

Curtin University of Technology  
School of Psychology

**PANIC DISORDER: SYMPTOMATOLOGY, MEDICAL UTILISATION AND  
TREATMENT**

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## DECLARATION

I, Clare Samantha Rees, declare that the thesis titled, 'Panic disorder: symptomatology, medical utilisation and treatment', is my own work and has not been submitted previously, in whole or in part, in respect of any other academic award.

Clare Samantha Rees

May, 1997.



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## ABSTRACT

The overall aim of this project was to investigate the nature and structure of the physiological symptoms of panic attacks and the relationship between these symptoms and use of the health care system by people with a clinical diagnosis of panic disorder. Cioffi's model of somatic interpretation was explored in relation to this issue as it had been previously applied to predominantly physiological conditions and appeared to offer a potentially useful framework for understanding the behaviour of people with panic disorder.

The first study consisted of a principal components analysis of 153 panic attack symptom checklists from the Anxiety Disorders Interview Schedule - Third Edition - Revised (ADIS-III-R). Five separate physiological components emerged from the analysis which mirrored common medical conditions. A cluster analysis of the symptoms of 153 individuals indicated that the sample formed five separate groups corresponding to the five physiological components identified. The results of this study supported suggestions put forward in the literature regarding the possible clustering of the physiological symptoms of panic attacks. The study also found evidence to suggest that individuals with panic disorder can be identified in distinct sub-groups according to the most predominant physiological symptoms reported.

The second study was made up of two parts. Part one investigated the health utilisation behaviour and associated costs for people with panic disorder and compared them with people with social phobia. Significantly higher costs and rates of

utilisation were found for the panic disorder group compared to the group with social phobia. Part two of this study investigated the relationship between a person with panic disorder's most predominant physiological panic symptoms and the type of medical specialists consulted. Fifty three individuals with panic disorder were included in the study and the proposed relationship was analysed using a bi-partial regression analysis. The respiratory group was significantly related to the type of specialist seen.

The third study was aimed at clarifying the interpretation of ambiguous symptoms in panic disorder. Thirty eight people with panic disorder completed a questionnaire requiring them to give explanations as to the cause of a number of ambiguous somatic sensations. It was hypothesised that there would be a relationship between the persons highest component score (as identified in the first study) and the interpretation of threat made in response to the items on the questionnaire. No such relationship was found although significantly more threat-interpretations were made when the individual's cognitive threat schema was activated.

Study four investigated the influence of the type of panic recording measure upon the severity and number of panic symptoms reported. A secondary aim was to compare panic symptoms recorded following a panic provocation procedure in the clinic with those recorded following naturally occurring panic attacks. Thirty seven people with panic disorder recorded the symptoms of panic attacks experienced in the natural environment and those induced via hyperventilation in the clinic. It was hypothesised that there would be an effect for recording measure on the dependent variables of symptom severity and number. This hypothesis was supported with the

structured recording measure producing significantly more symptoms of a greater severity than the unstructured or descriptive measure. An interaction effect was found for the neurological group of symptoms whereby the severity of symptoms was significantly higher in the clinic setting than in the natural environment with the descriptive measure resulting in significantly greater severity ratings.

The final study investigated the efficacy of information-giving as an intervention for panic disorder. Forty individuals with panic disorder were randomly assigned to either receive two sessions of information-giving as well as self-monitoring of their symptoms or self-monitoring only. As hypothesised the group receiving information as well as self-monitoring had significantly lower levels of general anxiety and depression as well as anticipatory anxiety at the end of the intervention period.

Several important implications emerge from these results. The finding that people with panic disorder can be identified according to the predominant set of physiological symptoms they report provides some useful information for identification of the problem in general medical settings. This project demonstrated the need for a screening measure for panic disorder in Australian medical settings as well as the potential effectiveness of the provision of information relating to anxiety and panic. In addition, Cioffi's model of somatic interpretation was found to be a useful framework with which to consider underlying processes relating to the interpretation of panic sensations.

