes in Internet use and effects on off-line behaviour after the six month period of study are beyond the scope of this research.

The second and third parameters require assessment of the range of virtual environments used by each individual. In order to meet this requirement, Study Three examines the extent of use of 10 commonly used on-line applications: email, WWW, newsgroups, discussion lists, MUDs, IRC, chats, Internet phone, videoconferencing, and networked multi-player games.

In order to assess the effect of personality on the types of virtual environments used and the extent of that use (parameter 3), and examine the effect of on-line behaviours on off-line life (parameter 4), Study Three includes a range of personality measures that will be assessed in both on and off-line settings. The personality measures used are existing measures with demonstrated reliability and validity in off-line settings. Assessments are made during research participants' first, third and seventh month on-line.

In summary, the research design for Study Three is a longitudinal study consisting of three surveys measuring personality and on-line use across a range of virtual environments.

7.4 Selecting the Methodology

Chapter 3 outlined the range of methodologies that could be used for conducting research on virtual environments and issues that need to be addressed when selecting a methodology. To recap, the first question to be addressed is whether the recruitment of research participants and research will be conducted on- or off-line, or using a combination of settings. The questions pertaining to recruitment and data collection will be addressed separately.

The population of interest for this research was new Internet users who have been on-line for less than one month. In order to identify and recruit individuals who met this criterion the decision was made to use a range of on-and off-line recruitment strategies. Internet Service Providers and computing sections of universities in Australia were contacted and asked to provide details of the study to new Internet users. On-line, new Internet users were recruited through postings to newsgroups for new Internet users. Further details of the recruitment procedures are provided in Chapter 8.

The specified recruitment procedures are likely to result in the recruitment of research participants from across the globe. With an international sample, sending surveys by post is likely to be costly, involve time delays and create difficulties in reimbursing research participants for the cost of stamps to return surveys. Given these factors, the decision was made to conduct the research on-line. As outlined in Chapter 3, on-line research can be time, resource and cost effective. The most commonly used methods of conducting survey research on-line are email surveys and WWW surveys. The WWW was selected as the medium for this survey as it provides greater opportunities for survey layout and design than does email.

In summary, the decision was made to conduct a longitudinal study using a series of three surveys on the WWW with both on- and off-line recruitment of research participants.

7.5 Issues in conducting WWW survey research

A number of issues need to be considered in conducting WWW surveys. First, survey designs need to take into account the computing facilities research participants are likely to have access to. Research participants may vary in the Internet platform they use. While the most frequently used language for writing WWW pages, hyper-text markup language (HTML), is platform independent (Reips, 1996), WWW surveys may change in layout according to the web-browser used and the size of the research participant's screen. In addition, some research participants may only have access to low-powered computer systems that cannot cope with graphics, sound, animation or Java script on WWW pages. Care needs to be taken in survey design to ensure material is readable across platforms and web-browsers and contains limited non-textual content (Hewson et al., 1996). In order to meet these requirements, the three surveys for Study Three were developed using HTML, used graphics for the title only and did not use sound, animation or Java script.

Second, WWW surveys need to clearly identify the research as academic and not commercial in nature. To improve the credibility of WWW surveys Cho and LaRose (1999) recommended that WWW surveys use an educational domain name, provide details of the researcher's identity and affiliations, and provide information on data confidentiality. All surveys for Study Three were housed on a university server with an educational domain name. In addition, an introductory information page was set up for the first survey that detailed the purpose of the research, the

researchers and affiliation, what participation would involve, and the confidentiality of data collected.

Third, as outlined in Chapter 3, obtaining informed consent for WWW survey research participation requires different procedures than are traditionally used in psychological research. For Study Three, the procedure for implied consent on-line as outlined by Joinson (1999) was used. The introductory information page was used as a gateway to participation in the first survey. Potential research participants were requested to read the page and click on a hyper-linked consent button to access the first survey.

Fourth, WWW surveys enable the submission of multiple surveys with little effort. This can be as simple as clicking several times on the 'submit' button. Multiple responses from the same individual can be difficult to detect in WWW surveys where participation is anonymous. Two methods for identifying multiple responses are examining the server log for multiple submissions from the same Internet domain address (Smith & Leigh, 1997) and comparing item responses across surveys. Ways of reducing the number of multiple surveys submitted include providing passwords to research participants (Smith & Leigh, 1997) and asking for an email address or phone number (Reips, 1996). Reips recommended that where multiple responses are suspected, only the first set of data from an Internet domain address be included in any analyses. However, this may result in valid responses being discarded as many users share the same domain name. Even where some multiple submissions of data go undetected, the effect on analyses may be minimal. Reips (cited in Azar, 2000) reported no difference in study results when multiple submissions were removed.

In order to minimise the likelihood of multiple responses to surveys in Study Three, research participants were asked to provide an email address on the first survey. Research participants who did not provide a valid email address were not invited to participate in the second and third surveys.

In summary, four issues related to conducting WWW surveys were identified: research participants' computing facilities, the credibility of the research and researchers, obtaining informed consent, and the potential for multiple survey submissions. Methods of addressing these issues were outlined and specific procedures detailed for use in Study Three.

7.6 Summary

This chapter has provided an overview of the development of parameters, research design and methodology for Study Three. Study Three examines how characteristics of the individual interact with the characteristics of the computer-mediated environment to affect the type of computer-mediated environment preferred, the extent of use of these environments, and their effect on personality characteristics. The research design consists of three WWW surveys measuring personality and on-line use across a range of virtual environments with research participants recruited in both on- and off-line settings. Issues related to conducting WWW surveys were identified and addressed. The next chapter presents Study Three.

CHAPTER 8.
STUDY THREE: THE PROGRESSION OF NEW INTERNET USERS
THROUGH VIRTUAL ENVIRONMENTS

8.1 Introduction

The overall aim of this research program was to explore how characteristics of the individual interact with characteristics of the CMC medium to enable socio-emotional communication and behaviour in text-based virtual environments. Study One and Study Two have established the existence and extent of socio-emotional communication and behaviour in two genres of text-based virtual environments, the characteristics of those environments that are conducive to socio-emotional communication, and the characteristic stages of use.

Study Three extends the findings of the first two studies by studying on-line use across a range of environments over time. Study Three focuses on how the characteristics of the individual interact with the characteristics of the computer-mediated environment to affect the type of computer-mediated environment preferred, the extent of use of these environments, and the effect of this use on personality characteristics.

The hypotheses to be tested in Study Three are predominantly based on the findings of Study One and Study Two. Because the substantive theories developed in Study One and Two were specific to the virtual environments in which they were developed, it was important to consider theory and research findings from other environments in order to develop hypotheses that could be tested across virtual environments. For each of the research variables in Study Three, findings from Study One and Two are overviewed and integrated with a literature review of relevant research. Testable hypotheses are developed that are not specific to MOOs or IRC, and can be tested across virtual environments.

8.2 Major Aims

Study One and Study Two provided a detailed picture of social interaction in two text-based virtual environments, MOOs and IRC. These are only two of many

virtual environments accessible by computer and modem. As such, these studies provide a portrait of only those on-line users who frequent these particular environments, and their behaviour within these environments. The exact number of users of MOOs are unknown, but the total number of users of MUDs has been estimated as "tens of thousands" (Schiano, 1997), representing only a small percentage of the total on-line population. IRC is a more popular medium used by hundreds of thousands of people at any point in time over a 24 hour period, but this still represents only a small percentage of the on-line population. How does the use of MOOs and IRC fit within the larger picture of Internet use? What determines whether an individual uses these specific environments? Do individuals who use MOOs and IRC differ from other on-line users in terms of their personality characteristics?

In order to examine these questions Study Three follows new Internet users for their first six months on-line. The major aims of Study Three are:

- 1) to chart the progress of individuals new to cyber-space through virtual environments
- 2) to examine the influence of personality characteristics on the type of cyber-domains used and the extent of cyber-involvement
- 3) to examine the influence of cyber-participation on personality characteristics

The hypotheses to be tested in Study Three were developed from the findings of Study One and Study Two, and are presented below.

8.2.1 Aim 1: Progress through virtual environments

Little is known about if and how individuals change in their Internet use over time. Most surveys have taken a 'snap shot' approach, providing a picture of Internet users at one point in time. Few published studies to date have examined patterns of Internet use over time. Commercenet and Nielsen Media Research conducted a 6 month follow-up study of Internet use based on a stratified random sample of Americans (Lindstrom, 1997). At the six-month follow-up, 21% of individuals who had Internet access at the time of the first survey no longer did so. Those who were still using the Internet were more likely than new Internet users to have accessed the Internet within the past 24 hours, and accessed it more frequently than 6 months

previously. Lindstrom (1997) interpreted this to mean that the Internet had a longer learning curve than other new technologies, resulting in increased use over time.

Different results were obtained in two studies by Kraut and colleagues where families were provided with computers and Internet access. Kraut et al. (1996) followed the Internet use of 50 families in Pittsburgh. Internet use was characterised by strong initial use followed by fluctuations over time. Internet use declined during school vacations and increased during the school year. Email use was stable over time. Using an expanded sample (110 households) Kraut et al. (1998) reported that email was more frequently used than the World Wide Web (WWW) and was usually accessed before the WWW. However, individuals spent longer per session on the WWW than using email. Email use was more stable over time than WWW use, which declined after the first few weeks on-line. People who used email more than the WWW were more likely to continue using the Internet throughout their first year.

The results from Study One and Study Two in this thesis also portrayed a decline in Internet use over time. Early stages of use of a particular virtual environment (MOOs or IRC) were characterised by exploration, immersion and establishment within the virtual environment with an accompanying high level of time on-line. This heavy usage decreased over time. It is likely that individuals explore a range of virtual environments in their first few months on-line, before settling to use the ones they prefer. It was hypothesised that:

H1. *The number of virtual environments used will increase between the first and fourth months, representing a period of experimentation with new environments, and will level off by 7 months.*

H2. *Hours spent on-line will decrease after the fourth month following an initial period of high connection times.*

8.2.2 Aim 2: Influence of personality characteristics

Lewin (1951) claimed that behaviour is a function of both the person and environment: $B = f(P,E)$. As such, it may be expected that individuals with different personality characteristics may exhibit different behaviours in the same settings, but also that individuals with the same personality characteristics may vary their behaviour across on-line and off-line environments. The effect of off-line personality characteristics (introversion/extraversion, absorption, shyness, sociability, propensity

to self-disclose) on the extent of cyber-participation (virtual environments used and hours spent on-line) and behaviour on-line (shyness, sociability, self-disclosure, telepresence, 'addiction') is examined in this study. The hypothesised effect of each personality characteristic is outlined below.

8.2.2.1 Introversion/Extraversion

Introversion and extraversion are terms describing individual differences on the dimension of excitability. Eysenck (1967) proposed a theoretical model of extraversion-introversion with a physiological basis. According to this model introversion and extraversion result from individual differences in the thresholds for excitatory and inhibitory activity in the central nervous system, with introverts having lower thresholds for activation. Extraverts are sociable, impulsive, and actively seek stimulation from their environment (Geen, 1986). In contrast, introverts are more likely to be shy and seek to avoid over-stimulation in social settings (Geen, 1986).

Argyle (1996) reported a weak relationship between personality and leisure activities, with extraverts seeking sociable leisure activities that provide stimulation. Argyle and Lu (1990) reported that happiness is correlated with extraversion. Using multiple regression analysis, they demonstrated that approximately half of the difference in happiness between extraverts and introverts can be explained by extraverts' higher rates of participation in social activities. Their research would suggest that extraverts would be more likely than introverts to actively seek out and use social virtual environments on the Internet.

H3. *Extraverts will be more likely to use synchronous social virtual environments than introverts due to their propensity to actively seek out sociable leisure activities.*

H4. *Extraverts will spend more time in synchronous social virtual environments than introverts due to their propensity to actively seek out sociable leisure activities.*

Conjecture about the effect of Introversion/Extraversion on on-line activities has been raised in the media and among researchers. Introversion has been related to the use of computers, and to the use of CMC as a communication tool. In a review of the research of personality factors in human-computer interaction, Pocius (1991) concluded that personality factors affected both an individual's decisions about whether to use a computer for an activity, and how they interacted with the computer.

Introverts were found to be more likely to select computer science as a major, and to outperform extraverts as programmers. Allbritton (1995) suggested that the Internet provided a safe medium for introverts to interact with others socially. Introverts may use email more frequently than extroverts (Theusen, cited in Livingood, 1995), and may be more likely to use CMC as a social interaction tool than extraverts (Livingood 1995). While introverts may be more likely to use the Internet for social interaction, the degree of participation in CMC groups has been correlated with the extraversion of the individual, with extraverts contributing more words than introverts (Straus, 1996). These findings from on-line research suggest that, in direct contrast to the previous hypotheses derived from off-line research, introverts will be more likely than extraverts to use text-based social virtual environments, and spend more time in these environments.

H5. *Introverts will be more likely to use text-based social virtual environments than extraverts due to their increased comfort level interacting within a text-only environment.*

H6. *Introverts will spend more time in text-based social virtual environments than introverts due to their increased comfort level interacting within a text-only environment.*

8.2.2.2 Absorption and Telepresence

Participants in the first two studies varied in the degree of telepresence they experienced while on-line in MOOs and IRC. While part of this variance could be explained by situational factors (e.g., degree of interest in what was occurring on-line and competing activities in the off-line environment) there also appeared to be differences among individuals in their ability to experience telepresence. Two personality characteristics that were hypothesised to affect the degree of telepresence experienced were absorption and imagery ability.

Absorption and imagery ability are related constructs. In a review of the research literature Roche and McConkey (1990) reported correlations ranging from .21 to .78 between imagery ability and absorption, noting that the two constructs load on to the same factor. Imagery vividness and absorption were also correlated (range .26-.78). Given the medium to high correlations reported between the two constructs

and the need to keep the surveys as short as possible the decision was made to measure only one of these constructs, absorption.

Absorption can be conceptualised as a state (i.e., the experience of being absorbed), or as a personality trait. For the purposes of this research, telepresence is conceptualised as a trait. Tellegen and Atkinson (1974) defined the personality trait of absorption as “a disposition for having episodes of ‘total’ attention that fully engage one’s representational (i.e., perceptual, enactive, imaginative, and ideational) resources” (p. 268). When an individual is absorbed, attention is focussed on the object of interest at the expense of other sensory input, and events that would otherwise be distracting often go unnoticed. The individual may experience an altered sense of reality and self. Wild, Kuiken, and Schopflocher (1995) noted that absorption required both the motivation to experience non-instrumental functioning and the cognitive ability to focus on and enrich attentional objects.

Quarrick (1989) also defined absorption in terms of an altered state of consciousness characterised by “absorbed attention” (p. 4). Quarrick described absorption as involving a two-stage process requiring the withdrawal of attention from everyday life and the focussing of attention on the object of interest, resulting in “suspension of everyday self, the feeling of a new identity and reality, relaxed arousal” (p.10).

It was hypothesised that the trait of absorption may affect the degree of telepresence experienced.

H7. *Absorption will be highly correlated with telepresence. The greater the individual's ability to become absorbed, the greater the telepresence they will report experiencing.*

H8. *Ability to be absorbed will also predict the amount of time spent in text-based virtual environments. The greater the individual's ability to become absorbed, the more time they will spend in text-based virtual environments.*

8.2.2.3 Shyness and Sociability

The terms shy and shyness are in everyday use in the English language. A range of competing definitions have emerged along with psychological research into shyness (Harris, 1984). Leary (1986), for example, noted 14 definitions of shyness used by shyness researchers. However, regardless of the everyday or research

definition used, one thing shy people have in common is that they are meta-self-consciousness, that is, they think about themselves as being shy (Cheek & Melchior, 1990; Carducci & Zimbardo, 1995). For the purposes of this research, the definition of shyness offered by Cheek and Buss (1981), shyness as "the discomfort and inhibition that may occur in the presence of others" (p. 330), will be used.

Shyness has affective, behavioural and cognitive components. Affective components include heightened emotional arousal, negative affectivity, distress and physiological symptoms such as blushing, and sweating. Behavioural components are evidenced in poor social skills, including poor verbal decoding ability in interpersonal situations. Cognitive components of shyness relate to the fear of negative evaluations by others, extreme levels of self-consciousness, negative thoughts about the self, and low global self-esteem. Shy people spend more time self-focussing during social interactions than the non-shy. (Cheek & Melchior, 1990; Cheek, Melchior & Carpentieri 1986; Eisenberg, Fabes & Murphy; 1995; Melchior & Cheek, 1990; Schmidt & Fox, 1995; Schroeder, 1995a, b). Crozier (1979) suggested that it was the individual's assessment of their own social competence, rather than an objective assessment, which resulted in shyness.

Fenigstein, Scheier and Buss (1975) identified three components of self-consciousness: private self-consciousness, public self-consciousness and social anxiety. Public self-consciousness may be a pre-requisite for social anxiety, as individuals must be aware of themselves as social objects before they can become anxious about social performance. Previous research has found that public self-consciousness is weakly correlated with shyness (Bruch, Hamer & Heimberg, 1995; Jones, Briggs & Smith, 1986), while private self-consciousness is not (Cheek & Buss, 1981; Fenigstein et al., 1975). Bruch et al. (1995) reported that shyness and high public self-consciousness have additive, rather than interactive, effects on dysfunctional social interactions.

Shy individuals may assume a protective self-presentation style to cope with their social anxiety (Arkin, Lake & Baumgardner, 1986). Cheek et al. (1986) noted that individuals can become trapped in a cycle of shyness where their protective self-presentation style and negative cognitions do not provide them with the opportunities to experience successful social interactions, or to open themselves to positive

feedback from others. They stressed the need to break the shyness cycle to enhance personal, social and occupational wellbeing.

Shyness has been conceptualised alternatively as a personality characteristic and as situationally dependent. While shyness has emerged as a discrete factor in factor-analytic personality studies (Crozier, 1979), there is also a marked effect for situational variance, with novel situations, situations involving evaluation by others and interaction with members of the opposite sex especially likely to elicit shyness (Crozier 1979, 1986; Pilkonis, 1977; Russell, Cutrona & Jones, 1986).

Crozier (1979) argued that shyness is a function of both trait and situation. To test the relative contributions of trait and situation to shyness Russell et al. (1986) conducted two studies. In the first study college students were assigned to a range of hypothetical shyness-eliciting situations. In the second study college students kept diaries of their social interactions. Trait shyness and situational characteristics equally contributed to shyness, with little evidence found to support an interaction effect.

In Studies One and Two of this thesis, shy individuals (shyness as a personality trait) were less inhibited in their behaviour and social interaction in text-based virtual environments than in their off-line lives (situationally dependent reduced shyness). This was attributed to the perception of IRC and MOOs as safe environments in which to interact. Similarly, in a study of gay men using IRC Shaw (1997) reported that a very shy gay man, 'Musician', found IRC appealing because:

I get to meet other gay men. I'm pretty shy so it's hard for me to meet people face to face in a bar. On the computer I can flirt and talk to people and get a sense of their reaction by the things they type: the grins, descriptions they say the computer makes it easier (p. 138)

In addition to MOOs and IRC, shy individuals can access all types of virtual environments. It is possible that some of these virtual environments may also provide 'safe' communication settings for shy individuals. Recent research into newsgroups (McKenna, submitted) found that socially anxious and lonely individuals were more likely than others to believe they expressed their 'real self' on the Internet, rather than in off-line life. Locating the 'real self' on the Internet was associated with forming strong attachments on-line, with many of the relationships formed moving to

off-line settings. Individuals who were not socially anxious or lonely but who located their 'real self' on the Internet also formed strong attachments on-line, but were less likely to move the relationships to off-line settings.

Some Internet sites are specifically set up to meet the needs of shy individuals. Sites on the Internet that provide information and resources for shy people range from WWW pages developed by professionals to pages developed by shy individuals themselves. Some shy individuals are using shyness newsgroups and discussion groups to meet and interact with other shy people. For example, the newsgroup alt.support.shyness is a busy newsgroup (more than 100 postings each day) where shy individuals can post messages to other shy individuals, ask questions and offer and receive advice and support. As one poster to alt.support.shyness responding to a survey on newsgroup use noted:

I often feel uncomfortable asking my friends/ acquaintances for help with being shy because I don't want this fact to ruin my friendships, as it sometimes has done in the past. I received more diversified opinions and support when online, and this also helps me – I ask for help "into the air" (one might say) and receive many replies, as opposed to asking one person for help and getting one reply - which is usually not enough to help. In short, I prefer asking for help online than asking my friends for help (Walther & Boyd, in press).

In their off-line lives shy people have smaller social support and friendship networks and report less, more passive interactions than the non-shy (Jones & Carpenter, 1986). CMC may provide them with the opportunity to increase their social and friendship circles and experiment with less-shy behaviours. For example, Scharlott and Christ (1995) found that shy users of a computer-dating system were using CMC to initiate relationships, actively seeking romance and sex.

However, some researchers are warning of the dangers of Internet use for shy individuals. Over the past two decades the prevalence of shyness in young adults in western societies has risen from forty to forty-eight percent (Carducci & Zimbardo, 1995). This increase has been attributed to social, economic and technological presses reducing the need for face to face contact between individuals in every day life and limiting the opportunities to develop and practice social skills and form

intimate relationships (Carducci, 1999; Carducci & Zimbardo, 1995; Henderson & Zimbardo, 1998). Indeed, Carducci & Zimbardo (1995) describe technology as “ushering in a culture of shyness” (p. 82) where technology is changing or replacing personal communication. At the same time they describe CMC as “the perfect medium for the shy” (p. 82) due to the greater control over the communication process, the absence of time-constraints in preparing messages and the absence of direct observation by others. Carducci and Zimbardo (1995) warned of the dangers of shy individuals using CMC as a way of avoiding face-to-face social interaction, claiming that these new technologies provide only the illusion of human connectedness. Carducci (cited in DeWees, 1996) stated that “Shy people should log off of their computers and log on to life”.

Based on the findings from Studies One and Two it was hypothesised that:

H9. *Those high in shyness off-line will experience lower levels of shyness on-line, while those low in shyness off-line will have similar levels of shyness on and off-line.*

Shyness and sociability are distinct constructs (Bruch, Gorsky, Collins & Berger, 1989; Cheek & Buss, 1981). Cheek and Buss (1981) defined sociability as the “tendency to affiliate with others and to prefer being with others to remaining alone” (p. 330). The stability of sociability across situations has received little examination. However, as sociability represents a trait preference for the company of others, it is likely to remain relatively stable across media. Across settings there would be an expectation of a trivial effect-size below the threshold for making a practical difference in how people behave. In the absence of published research on the threshold for practical differences in sociability an arbitrary threshold was developed based on Cheek and Buss’s (1981) 5 item self-report measure of sociability. Each scale item in this measure has a 5 point rating scale ranging from extremely uncharacteristic to extremely characteristic. Based on this scale a difference of less than two points would be deemed as trivial (ie: across the five areas there has been, at best, one area of change from, for example, extremely uncharacteristic to somewhat uncharacteristic). It was hypothesised that:

H10. *There will be a small significant difference in sociability across settings of less than 2 points on the Cheek and Buss (1981) sociability scale.*

8.2.2.4 Self-disclosure

One marked characteristic of social interaction in MOOs and IRC highlighted in Studies One and Two was the high rate of self-disclosure reported by participants. Self-disclosure involves divulging personal information about one's own experiences, thoughts, and feelings; or reactions to others' experiences. Definitions and measures of self-disclosure vary according to whether self-disclosure is seen as a state or a trait, and as a unidimensional or multidimensional construct (Chelune, 1979b). While self-disclosures are communication behaviours that occur within particular settings (state), the propensity to self-disclose, or disclosiveness, is a personality characteristic or trait (Wheeless, 1976).

Early research treated self-disclosure as a unidimensional construct, while more recent research has identified multiple dimensions underlying self-disclosure. For example, Derlega and Grzelak (1979) noted that self-disclosures vary in their valence (positive or negative), informativeness, appropriateness, flexibility, honesty and accessibility. Methods of assessing self-disclosure include self-report questionnaires, observational measures, and objective techniques. The wide range of conceptual definitions and measures of self-disclosure used in research have made cross-study comparisons problematic (Chelune, 1979b).

Preparedness to self-disclose and extent of self-disclosure vary according to the characteristics of the self-discloser, the communication partner, their relationship, the setting (Petronio, Martin, & Littlefield, 1984) and the reasons for disclosing (Prager, Fuller & Gonzalez, 1989). These variables will be examined in more detail below.

The sex of both the discloser and their communication partner may affect self-disclosures. Dindia and Allen (1992) conducted a meta-analysis of 205 studies of self-disclosure. Across studies women disclosed more than men (effect size $d = .18$). However, this effect was moderated by the sex of the person to whom the disclosure was targeted. Greater self-disclosure was present where the target was a female or person of the same sex. In existing relationships, women disclose more content than men. Where interacting with strangers, men report similar levels of self-disclosure to women, but observational measures find that they disclose less content than women.

Other personality characteristics may also affect self-disclosure. People prefer to self-disclose to others whom they perceive as having similar personalities to themselves (Skoe & Ksionzky, 1985). Extraverts are more likely to self-disclose than introverts (Archer, 1979). Some people are better at eliciting self-disclosures than others (a phenomenon called the 'opener effect') regardless of situational context (Pegalis, Shaffer, Bazzini & Greenier, 1994).

The relationship existing between the discloser and their communication partner affects self-disclosure. The amount, depth and content of self-disclosure between two people fluctuates over time. Factual disclosures frequently precede disclosures about personal feelings, as personal feelings are perceived to be higher risk (Hargie, Saunders & Dickson, 1994). Positive disclosures are made earlier in relationships, and negative disclosures reserved for intimate relationships (Gilbert & Whiteneck, 1976). Self-disclosures may increase in intimacy as the relationship between communication partners develops (Gilbert & Whiteneck, 1976; Prisbell & Dallinger, 1991; Won-Doornink 1979).

There is a reciprocity effect with self-disclosure. Both intimate disclosures about the self and intimate disclosures about others elicit self-disclosure from others (Hitz & Schuldt, 1994). Non-intimate reciprocal disclosures diminish over time, while intimate reciprocal disclosures show a curvilinear association with relationship level (Won-Doornink, 1979). Self-disclosure of emotion, rather than facts and information, is the strongest predictor of intimacy (Laurenceau, Barrett & Pietromonaco, 1998). Reis and Shaver's (1988) interpersonal process model of intimacy highlighted the role of self-disclosure, partner responsiveness and reciprocation as necessary components of the intimacy process.

Self-disclosure and reciprocity lead to increased liking of communication partners. Collins and Miller (1994) conducted a meta-analysis of the relationship between self-disclosure and liking. Their findings indicated that intimate self-disclosers are preferred to people who disclose less intimate details. Both the discloser and the person disclosed to increase their liking of the other as a result of self-disclosure. Liking in turn increases self-disclosure. The intimacy of self-disclosures was more important than the amount of self-disclosure in increasing liking.

Intimacy alone does not ensure reciprocity of self-disclosures or liking. The valence of self-disclosures is also important. Individuals who make positive self-disclosures are more liked than those who make negative self-disclosures (Lazowski & Anderson, 1991). Positive valence of self-disclosures elicits higher levels of disclosure intimacy, and negative valence reduces the reciprocation of self-disclosures (Taylor & Belgrave, 1986).

The setting in which communication occurs also affects self-disclosure. While no differences in the extent of self-disclosure were found between face to face and telephone interviews (Bermack, 1989), high rates of personal disclosures were reported for CMC in Study One and Two of this thesis and by Wysocki (1997). It was hypothesised that:

H11. *Self-disclosure on-line will be greater than self-disclosure off-line.*

In social situations, shy individuals may self-disclose less and more superficially than the non-shy. Self-monitoring is negatively correlated with self-disclosure (Bryan, Dodson & Cullari, 1997). Where public self-awareness is manipulated experimentally self-disclosures are reduced (Stephan, Stephan, Wenzel & Cornelius, 1991). Avoidance of self-disclosure is driven by the fear of projecting an unfavourable image. By not disclosing, males seek to maintain control over relationships, while females attempt to avoid harming their selves or their relationships (Rosenfeld, 1979). Individuals who are socially anxious make more superficial self-disclosures than their communication partners as a form of impression management and as self-protection against potential disapproval. As a result socially anxious individuals are perceived as less open, and create discomfort in their communication partners, resulting in negative interpersonal reactions (Meleshko & Alden, 1993; Reno & Kenny 1992). It was hypothesised that:

H12. *Shy individuals will report less self-disclosures than the non-shy.*

H13. *Shy individuals will report more superficial self-disclosures than the non-shy.*

In addition to curbing the amount and depth of self-disclosure an individual engages in, shyness may also affect the valence of self-disclosures. Shy people's tendency to rate their own competence negatively and the flow-on effects to self-esteem may result in shy individuals making more negative disclosures. It was hypothesised that:

H14. *Shy individuals will report more negative self-disclosures than the non-shy.*

8.2.2.5 Addiction

A recurrent theme in Study One and Study Two was that some individuals described their intense involvement in on-line life in terms of an addiction. For many, the feelings of addiction were transitory and decreased over time as their experience in on-line culture increased. As detailed in Chapter 2, the notion of 'Internet Addiction' as a psychological disorder is a contentious issue among psychologists. No research published to date has examined changes in addictive feelings or behaviour over time. It was hypothesised that

H15. *The majority of individuals meeting the criteria for 'Internet addiction' at one point in time in the study will not meet the criteria at later points in time.*

8.2.3 Aim 3: Influence of cyber participation

If behaviour differs in on-line environments from that normally experienced in off-line environments, there is the potential for the behaviour on-line to influence off-line behaviour or personality characteristics. In Studies One and Two some shy individuals were able to change the perception of their own interpersonal skills through experiencing successful social interactions with others in the virtual environments of IRC and MOOs. This resulted in decreased shyness in off-line social interactions. It was hypothesised that:

H16. *For shy individuals shyness off-line during the seventh month will be less than shyness off-line during the first month as a result of decreased shyness on-line.*

Shy individuals range in their need for sociability, from the unsociable to the highly sociable. High and low-sociable shy individuals may be distinguished on the basis of autonomic measures. Shy sociable individuals recorded higher mean heart rates and more stable heart rates prior to anticipated participation in social interaction (Schmidt & Fox, 1994). They also differed in resting frontal electroencephalographic power, with more activity in the left frontal lead (Schmidt, 1999).

Shy individuals who have a high need for sociability may have the most difficulties in social situations (Arkin & Grove, 1990; Cheek & Buss, 1981). In some situations, high and low-sociable shy individuals can be distinguished on the basis of their social behaviours. Shyness and sociability independently affected social interaction behaviours between undergraduates interacting with unfamiliar peers,

with shy-sociable individuals exhibiting more social anxiety (e.g., gaze aversion, touching the face and body) than shy-unsociable individuals (Cheek & Buss, 1981). Among male high school students, those who were both shy and sociable were significantly more likely to use hallucinogenic drugs, with a trend towards using more cocaine and marijuana (Page, 1990). However, a study by Bruch et al. (1989) failed to find differences between high and low sociable shy subjects in an experiment where subjects conversed with, and received negative feedback from an opposite sex confederate. Shyness was consistently associated with dysfunctional social behaviours, but sociability was not. Shyness was correlated with negative thoughts (.69), performance anxiety (.27), and increased heart rate during social interaction (.29), and negatively correlated with positive thoughts (-.38), and the number of utterances made (-.39).

Shy individuals who have a low need for sociability may receive all (or more than) their desired level of social interaction in their everyday lives. CMC may most benefit shy people who also have a high need for sociability that is not being met in their off-line lives. As an alternative to H16, it was hypothesised that:

H17. *For individuals high in shyness and sociability, shyness off-line during the seventh month will be less than shyness off-line during the first month.*

For some participants of MOOs and IRC, exposure to high rates of self-disclosure on-line had resulted in greater self-disclosure off-line. It is possible that this effect may be particularly marked for shy individuals. Positive reinforcement for increased self-disclosure on-line may result in more frequent, deeper and more positive self-disclosures off-line. The following hypotheses were developed to test the generalisability of this effect:

H18. *For shy individuals, higher rates of self-disclosure on-line will result in an increased rate of self-disclosure off-line in the seventh month.*

H19. *For shy individuals increased depth of self-disclosure on-line will result in an increased depth of self-disclosure off-line in the seventh month.*

H20. *For shy individuals increases in the positiveness of self-disclosures on-line will result in more positive self-disclosures off-line in the seventh month.*

8.2.4 Summary of Hypotheses

The hypotheses developed in the sections above are summarised below:

- H1.** *The number of virtual environments used will increase between the first and fourth months, representing a period of experimentation with new environments, and will level off by 7 months.*
- H2.** *Hours spent on-line will decrease after the fourth month following an initial period of high connection times.*
- H3.** *Extraverts will be more likely to use synchronous social virtual environments than introverts due to their propensity to actively seek out sociable leisure activities.*
- H4.** *Extraverts will spend more time in synchronous social virtual environments than introverts due to their propensity to actively seek out sociable leisure activities.*
- H5.** *Introverts will be more likely to use text-based social virtual environments than extraverts due to their increased comfort level interacting within a text-only environment.*
- H6.** *Introverts will spend more time in text-based social virtual environments than introverts due to their increased comfort level interacting within a text-only environment.*
- H7.** *Absorption will be highly correlated with telepresence. The greater the individual's ability to become absorbed, the greater the telepresence they will report experiencing.*
- H8.** *Ability to be absorbed will also predict the amount of time spent in text-based virtual environments. The greater the individuals' ability to become absorbed, the more time they will spend in text-based virtual environments.*
- H9.** *Those high in shyness off-line will experience lower levels of shyness on-line, while those low in shyness off-line will have similar levels of shyness on and off-line.*
- H10.** *There will be a small significant difference in sociability across settings of less than 2 points on the Cheek and Buss (1981) sociability scale.*
- H11.** *Self-disclosure on-line will be greater than self-disclosure off-line.*
- H12*.** *Shy individuals will report less self-disclosures than the non-shy.*
- H13*.** *Shy individuals will report more superficial self-disclosures than the non-shy.*
- H14*.** *Shy individuals will report more negative self-disclosures than the non-shy.*
- H15.** *The majority of individuals meeting the criteria for 'Internet addiction' at one point in time in the study will not meet the criteria at later points in time.*

H16. *For shy individuals shyness off-line during the seventh month will be less than shyness off-line during the first month as a result of decreased shyness on-line.*

H17. *For individuals high in shyness and sociability, shyness off-line during the seventh month will be less than shyness off-line during the first month.*

H18. *For shy individuals, higher rates of self-disclosure on-line will result in an increased rate of self-disclosure off-line in the seventh month.*

H19. *For shy individuals increased depth of self-disclosure on-line will result in an increased depth of self-disclosure off-line in the seventh month.*

H20. *For shy individuals increases in the positiveness of self-disclosures on-line will result in more positive self-disclosures off-line in the seventh month.*

*Hypotheses 12, 13, and 14 function as assumption tests or benchmarks based on theories of shyness and self-disclosure in off-line settings.

8.3 Methodology

8.3.1 Research design

The research design for Study Three is a longitudinal study following individuals for their first six months on-line. Measures were administered at three points in time: during the first ('Newbie' survey), fourth ('Midbie' survey) and seventh ('Oldbie' survey) month on-line.

8.3.2 Research Participants

The research participants in this study were 395 individuals who had obtained their first Internet account during the month prior to the survey period commencing. Only the data from the 70 individuals who met this criterion and had also completed all three surveys are used in the analysis presented here (see Section 8.3.4 for full details of the culling process). Thirty eight (54.3%) of the 70 research participants were male and 32(45.7%) female. They ranged in age from 14 to 65 years ($M = 37.26$ years, $SD = 12$ years). More than half were married (51.7%) or living in a defacto relationship (5.2%). The rest were single (34.5%) or separated/divorced (8.6%). The majority of research participants resided in Australia (65.7%), with other research participants residing in America (20%), Canada (8.6%), the United Kingdom (2.9%), South Africa (1.4%), and Hong Kong (1.4%).

Research participants had a wide range of occupations, ranging from professional and management (37.5%), trades and manual work (8.9%), clerical and administrative (10.7%) to sales and service (10.7%). Only 5.4% of respondents were directly employed in a computing position. Four (7.14%) of the research participants were homemakers or retired, and 10 (17.9%) were students. Participants reported between 5 and 21 years of formal education ($M = 13.93$ years, $SD = 3.15$ years). Nine (12.9%) of the research participants reported having a disability and four (5.7%) reported having Attention Deficit Disorder.

8.3.3 Measures

A summary of measures and the survey in which they were administered are presented in Table 8.1.

8.3.3.1 Demographics

Six items were developed to provide demographic details on research participants' sex, age, marital status, education, occupation, and country of residence.

Measure	'Newbie' Survey	'Midbie' Survey	'Oldbie' Survey
Demographics	✓		
Use of virtual environments	✓	✓	✓
Time spent on-line	✓	✓	✓
Extraversion/Introversion	✓		
Absorption	✓		
Shyness on-line		✓	✓
Shyness off-line	✓		✓
Sociability on-line		✓	✓
Sociability off-line	✓		✓
Self-disclosure on-line		✓	✓
Self-disclosure off-line	✓		✓
Internet Addiction	✓	✓	✓
Telepresence		✓	✓

Table 8.1. Measures used in the 'Newbie', 'Midbie', and 'Oldbie' surveys.

8.3.3.2 Use of Virtual Environments

Research participants were asked which of 10 types of virtual environments they had used during the survey period, and the amount of time spent in each type of environment during the previous week.

8.3.2.3 Time Spent On-line

A two item measure was developed that assessed the total amount of time spent on-line during the previous week, and the percentage of this time that was allocated to work or study purposes.

8.3.3.4 Extraversion/Introversion

The 12 item measure of extraversion from the Eysenck Personality Questionnaire-Revised Short Form (EPQ-R Short Form; Eysenck, Eysenck & Barrett, 1985) was used as a measure of introversion/extraversion. The EPQ-R has a long history of development dating from the 1950's and is one of the most frequently used measures of extraversion. The EPQ-R Short Form was designed for use when time is limited. It has high internal reliability of items (scale alphas .84-. 88).

8.3.3.5 Absorption

This research uses the Tellegen Absorption Scale (TAS, Tellegen & Atkinson, 1974), part of the Multidimensional Personality Questionnaire (MPQ), a questionnaire of the self-view domain (Tellegen 1982, 1992). The TAS has high internal consistency of items (Cronbach's alpha .86; Wild et al., 1995), is highly correlated (.75) with the Inventory of Childhood Memories and Imaginings (Lynn & Rhue, 1986), and the Openness to Experience inventory (.64; Wild et al., 1995), and positively correlated with hypnotic responsiveness (Roche & McConkey, 1990).

The MPQ Absorption Scale is a 34-item scale from which 6 factors were derived using tetrachoric correlations on a sample size of 2000. Due to the need to use a brief measure for this research items from only three of the scales (enhanced cognition, oblivious/dissociative involvement, and enhanced awareness) were selected, providing a total of 15 items. These scales were selected as the most relevant to the experience of telepresence.

8.3.3.6 Shyness and Sociability

Cheek and Buss (1981) developed a nine-item shyness scale that is a self-report measure based on affective and instrumental aspects of shyness in situations

where shyness is likely to occur. Each scale item has a 5 point rating scale ranging from 0 (extremely uncharacteristic) to 4 (extremely characteristic). The shyness scale had good internal consistency (Cronbach's $\alpha = .79$) with inter-item correlations ranging from .20-.44. Factor analysis confirmed it was a unidimensional scale. The 90 day test-retest reliability coefficient was .74 (Cheek & Buss, 1981). A revised version of the scale (Cheek, 1983) increased the number of items to 13. Using a sample of 679 undergraduate students the scale reliability was .82 (Bruch et al., 1989).

The Shyness scale is highly correlated (.75-.86) with other major shyness scales. Using a large sample ($N > 1,135$) Jones et al., (1986) reported significant correlations with their Social Reticence Scale II (.79), the Morris Shyness Scale (.75; Morris, 1984), the Social Avoidance and Distress Scale (.77; Watson & Friend, 1969) and the Interaction Anxiousness Scale (.86; Leary, 1983).

Correlations with related constructs were also in the expected direction. Using sample sizes of $N > 280$, Jones et al., (1986) reported the Cheek and Buss Shyness Scale was negatively correlated with sociability items from Eysenck Personality Inventory (-.59; Eaves & Eysenck, 1975), and positively correlated with the Fear of Negative Evaluation Scale (.51; Watson & Friend, 1969), Audience Anxiousness Scale (.53; Leary, 1983), Dyadic Anxiety Scale (.59; McCroskey, 1982) and the Public Speaking Anxiety Scale (.44; McCroskey, 1982). Jones et al., (1986) further determined that the Cheek and Buss shyness scale negatively correlated with assertiveness (-.54, Rathus, 1973), extraversion (-.29, Eysenck & Eysenck, 1968), and self-esteem (-.52, Rosenberg, 1965); and positively correlated with social fears (.50, Fear Survey Schedule, Geer 1965), fearfulness (.49, Buss & Plomin, 1975) and loneliness (.52, Russell, Peplau & Cutrona, 1980).

For the purposes of this research, a shortened measure of shyness was required. A shortened version of the Cheek and Buss Shyness scale has been used in two studies. Schmidt and Fox (1995) and Scharlott and Christ (1995) selected the five highest loading items of the Cheek and Buss Revised Shyness Scale (Cheek, 1983) to use as a reduced shyness measure. Scharlott and Christ reported that factor analysis of the 5 items resulted in the fifth item loading on a separate factor. The four

remaining items were computed into a scale with good internal consistency (Cronbach's alpha of .83). The 5 item measure was selected for use in this research.

Cheek and Buss (1981) also developed a 5-item self-report measure of sociability based on the desire to be with others. Each scale item has a 5 point rating scale ranging from 0 (extremely uncharacteristic) to 4 (extremely characteristic). The scale has adequate internal consistency of items for research purposes (range .70-.76; Cheek & Buss, 1981; Bruch et al., 1989). Inter-item correlations ranged from .20-.57 (Cheek & Buss, 1981; Bruch et al., 1989).

Factor analysis and Linear Structural Relations (LISREL) confirmatory factor analysis of the sociability and shyness items revealed 2 separate factors for sociability and shyness demonstrating that shyness and sociability are distinct constructs (Cheek & Buss, 1981; Bruch et al., 1989). Sociability and shyness correlated moderately, ranging from -.30 to -.43 (Cheek & Buss, 1981; Jones et al., 1986; Schmidt, 1999). This 5 item measure of sociability was selected for use in this research.

8.3.3.7 Self-Disclosure

For the purposes of this research a self-report measure of self-disclosure was sought that measured a general propensity to self-disclose, rather than self-disclosure to a specified individual. Wheelless (1976, 1978; Wheelless & Grotz, 1976; Wheelless, Nesser & McCroskey, 1976) developed the General Disclosiveness Scales that measure how an individual self-discloses with other people in general. The scales measure intent, amount, positiveness, depth and honesty/accuracy of self-disclosiveness. The scales were developed from factor analytic solutions of Likert items written for their face validity of dimensions of self-disclosure.

Three scales representing dimensions of the propensity to self-disclose were selected for use in this research. From the original General Disclosiveness Scales (Wheelless & Grotz, 1976) the amount of self-disclosure scale was selected. This is a four-item scale with adequate reliability for research purposes. Wheelless (1976) reported alpha scale coefficients of .74 for two studies based on samples of 188 undergraduates and 374 adult graduate students. From the Revised General Disclosiveness Scales (Wheelless, Nesser & McCroskey, 1976) the depth of self-disclosure (5 items) and the valence of self-disclosure (8 items) scales were selected.

Using a sample of 385 students, both scales had good internal consistency of items (scale alphas depth = .78, positiveness = .90). In addition, the survey asked respondents the number of people they were comfortable disclosing information to.

8.3.3.8 'Internet Addiction Disorder'

At present there is no reliable and valid measure of 'Internet Addiction Disorder' (IAD) or even agreement among psychologists that there is such a construct to measure. For the purposes of this research a measure was required that assessed the persistence of addictive feelings and/or behaviours over time. To enable the comparison of the results obtained here with other studies use of an existing measure was preferable to the development of a new measure.