## CHAPTER ONE

### GENERAL INTRODUCTION

#### Explanation of the Project

The aim of this project was to investigate the symptom structure of panic attacks in people with a primary diagnosis of panic disorder. This investigation has focused specifically upon the physiological symptoms of panic attacks as these are the symptoms expected to be most closely linked to the individual's use of health care services. The project was largely motivated by the personal observation made whilst working clinically that despite sound research in the area many sufferers of the disorder still appeared to have their problem go unnoticed in many health care settings. Therefore, more research into fundamental aspects of the disorder such as symptomatology and medical utilisation seemed important.

Specifically, the project consists of six separate investigations with the central theme being panic symptomatology and its overlap with medical conditions. The studies are all clinically-based with the final study consisting of an intervention aimed at incorporating the findings of the earlier studies. Each study is preceded by a short introduction to the specific area being investigated with a more comprehensive introduction to the general literature on panic disorder to follow.



## Overview

Panic attacks are discrete episodes of intense dread or fear, accompanied by physical and cognitive symptoms. The Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition,(DSM-IV)(American Psychiatric Association, 1994) criteria for panic attacks are that an individual must experience at least four of the following symptoms; palpitations, sweating, trembling or shaking, shortness of breath, choking sensations, chest pain, nausea or abdominal distress, dizziness or light headedness, derealisation, fear of losing control, fear of going crazy or dying, paresthesias and chills or hot flushes. These symptoms must develop abruptly and reach a peak within 10 minutes.

According to DSM-IV, an individual must experience recurrent, unexpected panic attacks followed by at least one month of persistent concern about having another panic attack in order to meet the criteria for panic disorder. Panic disorder has a high prevalence in the community and is the most commonly seen anxiety problem in clinics (Katon, 1992). Boyd (1986) reported that in comparison with subjects with mental disorders, those with panic disorder received approximately three times more mental health treatment. Recent epidemiological studies in the United States, Canada, Puerto Rico, Germany, Switzerland, Taiwan, and Korea have shown panic disorder to have a lifetime prevalence of about 2% and a 6-month point prevalence of about 1.2% (Wittchen & Essau, 1993).

In the medical setting also, panic disorder rates as the most commonly encountered anxiety disorder. Katon (1986) reported that 6.5% of primary care patients had a diagnosable panic disorder. A similar study found that 9.1% of primary care patients in Australia had a principal diagnosis of panic disorder (Zinbarg, et al., 1994). Markowitz, Weissman, Ouellette, et al. (1989) found that 43% of their subjects with panic disorder sought treatment from both general medical and psychiatric professionals and that they used the services of the emergency department twice as often as their subjects with major depression. Even in the general population the incidence of panic attacks is astoundingly common. It is estimated that 30% of individuals will experience at least one panic attack in their lifetime (Katon, Vitaliano, Russo, Jones & Anderson, 1986; Myers, Weissman & Tischler, 1984).

Despite the high incidence of the disorder, it was not until the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III)(American Psychiatric Association, 1980) that panic disorder was recognised as a specific anxiety disorder. Approximately 100 years ago Freud (1895) was the first to describe in comprehensive terms what he called 'anxiety neurosis'. This was followed later with the far less descriptive criteria set out in the Diagnostic and Statistical Manual of Mental Disorders - First Edition (DSM-I)(American Psychiatric Association, 1952) and second edition (DSM-II)(American Psychiatric Association, 1968). As a result of vague criteria, panic attacks were viewed as a general anxiety problem and consequently treatments were relatively non-specific. Research in the area of panic

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disorder has increased since the development of DSM-III and therefore major advances in knowledge of aetiology and treatments have occurred. Interest has also been fuelled by the number of secondary problems such as alcoholism, drug abuse, and severe depression associated with panic disorder (Margraf, Barlow, Clark & Telch, 1993). It has been suggested (Boyd, 1986) that the severity of the disorder and its consequences may be responsible for the fact that panic disordered patients seek professional treatment more frequently than patients with any other mental disorder.