At the time this research was conceptualised and conducted the most prominent researcher into Internet Addiction was Kimberley Young. Young modeled the IAD criteria on the pathological gambling criteria outlined in the DSM-IV. From these criteria she developed an 8 item Diagnostic Questionnaire for Internet addiction (Young, 1996a).

For this research, a modified version of the Diagnostic Questionnaire used by Young on her Internet Addiction Survey web-site (<http://www.pitt.edu/ksy/survey.html>) was used with her permission. The modification refers to the time period specified. "Have you ever..." was changed to "In the past three months have you ever..." to reflect the multiple data collection time points. The eight-item measure as used in this research is listed below. Each item requires a yes or no response. Young (1999) noted further research is needed to determine the construct validity and clinical utility of the diagnostic instrument.

During the past 3 months have you ever:

- Needed to spend increasingly longer periods of time on-line to achieve satisfaction?
- Experienced any type of withdrawal symptoms (e.g., increased depression, moodiness, or irritability) when you are off-line?
- Spent longer periods of time on the Internet than was intended?
- Made unsuccessful attempts to cut down how much time you spend on-line?
- Engaged in behaviour that allows longer time on-line (e.g., skip a class to use the Internet, go to bed late or wake up early just to use the Internet, etc.)?

- Lost interest in any social, occupational, or recreational activities because of the Internet (e.g., hobbies, going out with others, calling friends, etc.)?
- Continued to use the Internet despite recurrent problems in your real life either caused or exacerbated by your use of the Internet (e.g., work-related, school, financial or family problems)?
- Felt preoccupied with being back on-line when you are not using the Internet?

In addition, respondents were asked whether they currently had a disability that affected functioning or communication, suffered from depression, had an anxiety related disorder or Attention Deficit Disorder.

8.3.3.9 Telepresence

There is a paucity of measures of telepresence that are suited for use in non-immersive virtual environments. Recently Witmer and Singer (1998) developed the 'Presence Questionnaire' to measure presence in virtual environments and the 'Immersive Tendencies Questionnaire' to measure differences in the tendencies of individuals to experience presence. Unfortunately, these measures were not available at the time this research was constructed.

A one item measure of telepresence used by Towell & Towell (1997) was adapted for use in this research. Research participants were asked to rate the item: "I feel a sense of actually being in the same place with others when I am communicating with them in cyberspace" on a seven point scale ranging from strongly disagree to strongly agree.

8.3.3.10 Scale Reliabilities:

For each scale, reverse scored items were recoded and items added to produce a scale score. Scale reliabilities (Cronbach's alpha) were calculated using the data from all respondents ($N = 171$) who had completed two or more surveys. Cronbach's alpha scale co-efficients are presented in Table 8.2. The reliability of the amount of self-disclosure scale was not acceptable for research purposes, and has been dropped from all further analyses. All remaining scales have acceptable reliabilities for research purposes

These scales have not previously been used in on-line research. As a step towards examining the validity of using these on-line scales, where relevant the

scales were correlated to ensure that the size and direction of association were consistent with theoretical predictions and findings from off-line research. Extraversion and sociability were positively correlated ($r = .76, p < .001$), sociability and shyness were negatively correlated ($r = -.51, p < .001$), and shyness and extraversion were negatively correlated ($r = -.56, p < .001$). These findings are consistent with expectations and increase confidence in the use of these off-line measures in on-line situations.

Scale	Scale Reliability (Cronbach's alpha)
Extraversion	.80
Absorption:	.80
Shyness	.71
Sociability	.81
Self-disclosure:	
-amount	.55
-depth	.72
-valence	.88
-amount + depth	.75

Table 8.2. Scale reliabilities of measures used in Study Three.

8.3.4 Procedure

An information page about the research (see Appendix 12) and three surveys were created and uploaded onto the WWW. The three surveys, for completion during the first, fourth and seventh month on-line, were named the 'Newbie' Survey (Appendix 13), 'Midbie' Survey (Appendix 14) and 'Oldbie' Survey (Appendix 15) respectively.

Research participants were recruited through a range of methods. First, a list was developed of commercial Internet Service Providers (ISPs) in Australia listed in the February 1996 edition of Internet Australasia Magazine and all universities in Australia who provide remote access accounts for staff and students.

These service providers were contacted by email. The email outlined the study and sought permission to promote the survey to individuals who were obtaining their first Internet access account through one of the following means:

- a) by inserting a hyperlink to the survey from their WWW home page, OR
- b) including a paragraph about this research in the 'welcome' email sent to new clients, OR
- c) forwarding an email or information sheet about the survey to new clients.

Second, the address of the information page was posted to search engines on the Internet. Third, postings were made to newsgroups whose primary focus is assisting new Internet users (see Appendix 16). Regardless of the referral source, all individuals who were interested in the research were invited to visit the information page on the WWW. The information page detailed the purpose of the research, the researchers, what participation would involve, and the confidentiality of data collected. Informed consent was obtained by requiring individuals to click on a hyper-linked consent sentence on the information page in order to access the first survey (the 'Newbie' Survey).

Respondents to the 'Newbie' Survey who provided a valid email address were sent an email 3 months later with a link to the 'Midbie' Survey. If no 'Midbie' Survey response was received within two weeks, an email reminder was sent. Similarly, 6 months after completing the 'Newbie' Survey, emails were sent to respondents with a link to the 'Oldbie' Survey. If no 'Oldbie' Survey response was received within two weeks, an email reminder was sent. No further reminders were sent.

Three hundred and ninety five 'Newbie' surveys were completed. With WWW surveys an individual can easily respond several times. Making multiple responses can be as simple as clicking several times on the 'submit' button. To protect against multiple surveys from the same source survey respondents were requested to provide an email address. Completed surveys were checked for duplication of email addresses and thirty-four surveys that did not provide an email address were removed from the analysis. One further respondent did not wish to complete surveys electronically, leaving 360 completed 'Newbie' surveys.

The target respondents for this study were individuals who had obtained their first Internet access account within the past month ('Newbies'). From all the valid surveys received, only 216 (60%) were from respondents who met this criterion. Of these, 70 (32.41%) had completed all 3 surveys, 39 (18.06%) had completed two surveys, and nearly half (107) had completed only the 'Newbie' survey. Only the 70 cases where all three surveys had been completed by 'Newbies' were retained for the final analysis.

The high dropout rate over the course of the three surveys is of some concern. Two potential reasons for this high dropout rate are suggested. First, some emails sent out to remind respondents the next survey was due were returned as undeliverable. This suggests the individuals concerned had changed service providers, changed email addresses or no longer had an Internet account. The rapid turnover of Internet users is not a phenomenon specific to this survey. For example, Lindstrom (1997) found that over a 6 month survey period 21% of users who had previously had access to the Internet no longer did so. Second, the three surveys required a total time commitment of approximately one hour to complete. As one respondent noted, they would require payment in order to continue given the time commitment required.

Given the high dropout rate over the 6-month period of the surveys, comparisons were made to determine if the 70 'Newbies' who had completed all three surveys differed from the 146 who had not. First, respondents were compared on demographic details. An independent samples t-test revealed no differences in age. Chi Square analyses detected no significant differences in sex, marital status, or the likelihood of having a disability, an addiction, anxiety disorder, or depression. Second, respondents were compared on their personality attributes. Independent sample t-tests revealed no significant differences in shyness, sociability, introversion, self-disclosure or capacity to be absorbed. Third, respondents were compared on their use of the Internet at the 'Newbie' stage. Independent samples t-tests revealed no significant differences in the number of hours spent on-line, the percentage of time spent on work or study, or scores on the Internet addiction scale. These results increase confidence in the equivalence of the two groups on the basis of demographics, personality attributes, and initial Internet use.

The methodology used to recruit participants in this study resulted in a convenience sample. As such, it is useful to compare the sample selected with new Internet users in general. The demographics of Internet users are changing. Early adopters of Internet use were young, well educated and interested in trying new technologies (Atkin, Jeffres, & Neuendorf, 1998). This profile of early adopters of Internet users is consistent with the general profile of adopters of new technologies who are also young, highly educated, highly paid and male. As the price of new communication technologies drop, use of the technology expands to the general population (Carey 1989). Early adopters use technology differently from other users and findings based on them may not generalise to the rest of the population. (Kraut, 1996).

New Internet users are older, less educated, have lower incomes and are more likely to be female than more experienced users (GVU, 1997; Lindstrom, 1997; Pitkow, 1996). Lindstrom (1997) noted these changes are indicative of the Internet being used by more than just early adopters of technology. While the base of Internet users is expanding rapidly, there are still inequalities in who has Internet access. Internet access still varies according to educational attainment, income, gender and race (Hoffman, Novak & Schlosser, 2000; Robinson, 1998; Wolf, 1998). A press release by GVU (1996, December 12 http://www.ccgatech.edu/gvu/user_survey/papers/9610-release.html) noted that the expansion of the Internet is slowing, and demographics such as age, gender and income are stabilising as the percentage of new users declines.

The GVU WWW survey team from the College of Computing at Georgia Institute of Technology has conducted a series of 10 surveys of Internet users from 1994 to 1998. The GVU surveys have sampling biases associated with non-random sampling. The surveys have a bias towards heavy users, experienced users, and Americans. (GVU, 1997; Pitkow, 1996). For the purposes of comparison with this study, data from the 8th survey conducted in October 1997 are used. Only 36.62% of those surveyed had gone on-line in the past year. Table 8.3 presents a comparison of the demographics of this study's sample with that obtained in the 8th GVU survey. It should be noted that the GVU survey provides demographics for all survey respondents, not just new Internet users. From the table it is clear that the sample for

this study is slightly older, more likely to be female, married, and employed rather than a student. This is consistent with the changing demographics of the Internet, where new users more closely represent the general population than experienced users.

Demographics	Study Three	GVU Oct 1997 survey (N = 19,583)
Age	37.3 years	35.7 years
Gender	45.7% female	38.5% female
Education	56% tertiary educated	49.6% college degree
Marital Status	51.7% married	40.2% married
Occupation	17.9% in education 37.5% prof /management	23.1% in education 33.1% prof/management

Table 8.3. Demographics of research participants for Study Three and the 8th GVU survey

8.4 Results

Consistent with the longitudinal nature of this study many of the analyses are conducted using repeated measures analysis of variance statistics. Where indicated, planned comparisons are used to test *a priori* hypotheses. Elsewhere, post hoc comparisons are used.

As the number of statistical tests conducted for an experiment/study increase, the likelihood of obtaining Type One errors increases. Within the research literature there are mixed opinions on whether and how this possible increase in Type One errors should be adjusted for. For example, Maxwell and Delaney (1989) recommend the use of Bonferroni adjustments when conducting multiple planned comparisons. The alpha rate for significance testing for each planned comparison is set to equal .05 divided by the number of comparisons to be conducted. This provides protection against the increased likelihood of Type One errors. In contrast, Keppel (1991) argued that there is no need to make special corrections for Type 1 errors when only

“a reasonable number” (p. 167) of planned comparisons based on theoretically derived hypotheses are conducted.

Given the exploratory nature of this research and the nested nature of hypotheses in this study an intermediate approach was adopted. In accordance with Keppel (1991), the number of planned comparisons are limited to those of central importance to the study. In this study, the planned comparisons of central importance were the changes in behaviour between off-line and on-line settings (comparison of ‘Newbie’ survey off-line scores with ‘Midbie’ and ‘Oldbie’ surveys on-line scores) and changes in off-line behaviour resulting from on-line use (comparison of ‘Newbie’ and ‘Oldbie’ offline scores). To achieve this, simple contrasts with contrast weights of 1 and -1 are used to compare mean scores on the ‘Midbie’ and ‘Oldbie’ surveys with mean scores on the ‘Newbie’ survey.

Protection against Type One errors is provided by conducting an omnibus test of significance for an effect for each area prior to conducting planned comparisons. Where there is no significant overall effect, planned comparisons are not conducted. Where there is a significant overall effect, no corrections for Type 1 errors are made for planned contrasts. However, Bonferroni corrections are made for all post hoc comparisons.

The results are illustrated using a series of line graphs. For ease of interpretation, lines representing changes in on-line measures are coloured red, and lines representing changes in off-line measures are coloured black.

Cohen’s (1988) conventions are used when describing effect sizes. For correlations $r = .10$ is a small effect size, $r = .30$ is a medium effect size, and $r = .50$ is a large effect size (Cohen, 1998: 79-81).

8.4.1 Progress through Virtual Environments

H1. *The number of virtual environments used will increase between the first and fourth months, representing a period of experimentation with new environments, and will level off by 7 months.*

The number and percentage of respondents using each virtual environment during their first, fourth and seventh month on-line is presented in Table 8.4. The most popular environments were email and the WWW, with more than 95% of respondents using these at each point in time.

A repeated measures ANOVA using the GLM model was conducted to test changes in the number of virtual environments used over time. There was a significant main effect for time $F(2, 136) = 3.20, p < .05, \eta^2 = .05$. Tests of within subject contrasts revealed a significant quadratic trend ($F(1,68) = 4.18, p < .05, \eta^2 = .06$). The number of virtual environments used increased from the 'Newbie' survey in the first month ($M = 2.99, SD = 1.21$) to the 'Midbie' survey in the fourth month ($M = 3.39, SD = 1.41$) and had leveled off by the 'Oldbie' survey in the seventh month ($M = 3.20, SD = 1.16$). This relationship is graphically presented in Figure 8.1.

Virtual Environment	Number (Percentage) of Respondents		
	Month 1	Month 4	Month 7
Email	66 (94.3%)	70 (100%)	69 (100%)
WWW	68 (97.1%)	67 (95.7%)	69 (100%)
Newsgroups	32 (45.7%)	26 (37.1%)	24 (34.8%)
Discussion Groups	4 (5.7%)	12 (17.1%)	7 (10.1%)
MUDs	1 (1.4%)	2 (2.9%)	1 (1.4%)
IRC	12 (17.1%)	28 (40.0%)	24 (34.8%)
Chats	20 (28.6%)	24 (34.3%)	14 (20.3%)
Iphone	1 (1.4%)	4 (5.7%)	3 (4.3%)
CUSEE Me®	2 (2.9%)	1 (1.4%)	1 (1.4%)
On-line games	3 (4.3%)	5 (7.1%)	6 (8.7%)

Table 8.4. Number and percentage of respondents using virtual environments during their first, fourth and seventh month on-line.

H2: *Hours spent on-line will decrease after the fourth month following an initial period of high connection times.*

Each respondent was asked to provide estimates of time spent on-line in each virtual environment, and time spent on-line in total. As a cross-check, hours in each

virtual environment were added together and compared with the time spent on-line figure provided by the respondent. Where the total hours figure provided by the

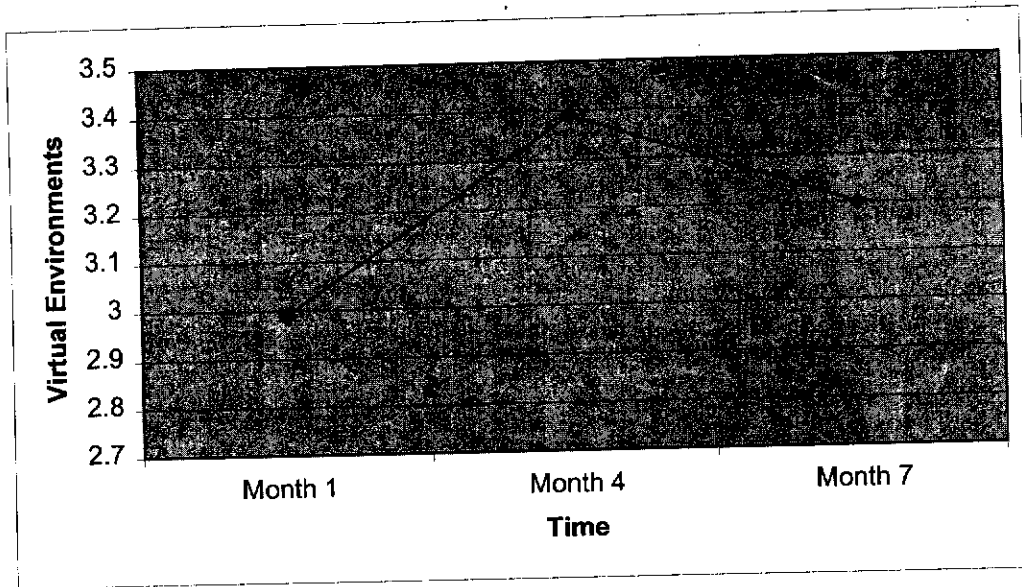


Figure 8.1. Changes in the number of virtual environments used over the 6 month period.

respondent varied widely from the figure obtained by adding time across environments, the data was re-examined. There are many more virtual environments than those specified in the survey, and time spent in these other virtual environments may explain cases where total time spent on-line was greater than the sum of time spent in the specified virtual environments. Cases where total time spent on-line were less than the sum of time spent across environments were more problematic. These cases were re-examined, and where data allowed for the possibility of spending time simultaneously in virtual environments (i.e., the total time was equal to or greater than time spent in any one virtual environment) the original figures were kept. Where the total hours on-line figure was less than the time spent in the most frequented virtual environment, or where the total number of hours on-line were not provided by the survey respondent, the computed figure was used.

Table 8.5 presents the number of hours respondents reported spending on-line over the course of the three surveys. In addition to total time spent on-line, information is presented on time spent using the two most popular Internet applications: the WWW and email.

The distribution of total hours on-line for each of the three surveys was positively skewed. In addition, the distributions of total hours on-line for the 'Newbie' and 'Oldbie' surveys had a positive kurtosis. As all data fell within hours of use reported in previous studies (indicating they were valid responses), outliers were not removed. A repeated measures ANOVA using the GLM model was conducted to test for differences in time on-line over the course of the survey. As ANOVA is robust to deviations from normality, the data were not transformed. The assumption of sphericity of data was violated, so multivariate tests were used to test significance. There were no significant differences in time on-line across the three points of the survey.

Virtual Environment	Hours per week		
	Month 1	Month 4	Month 7
Email ($N = 66$)	1.62 (1.67)	2.99 (5.16)	3.57(5.62)
WWW ($N = 64$)	7.94 (8.71)	7.05 (7.74)	6.30(5.85)
TOTAL HOURS ON-LINE	13.04(16.04)	13.76(11.94)	13.74(12.14)

Table 8.5. Mean hours on-line for each virtual environment during the first, fourth and seventh month on-line.

Repeated measures ANOVAs using the GLM model were also conducted to test for differences in time spent emailing and on the WWW over time. There was a significant effect for email use over time, with email use increasing over time ($F(2,130) = 4.16, p < .05$). There was no significant difference in WWW use over time. The increasing time spent emailing in comparison to use of the WWW and other virtual environments is graphically illustrated in Figure 8.2.

The relationships between individual characteristics and total hours on-line were examined using Spearman's rho correlations and Mann-Whitney U tests. Non-parametric tests were used as the total hours on-line data deviated from normality.

The demographics of age and years of education were not significantly correlated with time on-line on any of the surveys. Time on-line did not significantly differ by marital status. There was a significance difference in hours online by sex for the 'Midbie' survey, Mann-Whitney U (66) = 394.50, $p < .05$. Males spent significantly longer on-line ($M = 16.70$ hours, $SD = 13.14$) than females ($M = 10.17$ hours, $SD = 9.18$). There were no significant difference in time spent on-line by sex for the 'Newbie' and 'Oldbie' surveys. The personality characteristics of introversion, sociability, shyness, valence of self-disclosure, depth of self-disclosure and absorption were not significantly correlated with total time on-line for any of the surveys.

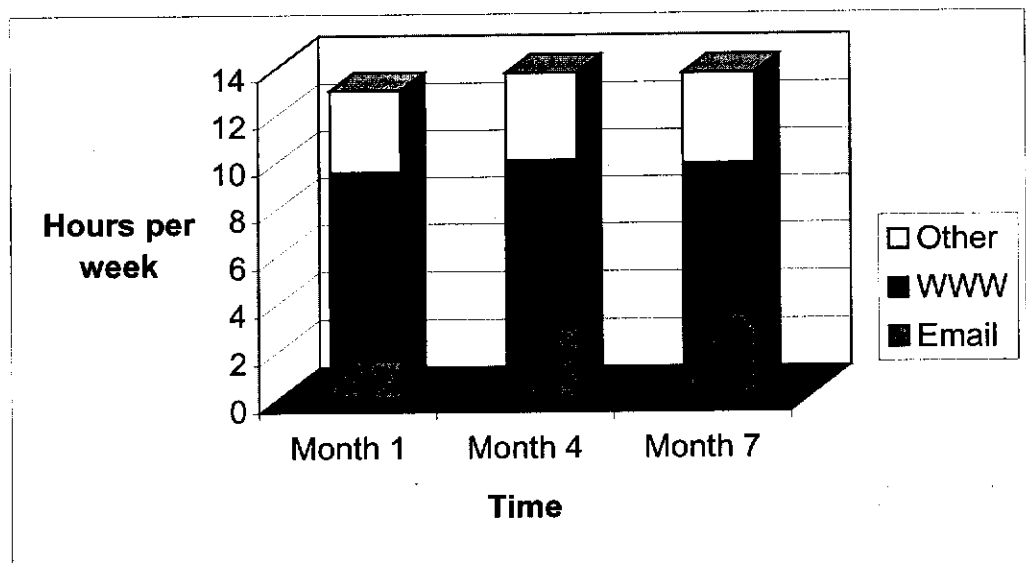


Figure 8.2. Mean time spent using email, the WWW and other virtual environments in the first, fourth and seventh month on-line.

8.4.2 Extraversion/Introversion

H3: *Extraverts will be more likely to use synchronous social virtual environments than introverts due to their propensity to actively seek out sociable leisure activities.*

Based on their Introversion scale score, survey respondents were divided into introverts (score 0-6, $n = 31$) and extraverts (score 7-12, $n = 38$). The two groups were compared in their likelihood to have used a synchronous social virtual environment (MUDs, Chats, IRC, Iphone, or CUSeeMe®) using Chi Square

analyses. Forty-three respondents (61.4%) had used a synchronous social virtual environment on at least one occasion. There were no significant differences in the likelihood of Introverts and Extraverts reporting using a synchronous social virtual environment for the 'Newbie', 'Midbie', or 'Oldbie' surveys, or overall. This hypothesis was not supported. One possible explanation for the failure to find significant differences is the low power to detect a small difference resulting from the small sample size.

H4: *Extraverts will spend more time in synchronous social virtual environments than introverts due to their propensity to actively seek out sociable leisure activities.*

Only the data from those respondents who reported using synchronous social virtual environments were used in these analyses. This hypothesis was tested in two ways. First, independent sample t-tests were conducted comparing Introverts and Extraverts on time spent in synchronous social virtual environments (MUDs, Chats, IRC, Iphone, CUSeeMe®). The assumption of equal means was violated and the more robust significance test applied. No significant differences were found. Second, Extraversion/Introversion scale scores were correlated with time spent in synchronous virtual environments. No significant differences were found. This hypothesis was not supported. Again, a possible explanation for the failure to find significant differences is the low power for detecting a small difference resulting from the small sample size.

H5. *Introverts will be more likely to use text-based social virtual environments than extraverts due to their increased comfort level interacting within a text-only environment.*

Sixty respondents (85.7%) had used at least one text-based social virtual environment (newsgroups, discussion groups, MUDs, IRC or chats) other than email. As nearly all respondents were using email, this hypothesis was tested using other text-based social virtual environments only. Chi square analyses revealed no significant differences between extraverts and introverts in their likelihood of using text-based social virtual environments in the 'Newbie' or 'Oldbie' surveys. However, a significance difference was found for the 'Midbie' survey. Extraverts (78.9%) were more likely to use a text-based social virtual environment than introverts (54.8%), $\chi^2(1, N = 69) = 4.57, p < .05$.

H6. *Introverts will spend more time in text-based social virtual environments than introverts due to their increased comfort level interacting within a text-only environment.*

This hypothesis was tested in two ways. Independent sample t-tests comparing Introverts and Extraverts on time spent in text-based social virtual environments revealed no significant differences. In addition, no significant correlations were found between time spent in text-based social virtual environments (including email) and Introversion/Extraversion scores.

8.4.3 Absorption and Telepresence

H7. *Absorption will be highly correlated with telepresence. The greater the individual's ability to become absorbed, the greater the telepresence they will report experiencing.*

The total scale score for absorption was correlated with the telepresence score using Spearman's rho. There was a significant correlation between the absorption score and telepresence at the time of the 'Midbie' survey ($r_s = .36, p < .01$). The greater one's capacity to be absorbed, the greater the telepresence experienced. Telepresence experienced at the time of the 'Midbie' and 'Oldbie' surveys were highly correlated ($r_s = .56, p < .001$). However, absorption was not significantly correlated with telepresence on the 'Oldbie' survey.

H8. *Ability to be absorbed will also predict the amount of time spent in text-based virtual environments. The greater the individuals' ability to become absorbed, the more time they will spend in text-based virtual environments.*

The absorption score was correlated with time spent in text-based (IRC, chats, email, discussion groups and newsgroups) and other (games, WWW, CUSeeMe®, Iphone) virtual environments at each point in time. No significant correlations were found. This hypothesis was not supported.

8.4.4 Shyness and Sociability

Scores on the shyness scale ranged from 0 to 19 ($M = 8.10, SD = 3.99$) and were normally distributed. Males and females did not significantly differ in their shyness scores, and all further analyses combine the two groups. Groups of high-shy and low-shy individuals were selected on the basis of their shyness score on the 'Newbie' survey: scores equal to or below the 25th percentile (score of 6) were

classified as low-shy, and equal to or above the 75th percentile (score of 10.25) were classified as high-shy.

H9. *Those high in shyness off-line will experience lower levels of shyness on-line, while those low in shyness off-line will have similar levels of shyness on and off-line.*

Repeated measures ANOVAs using the General Linear Model (GLM) were conducted separately to examine changes in shyness across time and settings for the high- and low-shy groups. Changes in shyness across time and settings for both high and low-shy groups are depicted graphically in Figure 8.3.

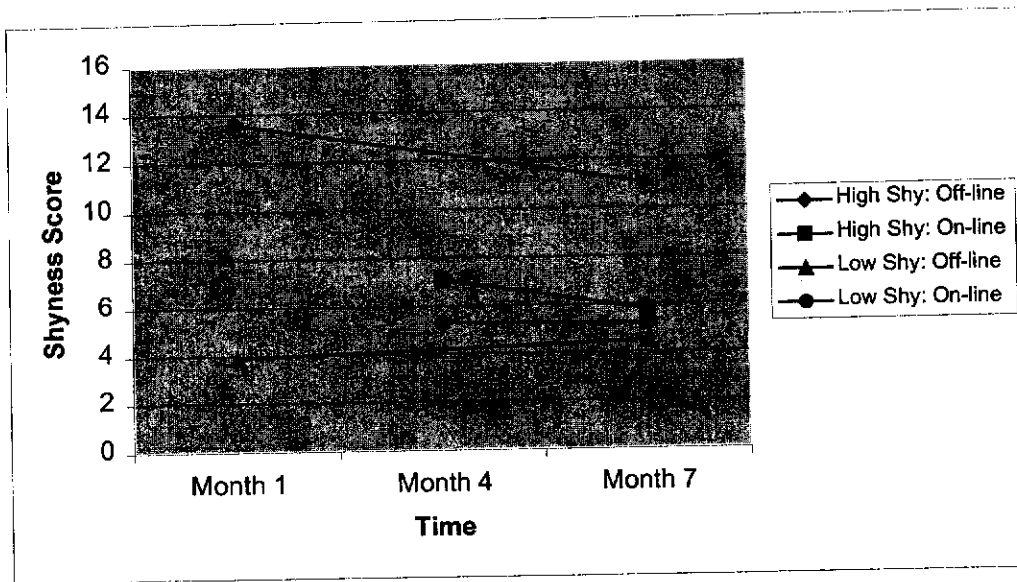


Figure 8.3. Changes in shyness across time and settings for high-shy and low-shy groups.

For those low in shyness ($n = 17$) there were no significant differences in shyness scores across time and settings ('Newbie' $M = 3.88$, $SD = 2.18$; 'Midbie' $M = 5.29$, $SD = 3.42$; 'Oldbie' On-line $M = 5.24$, $SD = 2.66$; 'Oldbie' Off-line $M = 4.47$, $SD = 2.81$).

For the high-shy group ($n = 10$), the more robust multivariate tests were interpreted as the data violated the assumption of sphericity. There was a significant main effect for shyness across time and setting (Pillai's trace $F(3, 7) = 33.19$, $p < .001$, $\eta^2 = .93$). Planned comparisons using simple contrasts confirmed significant differences in shyness scores off-line at the start of the survey ($M = 13.60$, $SD = 2.59$) and on-line shyness on both the 'Midbie' ($M = 7.10$, $SD = 3.48$, $F(1, 9) = 37.84$,

$p < .001$. $\eta^2 = .81$) and 'Oldbie' ($M = 5.80$, $SD = 2.57$, $F(1,9) = 56.10$, $p < .001$. $\eta^2 = .86$) surveys. Every member of the high-shy group reported decreased shyness on-line, ranging from 4 to 14 units on the shyness scale. Independent samples t-test confirmed that shyness on-line did not significantly differ for the high- and low-shy groups. There was no significant correlation between shyness off-line on the 'Newbie' survey and shyness on-line at the 'Oldbie' survey.

H16. *For shy individuals shyness off-line during the seventh month will be less than shyness off-line during the first month as a result of decreased shyness on-line.*

A planned comparison using simple contrasts confirmed that shyness off-line in the seventh month of Internet use ($M = 11.00$, $SD = 3.83$) was significantly less than initial shyness ($M = 13.60$, $SD = 2.59$, $F(1,9) = 7.57$, $p < .05$. $\eta^2 = .46$). While the majority of the high-shy group members experienced decreased shyness off-line after 6 months Internet use (range 1-7 units on the shyness scale), two (18.18%) reported a small increase in shyness (2 units on the shyness scale).

When groups are selected on the basis of extreme scores on a measure, there is an increased risk of regression to the mean. To test whether the difference in shyness scores between the 'Newbie' and 'Midbie' surveys could be attributed to regression to the mean due to measurement error the standard error of prediction was calculated using the formula suggested by Hsu (1995): $SD_x[1-r^2_{xx}]^{.5}$. Given the shyness scale reliability of .71 and a standard deviation for the 70 cases of 3.99, the equation is $3.99[1-.71^2]^{.5} = 2.81$. In the absence of an effect, post-test scores would be expected to fall within 2 times the standard error of prediction of pre-test scores (i.e., 5.62 units on the shyness scale). The mean difference for the high-shy group between the 'Newbie' and 'Midbie' surveys was 6.50 units on the shyness scale, indicating the difference obtained is reliable and cannot be accounted for by measurement error alone. Hypotheses 9 and 16 were supported. Those low in shyness off-line did not have significantly different levels of shyness on and off-line, while those high in shyness off-line experienced significantly lower levels of shyness on-line, and a significant reduction in shyness off-line after 6 months of Internet use.

H10. *There will be a small significant difference in sociability across settings of less than 2 points on the Cheek and Buss (1981) sociability scale.*

Scores on the Newbie sociability scale ranged from 0 to 20 ($M = 11.63$, $SD = 4.77$) and approximated a normal distribution. Males and females did not significantly differ in their sociability scores and all further analyses combined the two groups.

To examine the stability of sociability across settings a series of correlations were conducted. Offline sociability in the first and seventh months ($r = .75$, $p < .001$), and on-line sociability in the fourth and seventh months ($r = .52$, $p < .001$) were strongly correlated. However, there were no significant correlations between on-line and off-line sociability.

To test whether there were significant differences in the level of sociability across settings a Repeated measures ANOVAs using the General Linear Model (GLM) was conducted. The assumption of sphericity of data was violated, so multivariate tests were used to test significance. There was a significant effect across settings ($F(3,46) = 3.54$, $p < .05$, $\eta^2 = .19$). Post hoc comparisons (LSD) confirmed that sociability off-line (Newbie survey: $M = 12.04$, $SD = 5.14$, Oldbie survey: $M = 12.61$, $SD = 4.71$) was significantly higher than sociability on-line (Midbie survey: $M = 9.71$, $SD = 4.27$, Oldbie survey $M = 10.24$, $SD = 3.90$).

Given the unexpected finding of a significant difference in sociability across settings that was approximately two scale points it was deemed necessary to see if the effect held across both high and low sociable individuals. Groups of high-sociable and low-sociable individuals were selected on the basis of their sociability score on the 'Newbie' survey: scores below or equal to the 25th percentile (score of 8) were classified as low-sociable, and scores equal to or above the 75th percentile (score of 15) were classified as high-sociable. Repeated measures ANOVAs using the General Linear Model (GLM) were conducted to examine changes in sociability across time and settings for the high- and low-sociable groups separately.

For those low in sociability ($n = 11$), a repeated measures ANOVA (GLM) with sociability score as the repeated measure within subjects factor was conducted. The assumption of sphericity was met and univariate test results interpreted. There was a significant effect across settings and time ($F(3,30) = 6.02$, $p < .005$, $\eta^2 = .38$). This is depicted graphically in Figure 8.4. Planned comparisons using simple contrasts revealed that those low in sociability off-line at the beginning of the survey

($M = 5.09$, $SD = 2.84$) experienced greater sociability on-line on both the 'Midbie' ($M = 10.64$, $SD = 4.70$, $F(1,10) = 10.35$, $p < .01$, $\eta^2 = .51$) and 'Oldbie' surveys ($M = 10.09$, $SD = 4.04$, $F(1,10) = 9.61$, $p < .05$, $\eta^2 = .49$), with a trend ($p = .057$) towards an increase in sociability off-line on the 'Oldbie' survey ($M = 7.55$, $SD = 3.36$).

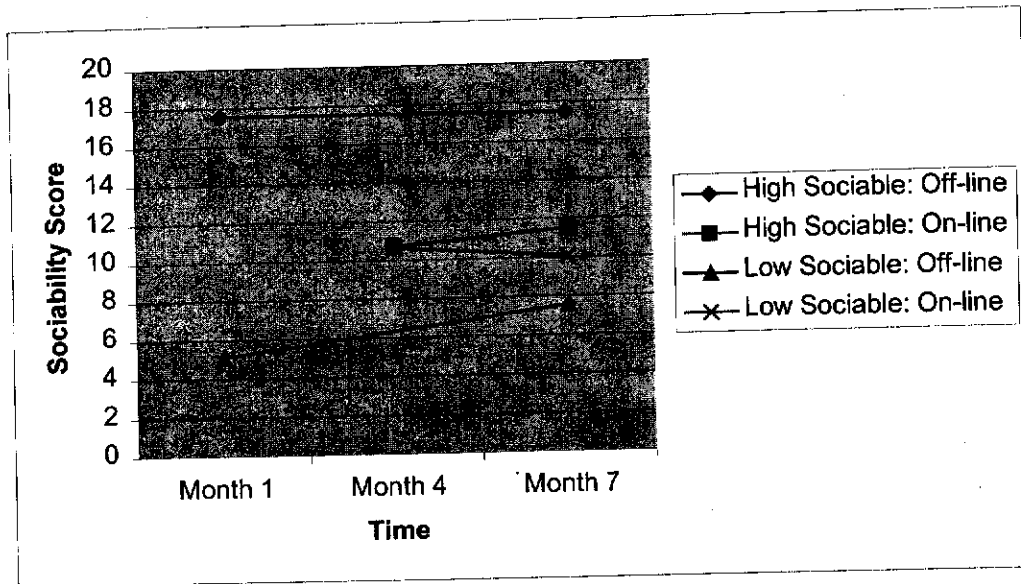


Figure 8.4. Changes in sociability across time and settings for high-sociable and low-sociable groups.

For the high sociability group ($n = 14$) there was also a significant main effect ($F(3,39) = 31.76$, $p < .001$, $\eta^2 = .71$). Planned comparisons using simple contrasts revealed that those high in sociability off-line at the beginning of the survey ($M = 17.57$, $SD = 1.99$) experienced lower levels of sociability on-line at both the 'Midbie' ($M = 10.71$, $SD = 2.55$, $F(1,13) = 46.08$, $p < .001$, $\eta^2 = .78$) and 'Oldbie' stages ($M = 11.50$, $SD = 3.13$, $F(1,13) = 29.31$, $p < .001$, $\eta^2 = .69$), but retained their original high levels of off-line sociability at the 'Oldbie' stage ($M = 17.50$, $SD = 2.28$, ns).

To test whether these changes could be attributed to a regression to the mean effect due to measurement error, the standard error of prediction was calculated. Given the standard deviation for 70 cases of 4.77, and a scale reliability of .81 the following equation was computed: $4.77[1-.81^2]^{.5} = 2.80$. In the absence of an effect from Internet use post-test scores would be expected to fall within 2 times the standard error of prediction (i.e., 5.60 units on the sociability scale). The mean difference for the high-sociability group between the 'Newbie' and 'Midbie' surveys

was 6.86 units on the sociability scale, indicating the difference obtained is reliable and cannot be accounted for by measurement error alone.

To examine the possible interaction of shyness and sociability on on-line behaviour a series of correlations were conducted. At each point in time within each setting shyness and sociability were negatively correlated ('Newbie' offline $r = -.51$, $p < .001$; 'Midbie' online $r = -.49$, $p < .001$; 'Oldbie' online: $r = -.48$, $p < .001$; 'Oldbie' off-line $r = -.55$, $p < .001$). Shyness off-line during the first month was also significantly negatively correlated sociability off-line after 6 months ($r = -.49$, $p < .001$), but not with sociability on-line. Similarly, sociability off-line during the first month is significantly correlated with off-line shyness after 6 months ($r = -.39$, $p < .001$), but is not significantly correlated with on-line shyness.

H17. *For individuals high in shyness and sociability, shyness off-line during the seventh month will be less than shyness off-line during the first month.*

Respondents were divided into 4 groups based on their off-line shyness and sociability scores on the 'Newbie' survey. The median point (10) on each scale was used as a cut point for the groups. Research participants who had not completed all measures were removed from the analysis. The four resulting groups were:

- high shyness score and high sociability score (hishyhisoc, $n = 6$)
- high shyness score and low sociability score (hishylosoc, $n = 6$)
- low shyness score and low sociability score (loshylosoc, $n = 8$)
- low shyness score and high sociability score (loshyhisoc, $n = 26$).

The hishyhisoc group ($M = 11.33$, $SD = 1.03$) was significantly less shy than the hishylosoc group ($M = 14.67$, $SD = 2.94$, $t(6.21) = -2.62$, $p < .05$). The two high sociability groups did not significantly differ in sociability.

A repeated measures ANOVA (GLM) with shyness score as the repeated measure within subjects factor and shyness/sociability grouping as the between subjects factor was conducted to compare shyness across time and settings for the four shyness groups. Data violated the assumption of sphericity (Mauchly's Test of Sphericity, Mauchly's $W = .58$, $df = 5$, Approx. $\chi^2 = 22.53$, $p < .001$) so the more robust multivariate tests were interpreted.

There were significant main effects for changes in shyness across time and settings (Pillai's trace $F(3,40) = 11.48$, $p < .001$. $\eta^2 = .46$) and shyness/sociability

grouping across time and settings (Pillai's trace $F(9,126) = 3.29, p < .001, \eta^2 = .19$). These are depicted graphically in Figure 8.5. There were no significant differences in shyness on-line for the four groups.

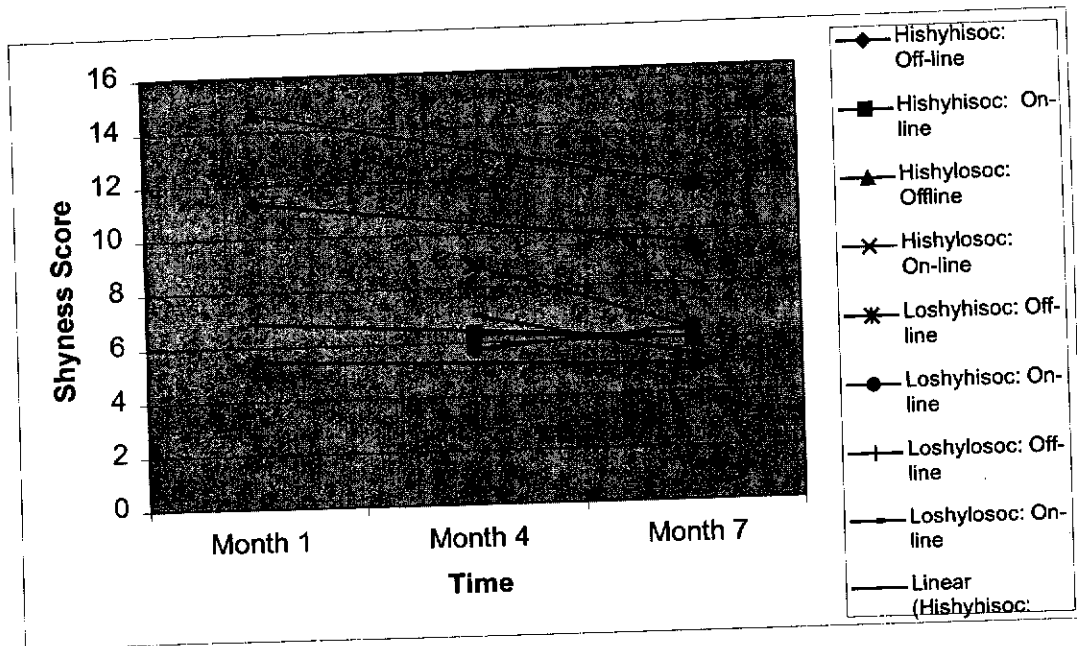


Figure 8.5. Changes in shyness over 6 month period by shyness and sociability groupings.

To test the hypothesised decrease in shyness following on-line use for individuals who were high in both shyness and sociability a repeated measures t-test was conducted. Shyness significantly reduced from the first month on-line ('Newbie' survey: $M = 11.11, SD = 1.05$) to the seventh month on-line ('Oldbie' survey: $M = 9.11, SD = 2.67, t(8) = 2.45, p < .05$). However, a similar significant decrease in shyness was also found for individuals high in shyness but low in sociability ('Newbie' survey: $M = 14.70, SD = 2.54$; 'Oldbie' survey $M = 12.00, SD = 3.86, t(9) = , p < .05$). This result suggests that shyness does not interact with sociability to decrease shyness off-line after periods of on-line use.

Given the unexpected changes in sociability reported above, further analyses were conducted to examine a possible interaction effect of shyness and sociability on sociability scores. A repeated measures MANOVA (GLM) with sociability score as the repeated measure within subjects factor and shyness/sociability grouping as the between subjects factor was conducted to compare sociability across time and settings for the four shy/sociable groups. Data violated the assumption of sphericity

(Mauchly's Test of Sphericity, Mauchly's $W = .54$, $df = 5$, Approx. $\chi^2 = 27.39$, $p < .001$) so the more robust multivariate tests were interpreted.

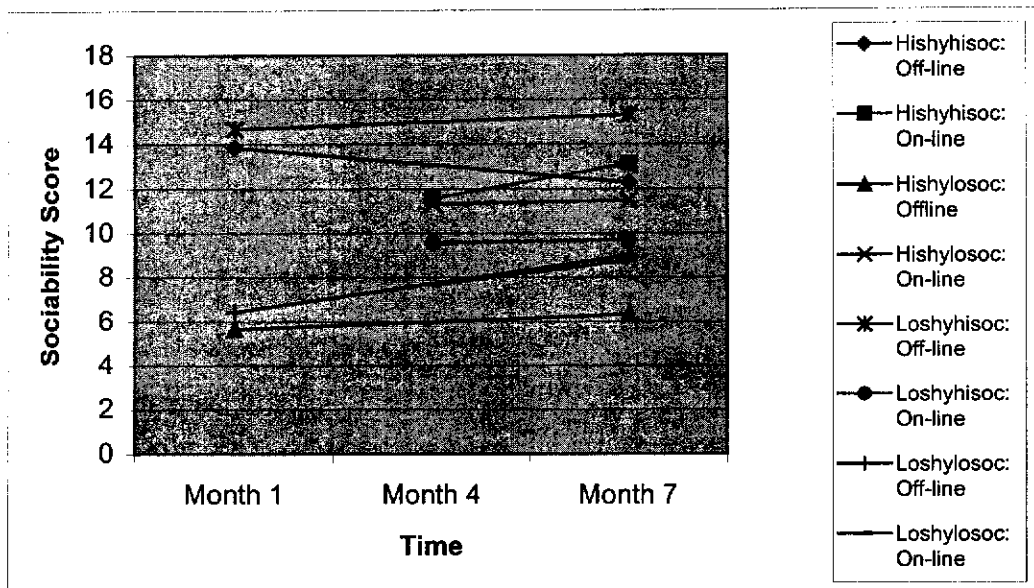


Figure 8.6. Changes in sociability over the 6 month period by shyness and sociability groupings.