Agoraphobia, which is conceptually linked to panic disorder is more common than panic disorder without agoraphobia with a lifetime prevalence of about 5% and a 6-month point prevalence of about 4%. There is continuing debate as to the relationship between panic disorder and agoraphobia. In essence there are two opposing views; 1) agoraphobia with recurring panic attacks is a severe sub-type of panic disorder, and 2) agoraphobia is a separate disorder that may either appear alone or may co-occur with panic attacks. Klein (1981) considered agoraphobia to be a natural reaction to the experience of recurrent spontaneous panic attacks. In contrast, Marks (1983) regarded panic attacks to be non-specific psychiatric symptoms that could be found in a number of disorders, including agoraphobia but not unique to it (Goisman, et al., 1994). The confusion over this issue is reflected in the ongoing changes in priority given to both panic disorder and agoraphobia in the major diagnostic systems. For example, the revised edition of DSM-III gave priority to panic disorder over agoraphobia. This was in contrast to the original manual which gave priority to agoraphobia over panic disorder. The International Classification of Diseases - 10 (ICD-10)(World Health Organisation, 1989) still gives equal and

separate status to agoraphobia and panic disorder although when the two co-occur priority is given to the phobic state. The DSM-IV has maintained the earlier decision to give priority to panic disorder over agoraphobia, which was based on the available literature indicating that agoraphobic avoidance is in fact secondary to panic disorder (Frances, et al., 1993).

### ***Models of Panic Disorder***

Understanding the causes of panic disorder is central to the development of effective treatments. The major competing models proposed to date, emphasise either a biological or cognitive causation for the disorder.

#### ***Biological Model***

Although the specific aetiology of panic disorder remains unknown some evidence suggests that it may have a biological basis (Sheehan, 1982). Consistent with this view, panic disorder is drug responsive, familial and marked by somatic symptoms. Panic disorder is referred to as a biopsychosocial illness, related to heritable characteristics, although this is certainly not the essential component to the development of panic disorder.

#### ***Genetic evidence***

Individuals with panic disorder are more likely to have a family history of anxiety problems in that approximately 30% of first-degree relatives of patients with panic disorder also suffer from this anxiety disorder (Katon, 1988). The age-corrected

morbidity risk for panic disorder and probable panic disorder is estimated at 22% for first degree relatives of probands with panic disorder and approximately 2% for first degree relatives of normal control subjects (Crowe, et al., 1983). However, as family studies can only demonstrate familiarity and not heritability it is important to review the evidence from twin and adoption approaches.

Torgerson (1983) interviewed all twin pairs born in Norway between 1910 and 1955, where one or both had received in or out-patient care for neurotic or borderline psychotic states. This study found that the frequency of panic disorder was 31% in monozygotic (MZ) twins of probands with panic and 0% in dizygotic (DZ) twins. Interestingly, there were also resemblances between the twins for the other disorders investigated. For probands with pure anxiety neuroses the incidence of any disorder in co-twins was 64% for MZ, and 28% for DZ, supporting a genetic model. A high degree of resemblance for anxiety-depression was also found with figures of 41% for MZ and 39% for DZ. Similar figures were found for 'pure neurotic depression' with figures of 59% for MZ and 48% for DZ. As noted by Foley and Hay (1992) in their review of this research, the results for the latter two groups indicate that some important environmental factor may be common to both twins and contributing to their vulnerability to general psychiatric conditions.

The Swedish Twin Registry (Allgulander, Nowak & Price, 1991) involved a large sample of 12,884 adult twins who participated in a 1973 health survey. A heritability of 60% was derived from MZ and DZ correlations of 0.32 and 0.26 (for males) and 0.58 and 0.21 (for females). The results of this study are limited due to

the fact that the data was restricted to six inpatient admission categories. However, the results indicate that even such a significant heritability still leaves over half of the MZ pairs discordant implying that environmental effects cannot be ignored.

In a recent Australian Twin Registry Study (Andrews, Stewart, Allen, & Henderson, 1990) a total of 462 twins were interviewed using the Diagnostic Interview Schedule and also completed four mailed questionnaires over the subsequent 16 months. This study found the DZ male correlation for depression at 0.005 and 0.34 for anxiety. The authors acknowledge that their results were based on a community sample rather than a clinical sample as had been used by Torgersen (1983) however, they highlight the finding in this study that no zygosity differences were found among those who had not required hospitalisation. Thus, it is still possible to make comparisons between this study and Torgersen's which used a clinical sample.

Taking these results into consideration, there are few firm conclusions which can be made beyond the fact that there is a genetic contribution to most of the anxiety conditions (Foley & Hay, 1992). Although these findings do suggest a heritable component to panic disorder, it remains unclear whether a general anxiety proneness is inherited or a more specific vulnerability to panic disorder (McNally, 1990).

### ***Medication studies***

Many researchers proposing biological causes for panic base their argument on the apparent success of various drugs in eliminating the panic response. For

example, studies have been reported which demonstrate the effects of alprazolam on reducing panic attacks (Ballenger, et al., 1988; Schweizer, Rickels, Weiss & Zavodnick, 1993). These findings have been interpreted as evidence that a chemical change is most likely implicated in the course of panic disorder. Klein (1964) reported that the tricyclic antidepressant imipramine blocked panic attacks but did not reduce anticipatory anxiety, whereas benzodiazepines reduced anticipatory anxiety but did not block panic. The differing effects of this medication on panic as opposed to general anxiety led Klein to propose that panic was qualitatively distinct from other forms of anxiety. Barlow & Craske (1988) have noted that Klein's pharmacological distinction was based on the logical fallacy of inferring pretreatment differences from treatment effects. Despite this consideration, the effectiveness of medication has encouraged the view that panic is a biological disease requiring pharmacological intervention.

Treatment studies have shown that although medication can reduce the frequency of panics experienced by this population, the maintenance of these changes is poor (Klosko, Barlow, Tassinari, & Cerny, 1988; Pecknold, Swinson, Kuch, & Lewis, 1988). A group of recent studies investigating the effectiveness of alprazolam as a treatment for panic disorder found that even when slow, flexible drug tapers were used, 20-38% of patients experienced discontinuation-emergent symptoms that precluded further dose reductions. Further, of the patients who did succeed in discontinuation of the drug treatment, approximately 50% relapsed during the subsequent six months (Marks, et al., 1993; Schweizer, Rickels, Case & Greenblatt, 1990; Spiegel, Bruce, Gregg & Nuzzarello, 1994).

**Biological challenge tests**

An anxious response to challenge tests has also been proposed as a possible biological marker for panic disorder (Sheehan, 1982). According to this view, challenges precipitate panic by directly amplifying an inherited, biochemical defect. Challenges that increase anxiety in individuals with panic disorder include infusions of sodium lactate (Liebowitz, et al., 1984) and isoproterenol (Rainey et al., 1984); oral administration of yohimbine (Charney, Heninger, & Jatlow, 1985); inhalation of carbon dioxide (Griez, Lousberg, van den Hout & van den Molen, 1987) and forced hyperventilation (Rapee, 1986).

It has been shown that CO<sub>2</sub> inhalation reliably produces an increase in subjective anxiety in a greater percentage of panic-disordered individuals than in normal controls (Gorman et al., 1984; Van Den Hout & Griez, 1984). Biological theorists have interpreted this sensitivity to CO<sub>2</sub> inhalation as evidence that panic is largely a biological disorder. One explanation which has been put forward to explain this effect is the chemoreceptor sensitivity theory (Gorman, Liebowitz, Fyer, Fyer, & Klein, 1986). This theory suggests that people who are prone to panic disorder are hypersensitive to carbon dioxide. As a result, they hyperventilate in order to maintain very low levels of CO<sub>2</sub> to avoid triggering their hypersensitive receptors. This theory has gained some support from a study by Gorman and colleagues (1988) who found that those who panicked during a 5% CO<sub>2</sub> challenge had a more rapid increase in the amount of CO<sub>2</sub> expelled in each breath than those who did not panic.



A similar model has been proposed by Klein (1993) who argues that patients with panic disorder have a hypersensitive suffocation monitor that predisposes them to experience panic attacks under certain conditions. This model predicts differential emotional responding to biological challenges that affect arterial partial pressure of carbon dioxide (PCO<sub>2</sub>). Accordingly, these patients are expected to exhibit lower fear and less likelihood of panic in response to biological challenges that lower PCO<sub>2</sub> levels (e.g. hyperventilation) and increased fear and greater likelihood of panic in response to biological challenges that raise PCO<sub>2</sub> levels (e.g. inhalation of 35% CO<sub>2</sub> gas).