Shyness & Sociability	Sociability Score			
	Month 1 <i>off-line</i>	Month 4 <i>on-line</i>	Month 7 <i>on-line</i>	Month 7 <i>off-line</i>
Hishyhisoc <i>n</i> = 7	13.86(1.86)	11.57(2.94)	13.14(2.91)	12.29(4.64)
Hishylosoc <i>n</i> = 6	5.67(3.01)	11.33(5.47)	11.50(4.04)	6.33(2.73)
Loshylosoc <i>n</i> = 9	6.44(3.13)	7.67(5.63)	8.78(4.41)	9.00(3.16)
Loshyhisoc <i>n</i> = 27	14.67(3.36)	9.56(3.62)	9.70(3.65)	15.30(3.22)

Table 8.6. Means and standard deviations for sociability scores across time and settings grouped by shyness and sociability status.

There was no significant effect for sociability over time and settings. There was a significant main effect for shyness/sociability grouping across time and setting (Pillai's trace $F(9,135) = 4.00$, $p < .001$, $\eta^2 = .21$). There was a significant between subjects effect for the four groups ($F(3,45) = 11.05$, $p < .001$, $\eta^2 = .42$). The relationship is depicted graphically in Figure 8.6. Despite the groups being assigned on the basis of sociability, post hoc Scheffe tests revealed no significant differences in sociability on-line between the four groups. Means and standard deviations are provided in Table 8.6.

8.4.5 Self-Disclosure

Prior to analyses the self-disclosure data from the 'Newbie' survey was examined to test for the independence or relatedness of the valence and depth of self-disclosure variables. No significant correlation existed between the variables, and a scatterplot revealed no discernable pattern. Independence of variables was assumed and separate analyses for valence and depth of self-disclosure conducted. No differences in depth and valence were found for males and females so both sexes were included in all analyses. Given the poor reliability of the amount of disclosure scale in this research, Hypotheses 11, 12 and 18 were not tested.

To examine the pattern of the depth and valence of self-disclosures across time and settings for all research participants two repeated measures ANOVAs using the General Linear Model were conducted. There was a significant main effect for the depth of self-disclosure (Pillai's Trace $F(3,48) = 2.96$, $p < .05$, $\eta^2 = .16$). Planned comparisons using simple contrasts revealed that on-line self-disclosures on the 'Midbie' ($M = 11.80$, $SD = 5.44$, $F(1,50) = 9.05$, $p < .005$, $\eta^2 = .15$) and 'Oldbie' surveys ($M = 12.35$, $SD = 6.12$, $F(1,50) = 6.47$, $p < .05$, $\eta^2 = .12$) were significantly more superficial than off-line self-disclosures on the 'Newbie' survey ($M = 15.02$, $SD = 6.40$), but did not result in a significant change in depth of self-disclosures off-line after 6 months ($M = 14.49$, $SD = 5.79$). This is graphically represented in Figure 8.7.

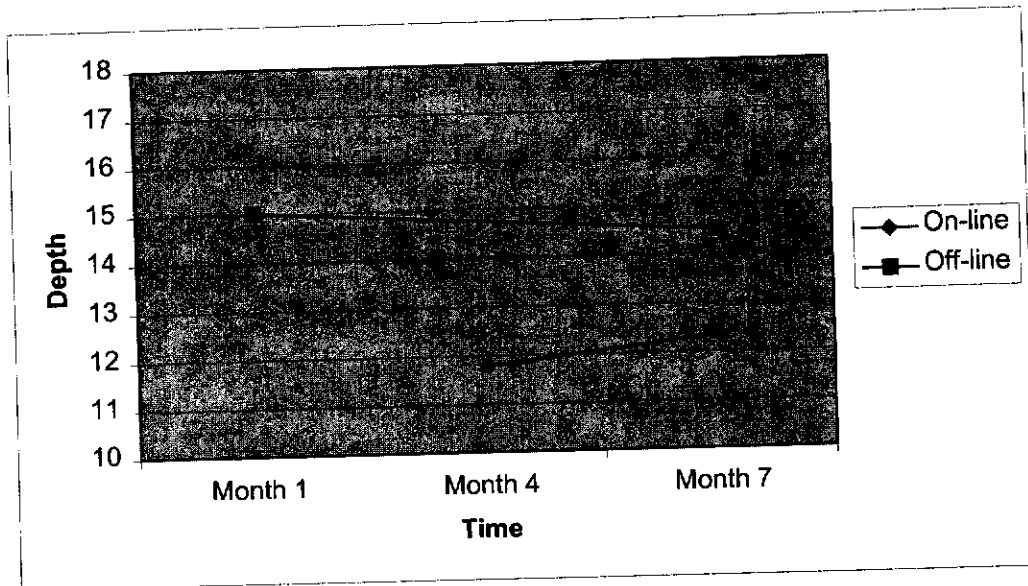


Figure 8.7. Depth of self-disclosures in on- and off-line settings over a 6 month period.

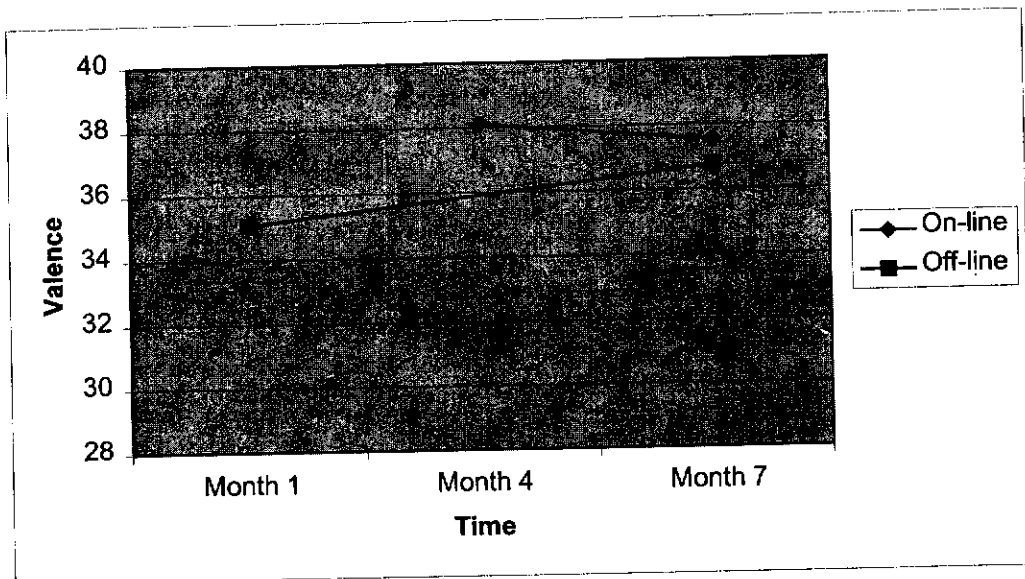


Figure 8.8. Valence of self-disclosure in on- and off-line settings over a 6 month period.

Multivariate tests interpreted for the second ANOVA revealed a non-significant trend for the valence of self-disclosure (Pillai's Trace $F(3,43) = 2.69$, $p = .058$, $\eta^2 = .16$). Planned comparisons using simple contrasts revealed that the valence of self-disclosures off-line on the 'Newbie' survey ($M = 35.09$, $SD = 7.31$) was significantly more negative than the valence of self-disclosures on-line on the 'Midbie' ($M = 38.11$, $SD = 4.75$, $F(1,45) = 7.23$, $p < .05$, $\eta^2 = .14$) and 'Oldbie' ($M =$

37.52, $SD = 5.10$, $F(1,45) = 6.66$, $p < .05$. $\eta^2 = .13$) surveys, and off-line on the 'Oldbie' surveys ($M = 36.76$, $SD = 6.02$, $F(1,45) = 4.83$, $p < .05$. $\eta^2 = .10$). This is graphically represented in Figure 8.8.

H13. *Shy individuals will report more superficial self-disclosures than the non-shy*

This hypothesis was not supported. Prior to Internet use, shyness was not correlated with the depth of self-disclosure. Nor were there any significant correlations between initial shyness and depth of self-disclosures on the 'Midbie' and 'Oldbie' surveys.

H14. *Shy individuals will report more negative self-disclosures than the non-shy.*

This hypothesis was supported. Prior to Internet use, shyness was negatively correlated with the valence of self-disclosure ($r = -.39$, $p < .005$). Shy people reported more negative self-disclosure than the non-shy.

To test whether shy individuals in particular experienced changes in self-disclosure over time two repeated measures ANOVAs using the General Linear Model were conducted using the high shy group (scored equal to or above the score for the top 25th percentile on the 'Newbie' shyness scale).

H19. *For shy individuals, increased depth of self-disclosure on-line will result in increases in an increased depth of self-disclosure off-line in the seventh month.*

Statistical analysis failed to detect a significant difference in the depth of self-disclosures over time for high shy individuals. In contrast to the hypothesis the pattern of scores for shy individuals was in line with the pattern of scores for all individuals with on-line self-disclosures ('Midbie' $M = 11.37$, $SD = 5.16$; 'Oldbie' $M = 12.32$, $SD = 5.64$) self-rated as more superficial than off-line self-disclosures ('Newbie' $M = 15.42$, $SD = 6.35$; 'Oldbie' $M = 14.63$, $SD = 7.01$). Given the power of this sample to detect a significant difference in self-disclosure scores was a low .28, no conclusion can be drawn.

H20. *For shy individuals increases in the positiveness of self-disclosures on-line will result in more positive self-disclosures off-line in the seventh month.*

A MANOVA revealed significant differences in the valence of self-disclosure across settings and time (Pillai's trace $F(3, 33) = 4.60$. $p < .01$. $\eta^2 = .30$). The results are displayed graphically in Figure 8.9. Planned comparisons using simple contrasts revealed significant increases in the valence of self-disclosure both on-line on the

'Midbie' ($M = 37.33$, $SD = 4.12$, $F(1,11) = 6.02$, $p < .05$, $\eta^2 = .35$) and 'Oldbie' surveys ($M = 36.92$, $SD = 6.27$, $F(1,11) = 12.05$, $p < .01$, $\eta^2 = .53$), and off-line after 6 months ($M = 35.42$, $SD = 7.18$, $F(1,11) = 14.35$, $p < .005$, $\eta^2 = .57$) compared to initial levels of valence of self-disclosure off-line on the 'Newbie' survey ($M = 30.42$, $SD = 8.12$). Compared to the baseline, shy individuals increased the positiveness of their self-disclosures over time.

The increase in positiveness of self-disclosures for shy individuals over time was also reflected in a changing pattern of correlations between initial shyness and valence of self-disclosures across the three surveys. Despite the significant correlation between shyness and self-disclosure off-line on the 'Newbie' survey ($r = -.39$) reported above, there were no significant correlations between shyness and valence of self-disclosure on-line on the 'Midbie' or 'Oldbie' surveys, or off-line on the 'Oldbie' survey. On-line, the shy and the non-shy cannot be distinguished in terms of the valence of their self-disclosures.

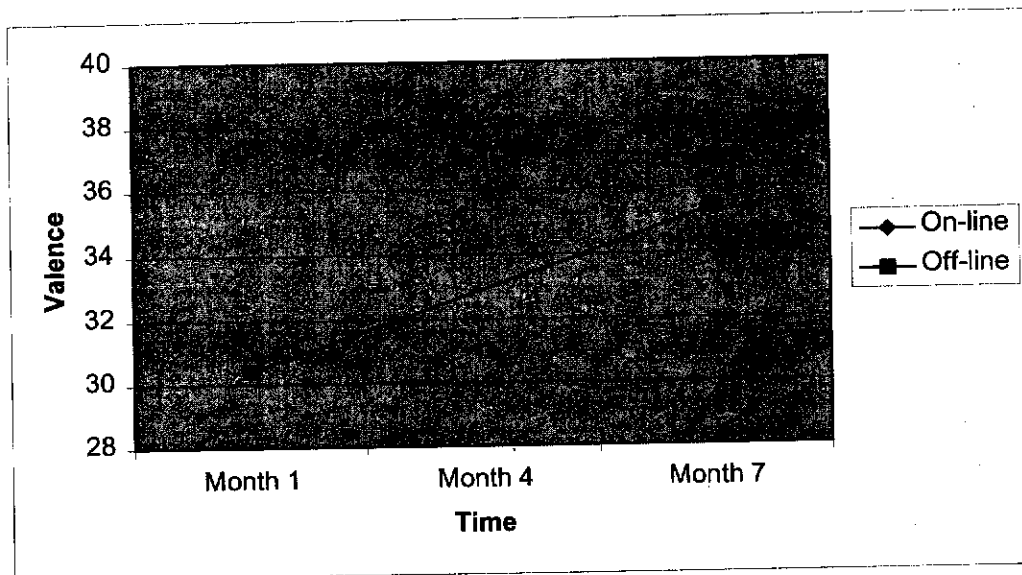


Figure 8.9. Changes in the valence of self-disclosure over time for the high shy group.

8.4.6 'Internet Addiction Disorder'

H15. *The majority of individuals meeting the criteria for 'Internet addiction' at one point in time in the study will not meet the criteria at later points in time.*

Across the three surveys 15 of the 70 respondents met the criteria for 'Internet Addiction Disorder' (IAD) using Young's (1996a) Diagnostic Questionnaire. Of these, only two meet the criterion for IAD at each of the three points in time. A further three were classified as addicted on two of the three surveys (one on the 'Newbie' and 'Oldbie' survey only, the other two on the 'Midbie' and 'Oldbie' surveys). The remaining ten met the criteria for IAD at only one point in time.

The number of hours spent on-line was examined for those who met the IAD criteria. It is notable that four of these respondents were unable or unwilling to provide a figure for total time on-line for at least one survey period. In these cases hours spent in each virtual environment were added to provide an approximate figure. The five respondents who met the IAD criteria more than once were on-line for more than ten hours per week during each survey period. In contrast, the majority (60%) of respondents who met the IAD criteria at only one point in time reported being on-line for ten hours or less per week during the period of 'addiction' (range 2 to 33 hours per week, *Mdn* = 9 hours per week).

Demographic features were compared for those who meet the criteria for IAD with those who did not. Of the fifteen respondents who meet the IAD criteria, nine were male and six were female. Using Chi Square analysis this difference was not statistically significant. There were no significant differences between the groups in years of education or marital status.

A series of independent sample t-tests compared those who meet the criteria for IAD with those who had not on a range of personality characteristics. There were no differences between the two groups in scores on measures of sociability, introversion/extraversion, absorption or depth of self-disclosures. Those who met the criteria for IAD scored higher on shyness ($M = 10.13$, $SD = 4.16$) than those who did not ($M = 7.55$, $SD = 3.80$; $t(68) = -2.59$, $p < .05$). They also made more negative self-disclosures ($M = 30.36$, $SD = 7.73$) than those who did not ($M = 35.86$, $SD = 6.56$, $t(62) = 5.50$, $p < .05$). While these differences were not significant once Bonferroni adjustments are made (6 tests: α of .05 divided by 6 provides an adjusted $\alpha = .008$) they provide an interesting avenue for further research.

The two groups were also compared in terms of physical and mental health problems at the beginning of the research. The two groups had similar percentages of

Item	Percentage of respondents reporting presence of symptom		
	Month 1	Month 4	Month 7
Longer periods to achieve satisfaction	Total: 34.3% Addicted: 100% Non-add: 28.1%	Total: 14.3% Addicted: 71.4% Non-add: 7.9%	Total: 14.3% Addicted: 77.8% Non-add: 4.9%
Withdrawal symptoms	Total: 4.3% Addicted: 33.3% Non-add: 1.6%	Total: 8.6% Addicted: 28.6% Non-add: 6.3%	Total: 11.4% Addicted: 77.8% Non-add: 1.6%
Stay on-line longer than expected	Total: 81.4% Addicted: 100% Non-add: 72.9%	Total: 71.4% Addicted: 100% Non-add: 68.3%	Total: 67.1% Addicted: 88.9% Non-add: 63.9%
Cut down time	Total: 14.3% Addicted: 83.3% Non-add: 7.1%	Total: 15.7% Addicted: 100% Non-add: 6.3%	Total: 12.9% Addicted: 88.9% Non-add: 1.6%
Changed behaviour to spend longer	Total: 48.6% Addicted: 100% Non-add: 40%	Total: 32.9% Addicted: 100.0% Non-add: 25.4%	Total: 27.1% Addicted: 100% Non-add: 16.4%
Lost interest in other activities	Total: 8.7% Addicted: 83.3% Non-add: 1.4%	Total: 8.6% Addicted: 57.1% Non-add: 3.2%	Total: 12.9% Addicted: 88.9% Non-add: 1.6%
Recurrent problems	Total: 10.0% Addicted: 50% Non-add: 5.7%	Total: 8.6% Addicted: 42.9% Non-add: 4.8%	Total: 15.7% Addicted: 100% Non-add: 3.3%
Preoccupied	Total: 23.2% Addicted: 100% Non-add: 14.5%	Total: 17.4% Addicted: 100% Non-add: 8.1%	Total: 17.1% Addicted: 88.9% Non-add: 6.6%

Table 8.7. Percentage of positive responses to Internet Addiction Scale items across the six month period.

people with self-reported disabilities (IAD: 13.3%, non-IAD: 12.7%) and addictions (IAD: 13.3%, non-IAD: 16.4%). Greater differences were recorded for self-reported depression (IAD: 33.33%, non-IAD: 7.3%), anxiety disorders (IAD, 20%, non-IAD 7.3%) and Attention Deficit Disorders (IAD: 13.3%, non-IAD: 3.6%). Given the small numbers of research participants who reported physical and mental health problems it was not possible to statistically test these differences. However, they provide an interesting avenue for further research.

Responses to the items that make up the Internet addiction scale are presented in Table 8.7. At each point in time more than half of all respondents reported the presence of the third symptom, staying on-line for longer periods than expected, suggesting this is a normative behaviour.

8.5 Discussion

This study followed the progress of 70 individuals over their first six months on-line in order to examine the bi-directional effects of personality characteristics and CMC in social virtual environments on behaviour. The results will be discussed in terms of the three aims outlined in the introduction to this chapter. The results pertaining to 'Internet Addiction Disorder' will be discussed separately.

8.5.1 Aim 1: Progression through virtual environments

The first aim of this research was to chart the progress of individuals new to cyberspace through virtual environments. The results suggest that new Internet users explore a limited range of virtual environments in their first few months on-line. By the end of the first 6 months on-line, the majority has settled into using email, the WWW, and one or two other virtual environments.

In this study, the hours spent on-line remained stable across the first six months. This finding contradicts the hypothesised decrease in hours on-line suggested by Studies One and Two and reported by Kraut and colleagues (Kraut et al., 1996, 1998). Work, study, family and other obligations may restrict the total number of hours an individual spends on-line each week. The majority of research participants in this study were married working adults. As such, they are likely to have busy off-line lives where work and family obligations place a ceiling on the time available for Internet use. In contrast, many of the research participants in

Studies One and Two were single students who may have more flexibility in the time available to spend on-line.

It is possible that time spent in a single virtual environment, such as a MOO or IRC channel, decreases over time while use of another (or other) virtual environments increases. For example, despite the stability of hours spent in total on-line over the six month period, time spent using email significantly increased over this period. Increasing use of email over time was also reported by Kraut et al. (1996, 1998). The breakdown of hours by virtual environments may change over time according to the level of satisfaction experienced with each virtual environment. Further research using large random samples is required to obtain a clearer picture of changes in hours spent on-line over time.

8.5.2 Aim 2: Influence of personality characteristics

The second aim of this research was to examine the influence of personality characteristics on cyber-participation. None of the personality characteristics measured (absorption, introversion, sociability, shyness, extraversion) were significantly associated with time spent on-line. Nor were personality factors predictive of the type of virtual environment individuals preferred or used. Contrary to prediction, extraverts were not more likely than introverts to use synchronous social virtual environments, nor did they spend more time in these environments. Similarly, introverts were not more likely than extraverts to use text-based virtual environments, and did not spend more time in text-based virtual environments. As only a limited range of personality characteristics were measured, it is possible that other personality measures may predict time on-line and the types of virtual environment preferred and used. A more likely explanation is that the initial selection of virtual environments is driven by recommendations from family and friends and the serendipitous discovery of new virtual environments, rather than a systematic evaluation of all available virtual environments.

While personality characteristics did not predict the quantity of on-line use, the personality characteristics of absorption, shyness, sociability and self-disclosure did have an impact on on-line behaviours. The effect of each of these personality characteristics is discussed below.

It was hypothesised that the personality characteristic of absorption would predict the degree of telepresence experienced on-line. Limited support was obtained for this hypothesis. Absorption measured at the time of the first survey was moderately correlated with the degree of telepresence experienced after three months on-line. However, while telepresence during the fourth and seventh months were highly correlated, absorption was not significantly correlated with telepresence in the seventh month. This suggests that absorption is not a prerequisite for telepresence. While the capacity to be absorbed may enhance telepresence during the first months of use, over longer periods of time the telepresence experienced is not dependent upon initial absorption capabilities.

Personality characteristics related to social comfort and competence (shyness, sociability and propensity to self-disclose) influenced social activities on-line. While individuals who were low in shyness experienced no change in shyness between on-line and off-line settings, individuals who were high in shyness reported dramatic differences in the shyness experienced between the two settings. Shy individuals were less shy on-line, with on-line shyness matching that of the non-shy. These findings provide empirical support for the reduction in shyness reported by research participants in Studies One and Two, and anecdotal accounts of reduced shyness on-line (Reid, 1991; Shaw, 1997; Turkle, 1995). The Internet provides virtual environments that free individuals from the shyness-related inhibitions to communication they experience in off-line settings. Text-based CMC provides a 'level playing field' for social interaction for the shy and non-shy alike.

What can account for the reduced levels of shyness on-line? One possibility relates to differences in public self-awareness between on- and off-line settings. Public self-awareness is reduced when using CMC (Matheson & Zanna, 1988; 1990). The self-presentational theory of social anxiety (Leary 1986) stated that where situational factors are likely to interfere with the communication process, the individual reduces their self-presentational concerns as any social interaction difficulties encountered may be attributed to the interfering factor. When using CMC, the reduction in non-verbal cues, the time taken to type messages and the variable response times in sending and receiving messages are all likely to be interfering factors in the communication process. As such, on-line environments may provide

shy individuals with a communication environment that reduces communication anxiety through reducing public self-awareness and self presentational concerns.

An unexpected finding was the malleability of sociability across on- and off-line settings. Individuals who were high in sociability in off-line settings were less sociable on-line. Conversely, individuals who were low in sociability off-line were more sociable on-line. This suggests that the sociability measure used has a strong bias towards actual sociable behaviour within a setting rather than an innate desire to be with others that permeates across setting. The results may be interpreted as indicating that the highly sociable have their sociability needs met in their off-line lives, and are not actively seeking sociable interaction with others on-line. In contrast, those low in sociability off-line are actively involved in seeking sociable encounters while on-line. An alternative explanation may be that the measure is not suitable for distinguishing sociability in on-line settings.

Differences in self-disclosure were also reported between on and off-line settings. The valence of self-disclosures fluctuated across settings and time. Across all research participants there was a trend towards more positive valence of self-disclosures on-line than off-line. For shy individuals, the effect was statistically significant. In off-line settings at the beginning of the survey period shy individuals self-reported more negative self-disclosures than the non-shy. On-line, the shy and the non-shy could not be distinguished in terms of the valence of their self-disclosures.

Across all research participants, online self-disclosures were significantly more superficial than off-line self-disclosures. While for shy individuals this failed to reach significance, the results are consistent with those obtained for all research participants, and in the opposite direction to the predicted increase in depth of self-disclosures on-line. Contrary to prediction, shyness was not related to the depth of self-disclosures on- or off-line. This suggests that shy individuals may have less of a propensity to self-disclose than non-shy individuals, but when they do self-disclose it is of equal depth.

What can account for the difference between the more shallow, but more positive self-disclosure on-line found in this study and the increased self-disclosure on-line reported in Studies One and Two and by Wysocki (1997)? First, these

previous studies examined on-line self-disclosure within specific social text-based virtual environments. In contrast, this study examined self-disclosure across virtual environments. It is likely that some virtual environments are more conducive to self-disclosure than others. Second, self-disclosure is a multi-dimensional construct. It may be that only some dimensions of self-disclosure are affected by change of settings. Previous studies focussed on the amount of self-disclosure, something that was not analysed in this study due to the poor reliability of the measure. Third, this study measured general disclosiveness, rather than disclosure to a particular individual. Different results may be obtained where disclosure to a specified individual is measured. For example, Parks and Roberts (1998) examined relationship development in on- and off-line settings, reporting that where the individuals disclosed to held the same relationship to the discloser (e.g., both friends) the breadth and depth of the relationships (as measured by self-disclosure items) did not differ across settings.

Taken together, these findings suggest that individuals who experience social discomfort in off-line settings are likely to be more comfortable interacting in on-line settings. In virtual environments they are likely to be less shy, more sociable and make more positive self-disclosures, and may not be distinguishable from their more socially adept counterparts. This is consistent with findings by McKenna (submitted) who identified socially anxious and lonely individuals as the most likely to express their 'real self' on the Internet rather than in off-line life.

8.5.3 Aim 3: Influence of cyber participation

The third aim of this study was to examine the influence of cyber-participation on personality characteristics. For some individuals who experience social discomfort in off-line settings, the increased social activity on-line had positive carry-over effects into their off-line social lives. For shy individuals as a group, Internet use resulted in significant reductions in shyness and increases in the positiveness of self-disclosures off-line. These results provide empirical support for anecdotal reports suggesting that shyness off-line may decrease following the adoption of a less-shy persona on-line (e.g. Turkle, 1995; Wallace, 1999). They are also consistent with Bier et al.'s (1996) findings of positive effects on personal identity and increased self-confidence.

What are the mechanisms through which this reduction in shyness occurs? As previously noted, on-line environments provide shy individuals with a communication environment that is perceived as non-threatening, enabling shy individuals to interact socially with others without the confines of shyness and to experiment with new less-inhibited behaviours. Where these behaviours are reinforced by positive feedback, the individual may change their perception of their social skills and the behaviours may generalise to off-line settings (Wallace, 1999). Over time, many relationships formed in on-line virtual environments migrate to off-line settings (Parks & Floyd, 1996; Parks & Roberts, 1998), and this may increase the shy individual's off-line social network while also providing them with further opportunities to practice their new skills within off-line settings. This is consistent with Suler's 'integration principle' that Internet use is healthy when on-line and off-line life are integrated.

While all of the high-shy individuals in this study experienced reduced shyness in on-line settings, some were not able to transfer this to off-line settings. This is consistent with findings from Studies One and Two, where only some individuals reported decreased shyness off-line after experiencing successful interactions on-line. Increased social competence on-line does not always result in increased social competence off-line. There is the potential for shy individuals to become 'stuck' in cyberspace, preferring virtual interaction to face-to-face interaction (Turkle, 1995).

8.5.4 'Internet Addiction Disorder'

This study also examined the temporality of 'Internet Addiction Disorder' (IAD). As hypothesised, the majority of individuals meeting the criteria for IAD at any one point in time did not meet the criteria at later points in time. Approximately one-fifth of respondents met the criteria for IAD on at least one point in time during the 6-month survey period. Of this group, two-thirds met the diagnosis for IAD at only one point in time, and hours spent on-line were generally low. Individuals who met the criteria for IAD on more than one occasion generally reported higher hours on-line than those who met the criteria on a single occasion. This suggests that previous research and practice into IAD that based diagnosis on an individual's state at the time of assessment may be applying the IAD label (and implied

psychopathology) to what is, for many, only a temporary state, rather than an enduring problem. The concept of 'Internet addiction' as a temporary phase rather than an illness has also been suggested by Wallace (1999) and Suler (1999), and is consistent with the 'newbie effect' in computer gaming noted by Durkin (1995).

One third of those who scored within the 'addiction' range during the course of the surveys self-reported being depressed at the beginning of the research. Young and Rodgers (1998b) reported that IAD was associated with mild to moderate levels of depression. However, while Young and Rodgers were unable to determine the directionality of effect (does extended Internet use cause depression, or do depressed individuals use the Internet pathologically?), the research findings from this study suggest that depression may be an indicator for extended or problematic Internet use. The Internet may provide an escape for depressed persons. Only one individual who met the IAD criteria and who was not initially depressed reported being depressed at a later stage, while 3 out of 5 of those who met the IAD criteria and were initially depressed did not report being depressed at the three and six month follow-ups. Given the small numbers in this survey and the reliance on self-reports of depression, further research is required to determine if extended Internet use is beneficial (i.e., an effective coping strategy) or detrimental (i.e., prolonging or deepening depression) to the mental health of individuals who are depressed.

Using Young's (1996a) Diagnostic Questionnaire approximately 20% of research participants in this study could be diagnosed as having IAD. If the Diagnostic Questionnaire is accepted as a valid and reliable tool for diagnosing psychopathology, the results imply there is something about the Internet that is psychologically damaging for one in five users. Before this conclusion is drawn, the measure will be examined in more depth.

There is a number of potential problems with both the preface and some items of the Diagnostic Questionnaire. The preface to the items on Young's WWW survey was "Have you ever...". Using this criterion, respondents would be required to provide affirmative responses to items when a specified behaviour had occurred once or only occasionally at any time in the past. For example, someone who had stayed up past their regular bedtime on one occasion to surf the Internet would answer yes to the 5th item. Similarly, using the preface adapted for this research "In the past 3

months have you ever..." would require the individual to provide affirmative responses where the specified behaviours had occurred at any time during the past 3 months.

The high positive response frequency for Item 3 of the Diagnostic Questionnaire (above 65% on each survey) suggests that staying on-line longer than intended is a normative behaviour rather than a sign of psychopathology. As such, it should not be included as a criterion for IAD. Items 5 and 6 suggest a reprioritising of activities in order to find time to spend on a new interest (the Internet). This in itself does not necessarily imply problematic behaviour. It is a matter of degree, rather than an absolute.

The Diagnostic Questionnaire for IAD as used in this research is not able to differentiate those who are having major problems associated with their Internet use from those who are not. Given the problems with both the preface and individual items of the questionnaire it cannot be recommended as either a research tool or as a diagnostic instrument in its current format.

8.5.5 Limitations

While this study suggests interesting directions for future research, there is a number of limitations that prevent the generalisability of the results to all new Internet users. These limitations pertain to the sample obtained and the measures used.

The sample for this study consisted of 70 new Internet users. A non-random sampling technique was employed, resulting in a sample with a strong Australian bias. However, comparison with other surveys suggested that other demographic features of survey respondents were consistent with the demographics of new Internet users. There was a high drop-out rate of respondents over the course of the three surveys. While no significant differences were found between those who completed all three surveys and those who dropped-out of the survey in demographics, personality attributes or initial Internet use, the two groups may differ in some way that was not measured in this research. Third, the high drop-out rate resulted in a small sample size. However, the small sample size was offset by the large effect sizes obtained for most analyses, providing the necessary power to detect significant differences and increasing confidence in the results.

All measures used in this study were based on self-reports. Of particular concern were self-reports of time on-line. In addition to the possibility of biased estimates based on social desirability impression management and self-deception, self-reports of the retrospective frequency of behaviour can be biased by limited episodic recall. Estimates of frequency behaviours are commonly based on inference from the fragmented episodic recall available (Schwarz, 1999). Computer logs of Internet use may provide a more accurate picture of both total time spent on-line and time spent in individual virtual environments.

Also of concern was the identification of depression, ADD and anxiety problems based on self-identification using single item measures. The results using these measures identify areas warranting further research (e.g., the effect of Internet use on depression), but cannot in themselves stand alone given the absence of diagnosis by a clinician or validated psychometric measure.

The psychometric properties of the measures used in this research have not been established for on-line research. As outlined in Chapter 3, the equivalence of psychometric properties of measures administered by pencil and paper and on-line computer screen-based administration has still to be determined. The majority of measures used on-line in this research had adequate scale reliabilities for research purposes. Relationships between measures were consistent with theoretical predictions and off-line research. These factors increase confidence in the use of these measures on-line. However, the less than adequate reliability of the amount of self-disclosure scale with an on-line sample highlights the need to compare the equivalency of psychometric properties of measures across modes of administration.

8.5.6 Future Research

This research has examined Internet use over the first 6 months an individual spends on-line. The research could be further developed by examining Internet use over longer periods of time to identify further changes that may occur.

The increased social competence resulting from Internet use is an important finding that has implications for both research and the treatment of shy and socially anxious individuals. First, further research is required to identify the long-term effects Internet use has on the social skills and psychological well-being of individuals who experience social discomfort in off-line settings. Are the social

competencies developed on-line maintained and further developed in off-line settings over time? What impact do negative social experiences (either on-line and off-line) have on these newly developed competencies? Second, further research is required to identify which shy individuals are unlikely to benefit from Internet use. While on-line social interaction may expand a shy individual's social network, if newly developed social competencies and contacts are not integrated into off-line life the individual may obtain little benefit from Internet use. The development of therapeutic strategies that will aid in the transference of on-line communication skills to off-line settings is important for this group.

The development of new measure(s) of psychopathology associated with Internet use is required. As previously outlined, the measure used in this study is not suitable for research or diagnostic purposes. Care needs to be taken to differentiate Internet-related psychopathology that represents symptomatology of pre-existing conditions from pathological use that stems from the use of the Internet itself.

8.6 Summary of Study Three

In summary, this study examined the bi-directional effects of personality characteristics and CMC for new Internet users over their first six months on-line. New Internet users explored a range of virtual environments in their first few months on-line before settling to use email, the WWW, and typically one or two other virtual environments. While hours spent on-line remained stable across the first six months, the time spent in specific virtual environments was subject to change.

Personality measures were poor predictors of time spent in both specific types of virtual environments and on-line in general. For the majority, 'Internet addiction' represented a temporary state rather than an enduring problem.

There were marked differences in self-disclosure, shyness, and sociability in on- and off-line settings. People who experienced social discomfort in off-line settings were more comfortable interacting on-line. They were more sociable, less shy and made more positive self-disclosures. For some individuals positive on-line social interactions resulted in increased social comfort in off-line social settings. The

implications of these findings when seen in conjunction with the findings from Study One and Study Two will be further developed in the next chapter.

CHAPTER 9. GENERAL DISCUSSION

9.1 Introduction

The overall aim of this thesis was to examine how characteristics of the individual interact with characteristics of the CMC medium to enable socio-emotional communication and behaviour in virtual environments. Towards this aim, three studies were conducted that examined social interaction within MOOs (Study One), IRC (Study Two) and across virtual environments (Study Three). This chapter integrates and evaluates the findings from the three studies. First, the processes of social interaction within the synchronous text-based virtual environments of MOOs and IRC are examined with the broader framework of Internet use over time and a decision pathway for the use of virtual environments is developed. Second, the questions raised in the literature review as requiring further research are re-examined in light of the findings from the three studies. The wider implications of this research are discussed and suggestions made for future research.

9.2 Integration of studies

Studies One, Two and Three varied in both research settings, research participants and the methodological and sampling procedures used. As a first step to integrating the findings of the studies it is useful to compare the patterns of on-line use self-reported by research participants across the studies.

9.2.1 Comparison of usage patterns

In order to situate the models of social interaction developed in MOOs (Study One) and IRC (Study Two) within the broader context of Internet use over time in general (Study Three), the usage patterns of research participants across the three studies are compared. Study Three charted the progress of 70 new Internet users across virtual environments. Upon gaining Internet access, individuals explored a range of virtual environments in their first few months on-line before settling to use email, the WWW, and typically one or two other virtual environments. Only three individuals (5%) had used MUDs (the family of virtual environments to which MOOs belong), and of these none had used MUDS across all three survey points. While the majority of survey respondents (61.67%) had used IRC at least once

during the 6 month survey period, only 10% reported using IRC across all three survey points. These figures suggest that the use of MUDDS, including MOOs, is not a common activity for new Internet users. In contrast, the majority of new users may at least try Internet Relay Chat, though few may continue use over the long term.

For new Internet users in Study 3 the hours spent on-line remained stable across the first six months, although the time spent in specific virtual environments was subject to change. Personality measures were poor predictors of time spent in both specific types of virtual environments and on-line in general. On average, new Internet users spent 13 to 14 hours per week on-line. This contrasts with usage patterns of research participants in the two previous studies. Research participants spent an average of 25 hours per week on MOOs and 22 hours per week on IRC alone. Long-term users in MOOs and IRC reported an initial period of high usage followed by a decline.

The comparison of usage patterns highlights the differences in research participants across the three studies. Research participants in Study One and Study Two are not representative of new Internet users who are unlikely to explore MOOs or use IRC on an ongoing basis. The research participants in Studies One and Two may best be characterised as long-term users who spend large periods of time on-line in the virtual environment of their choice.

Within the context of overall Internet use, the exploration of synchronous text-based virtual environments such as MOOs and IRC emerge as activities secondary to the more popular virtual environments of email and the WWW, and are engaged in by only a minority of Internet users.

9.2.2 Decision Pathway for Use of Virtual Environments

Based on the usage patterns across the three studies a decision pathway for the use of virtual environments was developed. This is depicted graphically in Figure 9.1. Individuals typically gain Internet access at home, work or through an educational institution. In the past, socio-economic status and educational level have restricted Internet access. While this is beginning to change in western countries, the majority of the world's population still does not have Internet access.

Once access has been obtained, the individual can explore a range of virtual environments. Based upon the initial exploration, each virtual environment is evaluated in light of the individual's needs and desires. Where the evaluation is negative, use of the virtual environment is discontinued. Where the evaluation is

positive, the virtual environment may be used on an ongoing basis. The time taken to learn to use each new virtual environment is dependent upon the individual's skills, the complexity of the new environment, and its similarity to virtual environments previously used. Over time reevaluations of the virtual environments occur and use discontinued where negative evaluations are made.

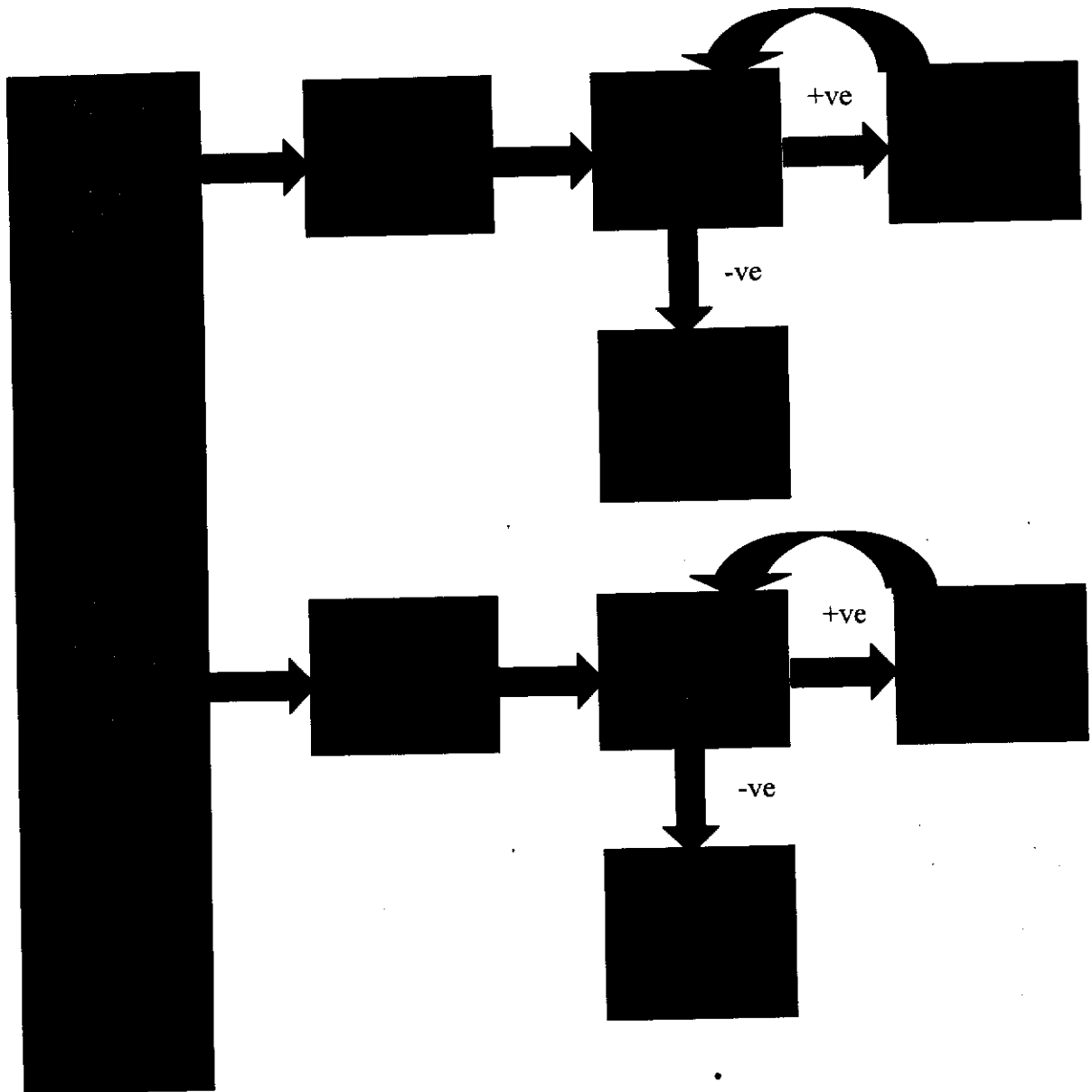


Figure 9.1. Decision pathway for use of virtual environments.

In the early stages of Internet use several virtual environments may be explored and evaluated. Rather than systematically evaluating the range of virtual environments accessible over the Internet, individuals are most likely to explore those environments that they have heard about through friends, family and colleagues, or read about in the press or on the Internet. Following the initial selection of virtual environments of interest, other virtual environments may be assessed when they are brought to the attention of the individual. The time spent in specific virtual environments may fluctuate according to how well each meets the needs and desires of the individual.

9.2.2.1 Application of the Decision Pathway to Specific Groups

The decision pathway for use of virtual environments can be applied to the three groups of Internet users that were the focus of the three studies presented in this thesis: MOO users (Study One), IRC users (Study Two) and new Internet users (Study Three). The application of the decision pathway for each group is outlined below.

The research participants in Study One were individuals who were using MOOs, ranging in experience from new MOO users to experienced MOO users. Individuals were most likely to have found out about the existence of MOOs through personal contact with friends, family or fellow students. Other ways of finding out about MOOs contained an element of serendipity. Individuals came across MOO related information on the Internet or in written material while looking for something else. The four stages of the decision pathway for exploring virtual environments (exploration of virtual environment, evaluation of virtual environment, ongoing use of virtual environment and virtual environment discarded) can be directly mapped to the Stage Model of MOOing presented in Study One. Exploration of the virtual environment equates to Stage Three (Exploration/ Immersion) in MOOs. Evaluation of the virtual environment equates to Stages Four (Enchantment/Addiction) and Five (Disillusionment). Ongoing use of the Virtual Environment equates to Stages Six (Equilibrium) and Seven (Integration of MOO and 'Real Life'). The discarding of the virtual environment equates to two possible pathways out of disillusionment: MOOicide and the gradual reduction in MOOing which ultimately ends in the individual ceasing MOO use.

The research participants in Study Two were individuals who were using IRC and ranged from new users to highly experienced long term users. As with MOO

users, the most common way of finding out about IRC was through personal contact (family members, friends, colleagues and students). Other methods included watching others use IRC, finding out about IRC on-line, in manuals or through experimentation. Again, the four stages of the decision pathway for exploring virtual environments can be directly mapped to the Stage Model of IRC use presented in Study Two. Exploration and evaluation of the virtual environment equates to Stage Three (IRC as novelty). Ongoing use of the Virtual Environment equates to Stages Four (IRC as relationships) and Five (IRC as communication device). The discarding of the virtual environment equates to the pathway from Stage 3 representing loss of interest in IRC, and the pathway from Stage 4a (IRC as addiction) representing an individual's desire to regain control over their time.

The research participants in Study Three were individuals who had obtained their first Internet account in the month prior to consenting to participate in the study. For this group of new Internet users the decision pathway for use of virtual environments can be used to interpret the continued use of some virtual environments and the decline in use of other virtual environments over time. For new Internet users the most commonly used environments in the first month on-line were email and the WWW. These are the two most widely publicised virtual applications, and as such are those most likely to have been known about by the new Internet users. Use of email and the WWW continued throughout the survey period. Using the decision pathway, these results would be explained by new Internet users exploring, evaluating positively, and continuing to use these virtual environments. Other virtual environments may have been explored, evaluated negatively and discarded as virtual environments not worthy of further use. For example, the percentage of new Internet users who explored IRC was 61.67%. However, only just over half of these individuals (55.81%) were still using IRC during their seventh month on-line.

Taking the three studies together, a pattern emerges of the exploration, evaluation, use and discarding of virtual environments. New Internet users typically use email and the WWW as base virtual environments, and explore a range of other virtual environments. Where a new virtual environment is positively evaluated it is retained for ongoing use. Where a new virtual environment is negatively evaluated use is discontinued. Similarly, the new MOO and IRC users interviewed in Studies One and Two were in the exploration stage of virtual environment use, and after

evaluation may go on to become regular long term users, or alternatively may become non-users. The long-term MOO and IRC users interviewed in Studies One and Two have explored a range of virtual environments, positively evaluated MOOs or IRC and maintain ongoing use of these environments.

9.2.3 Specific models of use of virtual environments

The decision pathway for use of virtual environments specifies how individuals select virtual environments for use. Actual use of specific virtual environments may vary according to the sensory components and synchronicity offered by the environment. Use may also vary according to the specific contexts the virtual environments provide. This was demonstrated in the stage models of use developed in this thesis for MOOs and IRC.

A comparison of the stage models developed in MOOs and IRC revealed many similarities in social interaction across the two environments. Individuals were motivated to use these virtual environments primarily for the opportunities for social interaction they offered. Initial forays into new environments involved learning to use the client, jargon, netiquette, and norms for behaviour. Social interaction was characterised by superficial conversations with many people in public areas. Over time, social interaction changed to communicating in depth with a smaller group in private areas. Relationships were characterised by high levels of self-disclosure and intimacy. Individuals developed a sense of belonging and sense of community and an intense involvement and interest in on-line life. For some, this resulted in a period where time on-line was preferred to time off-line, and was sometimes described in terms of feeling 'addicted'. Over time, on- and off-line life and identities merged. Relationships formed on-line frequently transferred to off-line settings, and distinctions between on- and off-line friends disappeared. Virtual environments became used primarily as communication devices.

Despite these similarities between IRC and MOO stage models, there were two major differences. First, early use of IRC was characterised by having fun playing with a new toy, while in MOOs the focus was on creating a virtual self and environment. Second, on MOOs there was evidence for a cycling through of periods of enchantment and disillusionment before a state of equilibrium was reached. These differences are reflected in the basic social psychological processes found to underlie the stage models. While the basic social psychological process for IRC focussed on the ease of communication, the basic social psychological process for MOOs

represented the change in thinking about virtuality overtime from MOOs as a separate or alternative reality to an acceptance of MOOing as part of everyday life. MOOs evoke thinking about the nature of identity, reality and virtuality to a greater extent than does IRC. Underlying the differences in basic social psychological processes are contextual differences. MOOs provide the architecture for the development and permanency of characters and objects, while IRC provides an ephemeral setting for communication.

9.2.4 Accounting for differences across studies

What can account for the differences in findings across the studies?

Differences between studies in contexts, individuals and methodology may explain the discrepancies.

Different contexts may elicit different behaviours. The first two studies examined behaviour within two specific social synchronous text-based virtual environments, while Study Three was broader in scope, assessing behaviour across virtual environments that included, but were not limited to, social synchronous text-based virtual environments. Differing results between the first two and the third studies may be partially attributable to broad differences in the environments (Study Three included graphic-, audio-, video- and text-based environments; and both synchronous and asynchronous environments). The smaller differences found between the first two studies may be due to specific contextual differences.

Characteristics of the research participants may also contribute to the differences found. In this series of studies, research participants came from 3 sub-populations of Internet users. As outlined above, research participants in the third study had less experience on-line and spent less hours on-line than research participants in the previous studies. In addition, while the personality characteristics measured in Study Three were not good predictors of the types of virtual environments individuals used, it is possible that an aspect of personality not measured may differentiate those who are attracted to use social synchronous text-based virtual environments such as MOOs and IRC from those who are not.

Differences in the methodology used between the first two and final studies may also have contributed to differences in results. Studies One and Two used Grounded Theory methodology and were heavily reliant on individuals introspecting about their past and present on-line behaviour and verbalising (or typing) responses to open-ended questions. In contrast, Study Three required individuals to complete a

series of questionnaires that consistently predominantly of scales with set response formats.

Future research using a range of contexts, research participants and methodologies will further tease out the similarities and differences in social interaction across virtual environments.

9.3 Re-examining areas identified as requiring further research

In the literature review (Chapter 2) areas requiring further research were identified and presented as a series of questions. These areas (**bolded**) and questions (*italicised*) will now be re-examined in light of the findings from the three studies.

9.3.1 Self Presentation and Identity

- *To what degree do individuals identify with their on-line identities?*

Studies One and Two examined the relationship between on- and off-line identities. The majority strongly identified with their on-line identities, in many cases making no distinction between on- and off-line identities. IRC users were more likely than MOOers not to make a distinction between on and off-line identities. However, some individuals reported little or no identification with on-line identities. Others felt their on-line identities represented aspects of themselves, or idealised versions of themselves.

- *How do on-line identities evolve over time?*

The evolution of on-line identities over time is affected by the level of identification and degree of fit between on- and off-line identities. Where there is strong identification with on-line identities, and a close match between on- and off-line identities, changes in on-line identities are likely to reflect changes in off-line identities. In contrast, where individuals adopt on-line identities that are not consistent with their off-line identities, either on- or off-line identities are likely to evolve over time. For some individuals interviewed, on-line identities evolved to become more like off-line identities, resulting in a closer identification with the character. However, others reported that off-line identities evolved to become more like on-line identities. In either case, the result is a merging of on- and off-line identities and a strengthening of identification with the on-line identity.

- *How do individuals conceptualise the relationship between their off-line and on-line identities?*

Individuals vary in the way they conceptualise the relationship between their off-line and on-line identities. As stated above, many IRC users do not make any distinction between their on-and off-line identities. Others view their on-line identities as more extroverted or open versions of their everyday selves. At the other extreme are individuals who view their on-line identities as expendable and attach little meaning to them.

In summary, individuals vary in their levels of identification with on-line identities, which are not static, but subject to change over time. The relationship between on-and off-line identities is dependent upon both the individual's level of identification with an on-line character and the degree to which on- and off-line identities have merged over time. Identity exploration was more prevalent in MOOs than on IRC, with the act of character creation in MOOs invoking reflection upon the nature of identity. These findings highlight the potential for text-based virtual environments to provide a safe context for identity moratorium periods where individuals can experiment with aspects of self and identity.

9.3.2 Disinhibited Behaviour

Consistent with previous research there was evidence of both negative (Dibbell, 1993; Dery, 1994; Gilbert, 1997; Lea, O'Shea, Fung & Spears, 1992; Mabry, 1997; McRae, 1995; Thompsen & Foulger, 1996, Van Gelder, 1995; Wang, 1996; Whitelaw, 1996; Witmer, 1997) and positive (Braithwaite, Waldron & Finn, 1999; Dunham et al., 1998; Finn, 1999; Glasser Das, 1999; McKenna & Bargh, 1998; North, 1998; Salem & Bogat, 1997; Salem et al., 1997; Sharf, 1997; Sproull & Faraj, 1995, 1997; Winzelberg, 1997) disinhibited behaviours in Studies One and Two.

- *How do individuals account for their own disinhibited behaviour?*

Users of MOOs and IRC attributed their own disinhibited behaviour to a range of factors. Anonymity was seen as reducing the personal consequences of disinhibited behaviour. The physical absence of bodies and control over self-presentation reduced individuals' concerns over their appearance and lessened inhibitions. The absence of eye contact and non-verbal feedback cues reduced perceptions of being evaluated. When combined, these factors provide the perception of on-line virtual environments as safe places to interact with others and engage in disinhibited behaviours.

Higher rates of negative disinhibited behaviour were reported in IRC than in MOOs. This may be at least partially attributable to a reduced sense of accountability associated with the ephemeral nature of nicknames on IRC. In contrast MOO characters are based on a unique object number that cannot be changed, providing a level of pseudonymous identity even when character names are changed.

- *How do individuals cope with the disinhibited behaviours of others?*

Individuals use a range of technical and social means of coping with the negative disinhibited behaviours of other virtual users. Initially, most offenders are asked politely to stop. Where this is not successful technical means may be used to control the behaviour. Program commands are available on both MOOs and IRC that can be used to block the messages of offending individuals (@gag on MOOs, /ignore on IRC), remove them from the immediate environment (@eject on MOOs, /kick on IRC) and block their return (@lock on MOOs, /ban on IRC). Over time, repeated negative disinhibited behaviours by others may erode an individual's perception of the safety of the virtual environment. The individual may respond by confining their activities to private (rather than public) spaces, discouraging interaction with new users, cutting back hours spent within the virtual environment, or withdrawing from the virtual environment altogether.

9.3.3 Formation of Relationships

- *In the absence of physical proximity and cues to physical attractiveness, how are users of text-based virtual environments attracted to one another?*

Users of text-based virtual environments are attracted to one another on the basis of names, characters' descriptions (MOOs only), and the content of initial social interactions. While physical attractiveness does not determine attraction when meeting on-line, it may re-appear as an issue when individuals involved in a romantic relationship on-line choose to exchange photographs, use Internet videoconferencing applications or meet off-line. Where physical appearance does not meet the romantic partner's expectations attraction may diminish.

- *What types of scripts apply to social interaction and the development of relationships in text-based virtual environments?*

In both MOOs and IRC the social scripts for relationship development were similar. Individuals typically meet in public spaces of the virtual environment. Individuals freely communicate within these public spaces without the off-line reservations against talking to strangers. Where one individual identifies another as a

person they would like to get to know better, electronic surveillance may be used to alert the individual when the other logs into the virtual environment. As relationships develop social interaction moves from public to private areas of the virtual environment. The content of interactions moves from general topics, to the exchange of demographic information and finally personal discussion. Relationships in text-based virtual environments characteristically develop quickly, with personal topics broached earlier in the relationship.

A social script also applies to the movement of relationships outside the text-based virtual environment of origin. At some point in the relationship development the question is raised about meeting in off-line settings. The stages of transfer to off-line settings typically involve the exchange of emails, use of other virtual environments, telephone conversation and the exchange of letters, presents or photographs (especially important in romantic relationships). Each stage is accompanied by an increasing warrant of identities.

9.3.4 'Addiction'

No specific questions were raised on 'Internet Addiction Disorder' in the literature review given the newness of the area of research and the controversy surrounding the very existence of 'Internet Addiction Disorder'. The findings from the three studies presented in this thesis provide strong support for extended periods of Internet use as a phase rather than as an enduring addiction or mental illness requiring treatment. In Studies One and Two self-reports of 'addiction' were associated with a stage of MOO/IRC use that was characterised by hyperpersonal communication. The models developed posited 'addiction' as a normative stage of online use that many individuals will pass through. Further support for 'addiction' as a phase was provided in Study Three, where the majority of individuals meeting the criteria for 'Internet Addiction Disorder' at any one point in time did not meet the criteria at later points in time.

For some individuals extended periods of on-line use may represent a coping strategy for dealing with (or avoiding) an off-line problem or mental illness. For example, in Study Three depressed individuals were more likely than other individuals to meet Young's (1996b) criteria for 'Internet Addiction Disorder'. As such, it may best be conceptualised as a symptom of underlying distress rather than as a disorder in its own right. Further research is required to determine if extended

Internet use is a healthy or harmful form of coping behaviour for individuals with pre-existing conditions.

'Internet Addiction Disorder' research is plagued by a lack of consensus over the existence, name and definition of Internet addiction, and the absence of a reliable measure of the construct. Study Three used Young's (1996a) 'Internet Addiction Disorder Questionnaire'. The problems identified in this study with both the preface and individual items of this questionnaire mean it cannot be recommended for either research or diagnostic purposes.

9.3.5 Sense of Community

- *To what degree do individuals experience a sense of community in text-based virtual environments?*

In both MOOs and IRC individuals varied in the degree of sense of community they experienced on-line. This ranged from experiencing no sense of community to a very strong sense of community. However, the majority of participants experienced at least some sense of community in the virtual environment of their choice.

- *At what level of virtual environments do individuals experience a sense of community?*

Individuals varied in the level of virtual environments in which they experienced a sense of community. Within IRC, sense of community may be experienced within the home channel or within the IRC network as a whole. In MOOs, sense of community may be experienced across MOOs, within a MOO, or within smaller groupings within a MOO. Within both settings, sense of community was most commonly reported and strongest for the virtual 'home' of the user (i.e. home channel or home MOO).

- *What gives text-based virtual environments a sense of community?*

Participants in virtual environments tended to use their conception of community and sense of community in 'real-life' as the basis for judging sense of community on MOOs and IRC. The experience of sense of community develops over time as the individual forms relationship with other participants of the virtual environment.

9.3.6 Telepresence

- *What degree of telepresence do users experience in text-based virtual environments?*

The degree of telepresence experienced by users of MOOs and IRC ranged from none to total engagement, with the majority of users experiencing at least a degree of telepresence. Across all types of virtual environments, the percentage of individuals experiencing telepresence may be lower than in the social synchronous text-based virtual environments of MOOs and IRC. In Study Three only 42.9% of individuals reported experiencing telepresence after 3 months of Internet use, and this had dropped to 32.2% after 6 months of Internet use.

- *What factors affect the degree of telepresence experienced?*

The results from the three studies reveal that telepresence is not a constant state, but fluctuates over time. Environmental and personal factors interact to determine the level of telepresence experienced by the individual at any point in time. Activity in the physical environment, the physical comfort of the user and level of involvement and interest in on-line activity affect telepresence. In addition, the results from Study Three suggest that an individual's absorption ability may affect the ability to experience telepresence in early stages of on-line use.

- *What effect does the presence, or absence, of telepresence have on the processes of social interaction?*

Telepresence enhances the process of social interaction on-line. Individuals who experience telepresence become absorbed in the social interaction process, experiencing 'co-presence' with their communication partners. Frequently individuals who experience telepresence are able to use mental imagery to picture their communication partners, hear their voices, and see their actions. While telepresence enhances social interaction on-line, it is not an essential requirement for successful social interaction on-line.

9.3.7 Use of Virtual Environments over Time

- *How does Internet use change over time?*

Changes in Internet use over time have been detailed in section 9.2 above.

- *What effect does Internet use have on psychological well-being?*

The findings from the three studies suggest that Internet use can have a range of positive and negative effects on psychological well-being. Negative impacts of on-

line use on off-line life were predominantly associated with the time spent on-line displacing time previously spent on off-line activities such as sleep, work, study, leisure activities, and interacting with family and friends. As a result of the displacement of time relationships with friends and family could become strained and employment and studies could be jeopardised. These negative effects were especially prevalent during 'addiction' stages in Studies One and Two.

The potential positive impacts of Internet use on psychological well-being were significant. Positive effects of Internet use on off-line life were recorded across the three studies. Social interaction on-line can provided an avenue for the outlet of emotions, the development of new relationships, and the exploration of self and identity. Some individuals used on-line social interaction as a form of escapism or coping mechanism for depression or other off-line problems.

Virtual environments provide an atmosphere conducive to social interaction. Across the three studies, individuals self-reported differences in their on- and off-line social interaction behaviours. In the first two studies, MOOs and IRC were perceived by users as safe environments for social interaction. Control over self-presentation through the use of characters (MOOs) or 'nicks' (IRC) enabled users to interact freely without fear of off-line consequences. Self-disclosure was high, relationships formed quickly and communication reached hyperpersonal levels. In Study Three, changes in behaviour between on- and off-line settings were associated with the personality characteristics of the individual. Low-sociable individuals were more sociable on-line, while high-sociable individuals were less sociable on-line. Shy individuals made more positive self-disclosures and were less shy on-line, while non-shy individuals did not vary in their shyness across on- and off-line settings.

As a result of successful on-line social interaction some individuals enhanced their interpersonal skills and confidence in their social skills. The studies presented in this thesis provide both qualitative and empirical support for a reduction in shyness following extended periods of Internet use. The transfer of relationships from on-line to off-line settings may aid this process by providing shy individuals with face-to-face communication partners with whom they have already established rapport.

The positive effects on well-being found across the three studies are contrary to the social disengagement proposed by Kraut et al. (1998), but are consistent with findings from other longitudinal studies (Bier et al., 1996; Dunham et al., 1998) that have reported positive effects of Internet use. Over time, Internet use becomes

integrated into the lives of users. The Internet functions as a communication tool for business and personal life, in addition to providing a readily accessible repository of information.

9.4 Implications of Research

The research presented in this thesis has painted a broad sketch of Internet use for new users over their first six months on-line. In addition, detailed models of changes in social interaction over time within two specific virtual environments were developed. This is the first time normative models of on-line social interaction have been presented. Prior research that labeled some on-line behaviours as psychopathological (e.g., the literature on Internet addiction) has been hampered by the absence of normative data against which to compare the 'psychopathology' described. Typically, these studies have used self-identified 'Internet addicts' or populations considered at risk for 'Internet addiction' (e.g., students). Without normative models of Internet use to provide a comparison, individuals may have been incorrectly classified as mentally ill and requiring treatment. For example, the findings from the research presented here suggests that many of the individuals classified as suffering from Internet Addiction Disorder may in fact merely have been passing through a normative stage of Internet use. This calls into question both the assessment methods used to diagnose 'Internet Addiction Disorder' and the need for treatment programs.

Models of normative Internet use may be especially helpful to psychologists and other therapists who are working with individuals who are presenting with Internet related problems, or family members who are concerned about an individual's Internet use. Knowledge of the typical stages of Internet use will provide the background against which to assess an individual's on-line behaviour. Research findings of an association between extended or problematic Internet use and depression (Study 3; Young, 1997; Young & Rodgers, 1998b) highlight the need for therapists to examine underlying psychological or social problems, rather than focussing on Internet use alone as the problem.

A major finding of this research is that participation in virtual environments has the potential to enhance psychological well-being for shy individuals. Across the studies, shy individuals reported reduced shyness in on-line settings, and some were able to transfer their new social competencies to off-line settings. Lebow (1998)

contended that virtual participation without a therapist is no substitute for therapy, resulting in greater risks and smaller gains. The results of the research presented in this thesis suggest that for many shy individuals, shyness may decrease as a result of on-line participation without the need for a therapist or treatment program.

Some shy individuals did not report decreased shyness off-line as a result of successful on-line social interactions. These individuals may need the help of a therapist to aid the transfer of socially competent behaviours to off-line settings. There is a relatively unexplored potential for the use of virtual environments and CMC as part of shyness treatment programs. For computer-literate shy individuals, text-based virtual environments may provide a non-threatening environment in which to rehearse social skills as part of social skills training or a graduated exposure treatment. Some shy individuals who will not seek treatment in off-line settings may be willing to engage in on-line therapy, with the potential for on-line therapy to act as a precursor to off-line therapy where necessary.

Which virtual environments can best be utilised for on-line shyness treatment programs? The findings from the research presented in this thesis suggest that synchronous text-based virtual environments may be ideally suited for social skills training and practice with shy individuals. Sempsey (1998a) argued that MUDs promote disinhibition, equality of participation and lower degrees of group conformity, and may provide acceptable environments for on-line psychotherapy. King and Moreggi (1998) provided a hypothetical model of how an on-line support group for shyness could be set up utilising a combination of MUDs, email and the WWW. These options warrant further research.

9.5 Limitations

This section addresses limitations to the research as a whole that affect the generalisability of findings. The limitations specific to each study have been addressed in previous chapters.

There are three major limitations of this research. First, the majority of data in this research was collected on-line. While the results of early studies (e.g., Buchanan & Smith, 1999; Pasveer & Ellard, 1998; Smith & Leigh, 1997; Stanton, 1998) examining the comparability of on-and off-line data collection are encouraging, the use of on-line data collection methods require further study before findings can be interpreted with confidence. Second, while attempting to provide a picture of stages

of Internet use over time, this research was limited by collecting data over a six month period in Study 3, and retrospective data in the first two studies. Further changes in the use of virtual environments may occur after the first six months on-line. Third, this research examined social interaction within two social synchronous text-based virtual environments. It is likely that there will be small variations to the stages of social interaction within other social synchronous text-based virtual environments, and larger differences in other types of virtual environments. Because of these limitations, further research is required to replicate and extend the results obtained in this series of studies.

9.6 Future Research

The studies presented in this thesis were conducted between 1996 and 1999, and provide a picture of Internet use during this period. The Internet has experienced exponential growth and is rapidly changing. Predominantly text-based virtual environments are being supplemented and replaced by audio, graphical and video interfaces. How people use the net will change as the available bandwidth increases and these interfaces become more prevalent. Further research is required to identify the changes in social interaction that occur with the addition of each sensory component, and the combination of components. In addition, research is required to examine social interaction within a wide range of virtual environments in order to differentiate context-specific and generic components of computer-mediated communication.

The composition of Internet users is also changing. The falling prices of computer equipment are making Internet access affordable for more people. Many educational institutions from kindergartens to universities are now providing Internet access for students. Children growing up with Internet access may not struggle with the issues of reality and virtuality that adult users have in the past. Further research is required to examine children's social interactions on-line. More specific areas for further research were identified following each study.

9.7 Summary

In summary, this thesis presented a series of three studies examining Internet use. The progression of new Internet users through text-based virtual environments was charted and a decision pathway for use of virtual environments developed. Stage

models of the use of two social synchronous virtual environments, MOOs and IRC, were also developed. The potential for participation in virtual environments to enhance psychological well-being for individuals who experience social discomfort in off-line settings was highlighted. Limitations of the research were discussed and suggestions made for future research.

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APPENDIX I: GLOSSARY OF INTERNET TERMS AND ABBREVIATIONS

#	symbol used for an IRC channel
auto-ops	to be automatically assigned operator status upon joining an IRC channel
bashes	parties where MOOers meet face-to-face
bf	boyfriend
BBS	bulletin-board system: dedicated host computer system
BDSM	bondage, discipline, sadism and masochism
bots	robots on IRC channels
char	character
CMC	computer-mediated communication
desc	description of a character
DCC	Direct Client to Client protocol enabling direct communication between computers
elsemoo	MOO(s) other than the one currently being used
emoticons	icons created from ASCII text used to express emotions
flaming	computer-mediated text containing extreme public ridicule or put-downs
flood	to send a stream of unwanted text to another user or channel on IRC
fo's	feature objects in MOOs
F2F	face-to-face
gf	girlfriend
gopher	a search and retrieval program for the Internet
/ignore	IRC command used to block all messages from a specified user
imho	in my humble opinion
imo	in my opinion
ipl	in 'physical life'
ipr	in 'physical reality'
IRC	Internet Relay Chat
irl	in 'real life'
ivr	in 'virtual reality'
kicked	to be forcibly removed from channel

log off	to exit a computer program
/me	IRC command used to perform an action or emotion
/msg	IRC command used to send a private message to a specified individual
messaging	sending a private message on IRC
MOO	Multi User Dungeon/Dimension, Object-Oriented
morph	alternative identity
morphing	changing between identities
MUD	Multi User Dungeon/Dimension
multimooing	actively using more than one MOO simultaneously
MUSH	Multi-User Shared Hallucination (a type of MUD)
netiquette	the etiquette associated with using the Internet
netsex	exchange of sexually-oriented messages, sometimes accompanied by masturbation
net.sleazing	the practise of trying to attract other IRCers for sexual purposes
newbie	new Internet user
nick	nickname used on IRC
off-line	not connected to the Internet
on-line	connected to the Internet
ops	operator status on an IRC channel
pic	picture or photograph
pc lab	computing laboratory
ppl	people
pr	physical reality
rl	'real life' (as opposed to life on-line)
rpg	role-play gaming
rt	'real time'
talker	a type of chat environment
telnet	a computer program used to log on to a remote computer
VR	virtual reality
wizards	administrators on MOOs

APPENDIX II: CHARACTER AND ROOM DESCRIPTION ON MOOS FOR RESEARCH PURPOSES

Character name: Questioner

Character description:

Questioner raises her head from the keyboard to smile at you. She is probably going to ask you lots of questions about your MOOing experiences...

She is awake and looks alert.*

Room Name: Questioner's Retreat

Room Description:

The place where Questioner retires to when she wants to think, to study and to work. A comfortable room with a lived in feel to it. Large open windows allow the sunshine and fresh air to stream in. Old deep seated armchairs surround a low circular coffee table. Wall to wall bookcases are crammed with books and files. The smell of freshly ground coffee permeates the air.**

Key:

*Description seen by MOOer when they use the 'Look Questioner' command. The name 'Questioner' was selected because other obvious names such as 'Researcher' were already in use.

**Room description seen when first entering the room, and subsequently if the 'Look' command is used.

APPENDIX III: SEMI STRUCTURED INTERVIEW GUIDE FOR MOOs*

Why use MOOs?

- How did you discover MOOing?
- How long ago did you start using MOOs?
- What initially attracted to using the MOO?
- What is it about the MOO that keeps you MOOing?

Activities on MOOs

- How do you spend your time on the MOO?
- Obtain breakdown of activities and perceived importance
- How many MOOs do you use?

Relationships on MOOs

- How do you decide who you are going to talk to on the MOO?
- How do you meet new MOOers?
- What attracts you to talk to someone?
- When you first meet someone on the MOO what do you talk about?
- How do you decide if you will talk to a new MOOer again?
- Does the type of conversation/interaction change the longer you know a MOOer? In what way?
- How would you compare your way of interacting with people on MOOs in comparison to how you interact with people off-line?
- What type of relationships have you formed on the MOO?
- How important are your MOO-relationships to you?
- How do your MOO relationships compare to 'real-life' relationships?
- Have you met any of your MOO friends in 'real life'? If yes, were they as expected?
- Did your relationship change after meeting in 'real life'?

Sense of Community

- Do you think there is a sense of community on MOOs?
- If yes, what gives your MOO a sense of community?
- Do different MOOs have the same sense of community?

MOO Characters

- How many MOO characters do you have?
- How did you choose the name and description for each of your characters?
- To what extent do you identify with your MOO characters?
- Have the names and descriptions of your MOO characters changed over time?
- How similar is the behaviour of each MOO character to your own RL behaviour?
- Why have you chosen to have multiple/single MOO character(s)?
- How do you decide which MOO character to use?
- Are different morphs/characters used for different things?
- Which of your MOO characters best represents the 'real' you?
- How does the personality of your MOO character differ from your 'real life' personality?

Perceptions of communication partners

- When you are chatting with others in MOOs, how do you conceptualise the other person?

Use of computer-mediated communication

- What are the advantages of using MOOs?
- What are the disadvantages of using MOOs?
- What do you like about MOOing?
- What do you hate about MOOing?

Telepresence:

- When you are MOOing, where are you?
- Are you more aware of the self-at-keyboard or the self on the MOO?
- Are you conscious of typing and reading while MOOing?
- What mental images do you have of MOOs?
- Do you 'see' what is appearing in words on the keyboard in front of you?

Integration of net life and 'real life'

- Are net and 'real life' kept separate, or integrated?
- Conflicts between net and 'real-life'?
- Impact on family/work/leisure time/friendships?
- Has 'real life' personality/behaviour changed because of net use?

Current usage

- How many hours per week do you spend on the computer?
- Division between work/study and social usage of computers?
- Computer courses completed?
- Years of experience computing?
- Self-rating of competence level?

Location when MOOing

- Where do you MOO from?
- Who else is present while you use MOOs?

Demographic information:

- Gender
- Age
- Education

- Occupation
- Country

Close:

- Thank for time and patience in answering questions and sharing experiences.
- Do you have any questions you would like to ask me?
- Would you like to make any additional comments about MOOing?

*Used as a guide for initial interviews only.

**APPENDIX IV: PARTIAL LOG OF AN INTERVIEW CONDUCTED ON A
MOO***

You say, "I'd like to start by asking how you discovered MOOing"

X says, "Hmm, well I think around 1994 or 1993 there was an article in the Good Weekend [smh supplement], which was a reprint of the Village Voice article on the Mr. Bungle incident. I'm pretty sure it included a telnet address."

Questioner nods

You say, "Did you start MOOing then?"

X says, "I think I left it for a month or so, and then guested onto Lambda. At that time the connection character creation was disabled, but I recieved a character immediatly when I requested one as a guest."

You say, "What was it about MOOing that initially attracted you?"

X says, "Well I had been vaguely fiddling around with a vax/vms account trying to reach US sites of all sorts, mainly phone sites. I was into BBSing as the local scene had 3 or 4 good boards. I was completely unaware of the internet even though I had access from 1990."

Questioner nods

X says, "MOOing was important because it seemed like a reality where my persona was the important part, and not my physicality."

You say, "Is that what keeps you MOOing now?..or have your moitivations for MOOing changed?"

X says, "I'd say that I Moo for a number of reasons now. The play and game aspect has diminished, but I'm part of a community. I also Moo to stay sane, so that stress doesn't build up. Over the summer I also became involved in Moo politics."

Questioner nods

You say, "Do you think that MOO's ahve a sense of community?"

X says, "They definately do have a sense of community, but not for all participants. It seems that the best way to Moo is as if they were a community, you recieve more support."

You say, "What do you think gives MOOs a sense of community?"

X says, "I guess iRL its because people relate through language much more than through image or physically being there. Moo as a textual vr simulates the most important aspect of reality and allows people to invest themselves emotionally into the Moo."

Questioner nods

***Explanatory notes:**

- "You say" indicates questions asked by the researcher
- Research participant's MOOname changed to X.
- Text appears verbatim, including typographical errors.

APPENDIX V: PARTIAL LOG OF AN INTERVIEW CONDUCTED FACE-TO-FACE WITH A MOO USER*

Questioner: Would you like to tell me how you found out about MOOing?

X: Well I got my modem because my parents wanted to communicate with me by e-mail and then I was just talking to my friends on the Internet and, well just a friend I know and she said get a MOO, and I was like what was MOOing, sounds really weird doesn't it, so I said sure why not ..I logged on...and that's how I got on.

Questioner:: What was it that initially attracted you about MOOing?

X: ummm...The fact that you have got to speak to so many people from all these countries. The first night I was on I spoke to someone from America, from Portugal, France, Singapore and Australia. That was the first night and I just got stuck from there because there was just so many countries. You don't normally get that unless you are an international school.

Questioner: Is that what keeps you MOOing now, meeting people from different countries, or has your motivation changed?

X: Initially it was just to speak to all these different people and you just got such a different insight into other cultures. It is not something you get really often but after a while it was just basically to log on and talk to friends.

Questioner: What do your net friendships mean to you?

X: Some of them are real life friendships now because I have actually met them, some of them I don't really care about but some of them I would be pretty upset if I didn't talk to them. After a while boundaries between the virtual world and the real world kinda merge.

Questioner: You regard them as real life friends now, some of them?

X: Yep some of them, not many, you can get some real idiots on the net.

APPENDIX VI: RESEARCH PARTICIPANT INFORMATION SHEET FOR MOOS

MOOing and Chatting in Cyberspace

Thank-you for your interest in taking part in this research.

This research is being undertaken by Lynne Roberts, a PhD student in the School of Psychology at Curtin University of Technology in Western Australia.

PURPOSE OF RESEARCH:

The purpose of this research is to find out more about how individuals relate socially to others in cyber-space, and how this affects their 'real' lives. The Internet is expanding rapidly as more and more people choose to connect to the Internet from work, place of study or home. To date, little research has examined how people interact socially in cyberspace using computer-mediated communication. Little is known about how time spent in cyberspace interacting with others affects people's real lives and relationships.

BENEFITS OF THIS RESEARCH TO THE COMMUNITY

This research may have no direct benefits to you as an individual. However, the results of this research may benefit future users of virtual environments. An understanding of social relationships in cyberspace and the effect on individual's real lives can be used by therapists in counseling net users who are experiencing problems, and for the development of role-playing therapy in cyberspace.

WHAT WILL TAKING PART IN THE STUDY INVOLVE?

If you decide to take part in this research you will be interviewed by the researcher, Lynne Roberts, either in a MOO, on Internet Relay Chat, or in person. During the interview, you will be asked about your MOOing/chatting experiences. You are under no obligation to answer all questions. The interview will take approximately one hour.

Your involvement in this research is entirely voluntary. Your decision not to take part, or to withdraw from the study part way through may be done freely and will not affect your rights not the responsibilities of the researchers in any respect.

This study has been approved by the Curtin University Human Research Ethics Committee. It is not anticipated that your participation in this research will result in you experiencing any adverse effects.

CONFIDENTIALITY

All information supplied by you will be treated confidentially. You are not required to provide your name, address, telephone number or other personal 'real life' information. You will be asked about the names and identities you use in cyber-space, but these names will not appear in any reports written about this research.

NEED FURTHER INFORMATION?

Should you desire further details about the study, either before, during or after the study you may contact Lynne Roberts at the School of Psychology, Curtin University of Technology in Perth Western Australia. Lynne can be contacted by email at RobertsL@psychology.curtin.edu.au.

Thanks again for your interest. I look forward to interviewing you!

**APPENDIX VII: SEMI STRUCTURED INTERVIEW GUIDE
FOR IRC***

Why use IRC?

- How discovered IRC?
- How long ago started using IRC?
- What initially attracted to using IRC?
- What is it about IRC that keeps you using it?

Activities on IRC

- How do you spend your time on IRC?
- Obtain breakdown of activities and perceived importance
- Amount of time chatting one on one versus in groups
- Operator status in channels?
- How many IRC channels used?
- How do you decide what channel to join on IRC?
- How many channels do you use at the one time?

Relationships on IRC

- How do you decide who you are going to talk to on IRC?
- How do you meet new people on IRC?
- What attracts you to talk to someone?
- When you first meet someone on IRC what do you talk about?
- How do you decide if you will talk to an IRCer again?
- What makes you decide to message a person rather than stay in a channel?
- Does the type of conversation/interaction change the longer you know a IRCer? In what way?

- How would you compare your way of interacting with people on IRC with how you interact with people off-line?
- What type of relationships have you formed on IRC?
- How important are your IRC relationships to you?
- How do your IRC relationships compare to 'real-life' relationships?
- Have you met any of your IRC friends in 'real life'. If yes, were they as you expected?
- Did your relationship change after meeting in 'real life'?

Sense of Community

- Do you think there is a sense of community on your IRC channels?
- What gives your IRC channel a sense of community?
- Do different IRC channels have the same sense of community?

IRC Persona

- How many different nicks do you use?
- Why have you chosen to have multiple/single IRC names?
- How did you choose the name(s) to use?
- How do you decide which IRC name to use? Are different names used for different things?
- Have the names you used changed over time?
- To what extent do you identify with your IRC persona?
- What do you see as the relationship between your IRC persona and your 'real self'?
- Which of your IRC names best represents the 'real' you?
- How similar is your behaviour on IRC to your behaviour in 'real life'?
- How does the personality of your IRC character differ from your 'real life' personality?

Perceptions of Communication Partners

When you are chatting with others in IRC, how do you conceptualise the other person?

Use of Computer-Mediated Communication

What are the advantages of using IRC?

What are the disadvantages of using IRC?

What do you like about IRC?

What do you hate about IRC?

Telepresence

When you are chatting, where are you?

Are you more aware of the self-at-keyboard or the self on IRC?

Are you conscious of typing and reading while IRCing?

What mental image do you have of IRC?

Do you 'see' (image) what is appearing in words on the keyboard in front of you?

Integration Of Net Life And 'Real Life'

Are net and real life kept separate, or integrated?

Conflicts between net and real-life?

Impact on family/work/leisure time/friendships?

Has 'real life' personality/behaviour changed because of net use?

Current Usage

How many hours per week do you spend on IRC?

Has this amount changed during the period you have been using IRC?

How do you feel about the amount of time you spend on IRC?

Computer Usage

How many hours per week do you spend on the computer?

Division between work/study and social usage of computers?

Computer courses completed?

Years of experience computing?

Self-rating of competence level?

Location when using IRC

Where do you IRC from?

Who else is present while you use IRC?

Demographic Information

Gender

Age

Education

Occupation

Country

*Used as a guide for initial interviews only.

APPENDIX VIII: IRC NEWSGROUPS MONITORED DURING STUDY

THREE

All newsgroups in the alt.irc hierarchy including:

alt.irc

alt.irc.questions

alt.irc.recovery

APPENDIX IX: PARTIAL LOG OF AN INTERVIEW CONDUCTED FACE-TO-FACE WITH AN IRC USER*

Questioner: Perhaps you can start by telling me how you found out about IRC?

X: I was on the Net for about a year before I even realised what IRC was. I had a peek into IRC as soon as I got on cause I was trying everything I could and I wasn't terribly amused by it or whatever, especially since I had no idea that there were an Australia servers, I just sort of went to the US and found it all very remote and what not and just put it in the back shelf for a while, till I found out that a friend of mine in the states just got a copy of whatever IRC software I was using and said why don't you meet me on such and such a channel and we just had a chat. Then I discovered Australian channels, discovered channels that were particular to Perth and what not and thought it was cool. You know I'm gay. Did you see what channel I was on?

Questioner: I would have had it up at the time but didn't watch it.

X: (*channel names and references removed to protect privacy*) ... and in that sense it is a good way to meet people and have a chat. I sort of stumbled into the channel one day, just rummaging through channels, and just was totally amused by it, I just thought it was fantastic, they were really nice people, or at least that was the first impression I got, these people were also cool and what not. It was great fun, just talking on the channel at the time. I started meeting people and getting to know them better. I realise the various risks of IRC etc..that I suppose every newbie has to go through ..but once you get over that particular little hurdle it is a lot of fun.

Questioner: What do you define those risks to be?

X: Specific in the gay community, I suppose it is everywhere in that sense. There is so much lying ..at the moment on IRC it seems to be so easy to tell a certain lie or not be truthful about yourself, or say something that

isn't true, people seem to do it more often. At the same time, somehow you seem to either, you get a different impression of someone. Maybe it is truer impression than you get when you actually meet someone, or maybe it is the lack of inhibition they feel. People do change considerably from IRC to real life. As far as I am concerned I have noticed I am much more at ease about what I say on IRC, in real life it is kind of more complicated. On IRC you say what you think.

*Research participant's nickname changed to X.

APPENDIX X: PARTIAL LOG OF AN INTERVIEW ON IRC*

<Questione> OK :) ..How did you discover IRC?

[22:55] <X> through a firend of mine....i live in student housing, just one of my mates from there

Questione nods

<Questione> what initially attracted you to trying irc?

[22:56] <X> instantanious (free :) communication with all sorts of people, i think

<Questione> how long ago did you first try it?

[22:57] <X> about 6 months ago..

<Questione> has your motivation for using IRC changed since then?

[22:59] <X> sure, now i have made many friends, who i see in "real" life, who have become quite close. I also have quite a few good friends. The emphasis has changed to communicating to this handfull of people. Meeting new people all the time is also nice

Questione nods

<Questione> can you tell me about meeting people in RL that you met first on irc?

[23:02] <X> sure...well they werent quite what i was expecting, which is to be expected...um...but since i have gon out with them numerous times and have become alot closer. it give a much more intimate irc experience

<Questione> can you tell me in what ways the people weren't as you expected?

[23:04] <X> in every respect really...they werent what i thought they looked like at all, they didnt interact socially like i thought they might, but it was not a dissapointment because you cant go into these things thinking you will know the outcome of your meeting...mmm

Questione nods

<Questione> did the way you interacted with them on IRC change after meeting in RL?

[23:07] <X> well on irc its very easy to give somebody a hug or a kiss or whatever, but social constraints ...um..... discourage that kind of closeness of a stranger...

Questione nods

[23:07] <X> things just started a little 'fridged'

<Questione> how about when you communicate with them on irc now?

[23:09] <X> when on irc it help to be nice and charming cause its nice and easy, but know i know them i can just be myself :) (not that im not a nice charming person inb real life :)

Questione smiles

<Questione> how many people have you met in RL that you first met on irc?

[23:10] <X> four...to date

Questione nods

[23:11] <X> i have more i want too meet.....people that say "we must meet".,

***Explanatory notes:**

- <> indicates who is 'speaking'
- Research participant's nickname changed to X.
- Text appears verbatim, including typographical errors.

**APPENDIX XI: RESEARCH PARTICIPANT INFORMATION SHEET FOR
IRC**

MOOing and Chatting in Cyberspace

Thank-you for your interest in taking part in this research.

This research is being undertaken by Lynne Roberts, a PhD student in the School of Psychology at Curtin University of Technology in Western Australia.

PURPOSE OF RESEARCH:

The purpose of this research is to find out more about how individuals relate socially to others in cyber-space, and how this affects their 'real' lives. The Internet is expanding rapidly as more and more people choose to connect to the Internet from work, place of study or home. To date, little research has examined how people interact socially in cyberspace using computer-mediated communication. Little is known about how time spent in cyberspace interacting with others affects people's real lives and relationships.

BENEFITS OF THIS RESEARCH TO THE COMMUNITY

This research may have no direct benefits to you as an individual. However, the results of this research may benefit future users of virtual environments. An understanding of social relationships in cyberspace and the effect on individual's real lives can be used by therapists in counseling net users who are experiencing problems, and for the development of role-playing therapy in cyberspace.

WHAT WILL TAKING PART IN THE STUDY INVOLVE?

If you decide to take part in this research you will be interviewed by the researcher, Lynne Roberts, either in a MOO, on Internet Relay Chat, or in person. During the interview, you will be asked about your MOOing/chatting experiences. You are under no obligation to answer all questions. The interview will take approximately one hour.

Your involvement in this research is entirely voluntary. Your decision not to take part, or to withdraw from the study part way through may be done freely and will not affect your rights not the responsibilities of the researchers in any respect.

This study has been approved by the Curtin University Human Research Ethics Committee. It is not anticipated that your participation in this research will result in you experiencing any adverse effects.

CONFIDENTIALITY

All information supplied by you will be treated confidentially. You are not required to provide your name, address, telephone number or other personal 'real life' information. You will be asked about the names and identities you use in cyber-space, but these names will not appear in any reports written about this research.

NEED FURTHER INFORMATION?

Should you desire further details about the study, either before, during or after the study you may contact Lynne Roberts at the School of Psychology, Curtin University of Technology in Perth Western Australia. Lynne can be contacted by email at RobertsL@psychology.curtin.edu.au.

Thanks again for your interest. I look forward to interviewing you!

**APPENDIX XII: WWW INFORMATION AND CONSENT PAGE FOR STUDY
THREE**

To view this page please use a web browser (e.g., Netscape or Microsoft Explorer) to open the file called 'Newbiein.htm'. The IBM disk containing the file is attached to the inside back cover of this thesis.

APPENDIX XIII: 'NEWBIE' SURVEY

To view this survey please use a web browser (e.g., Netscape or Microsoft Explorer) to open the file called 'Newbiesv.htm'. The IBM disk containing the file is attached to the inside back cover of this thesis.

APPENDIX 14: 'MIDBIE' SURVEY

To view this survey please use a web browser (e.g., Netscape or Microsoft Explorer) to open the file called 'Midbiesv.htm'. The IBM disk containing the file is attached to the inside back cover of this thesis.

APPENDIX 15: 'OLDBIE' SURVEY

To view this survey please use a web browser (e.g., Netscape or Microsoft Explorer) to open the file called 'Oldbiesv.htm'. The IBM disk containing the file is attached to the inside back cover of this thesis.

APPENDIX XVI: ADVERTISING THE INTERNET SURVEY

The URL of the Information page of the Newbie Survey was submitted to the following search engines and Internet sites:

- Info Space
- Alta Vista
- Appollo (internet category)
- Comfind
- Infoseek Guide
- Metroscope
- Yellow Pages
- Nerd World Media
- What's New Too
- Starting Point
- Web Crawler
- Web Direct
- Yahoo
- Excite
- Lycos

In addition, postings were made to the following newgroups about the Newbie Survey:

- news.newusers.questions
- alt.newbie
- alt.newbies