A study by Gorman et al. (1994) compared the responses of normal controls and people with panic disorder to inhalations of 5% CO<sub>2</sub>, 7% CO<sub>2</sub> and hyperventilation. They found that none of the normal control subjects had a panic attack during the hyperventilation challenge or 5% CO<sub>2</sub> challenge, whereas 13% of the subjects with panic disorder panicked during the hyperventilation challenge and 29% panicked during the 5% CO<sub>2</sub> challenge. During the 7% CO<sub>2</sub> challenge, 12% of the normal control subjects panicked compared to 68% of the subjects with panic disorder. These findings lend support to Klein's theory that people with panic disorder display a hypersensitivity to CO<sub>2</sub>. However, the differential reactions displayed by panickers may either be a result of this sensitivity or fear of challenge induced sensations. Indeed, Salkovskis and Clark (1990) have argued that panic provoking agents such as CO<sub>2</sub> produce panic due to their ability to create sensations that are then misinterpreted by the individual.

Schmidt, Telch, & Jaimez (1996) also tested Klein's theory but were unable to support it. They found that the inhalation of CO<sub>2</sub> was panicogenic in a substantial proportion of subjects with panic disorder in their study. However, they noted that a majority of participants did not panic during the challenges even when the inhalation of CO<sub>2</sub> was as high as 35%. As they point out this is a CO<sub>2</sub> concentration 875 times greater than inspired dry room air. If Klein's theory was correct it would be expected that these seemingly potent doses would cross even the normal threshold of control subjects. The authors suggest that although they were unable to find support for the model it may be that the suffocation alarm is defined by a more complex biological system rather than the unidimensional system defined solely by examining PCO<sub>2</sub> levels.

Despite the results of the studies discussed, the arguments for a biological model of panic disorder are largely circular. Biological theorists claim that because certain provocation procedures such as inhalation of CO<sub>2</sub> can produce symptoms which are almost identical to full-blown panic attacks, then this is evidence that panic disorder is caused by a biological dysfunction. Cox, Swinson, & Endler (1991) point out that biological research on panic attacks is problematic because it confuses aetiology with symptomatology. That is, although there are a number of physiological symptoms associated with panic attacks which can be produced via biological challenges, this does not necessarily prove a physiological aetiology.

### ***Psychophysiological Models***

The role of hyperventilation in panic disorder is the subject of considerable disagreement, with two competing models evolving out of this conflict: psychophysiological versus cognitive models of panic. Psychophysiological models of panic regard hyperventilation as a central and necessary feature of panic. In contrast, cognitive models consider hyperventilation as only another symptom of general symptoms present during a panic attack. Psychophysiological models propose that panic disorder consists of both psychological and physiological elements and that internal physiological sensations can trigger a panic attack (Barlow, 1986, 1988; Ehlers & Margraf, 1989; Margraf, Ehlers, & Roth, 1986). Cognitive processes such as the interpretation of changes in these bodily sensations and in environmental cues as dangerous, then causes increases in anxiety (Margraf et al., 1986).

#### ***Fear of fear model***

Goldstein and Chambless (1978) were among the first to describe panic disorder in terms of a fear of fear model. They based their description upon the principles of Pavlovian interoceptive conditioning where panic disorder was regarded as a conditioned response to interoceptive stimuli. That is, having experienced more than one panic attack an individual becomes hypervigilant to their sensations and interprets feelings of mild to moderate anxiety as a sign of an imminent attack. This reaction would then raise the person's anxiety level thus increasing the real probability of having a panic attack.

This model prompted treatments for panic disorder which included systematic exposure of a person to their feared interoceptive cues. The effectiveness of this type

of treatment has been shown in both uncontrolled (Bonn, Harrison, & Rees, 1971; Salkovskis, Jones, & Clark, 1986) and controlled studies (Griez & van den Hout, 1986; van den Hout, van den Molen, Griez, Lousberg, & Nansen, 1987). Although the model inspired the development of interoceptive exposure treatments, it was less adequate at explaining the mechanisms underlying panic disorder according to an interoceptive conditioning model. This was due to the difficulty in discriminating between bodily sensations which act as the conditioned stimulus and those which act as the conditioned response.

### ***Hyperventilation theory***

Ley's theory of hyperventilation in panic disorder provided one of the first alternatives to biological explanations of panic. Ley considered hyperventilation or overbreathing as central to the explanation of panic disorder (Ley, 1987; 1991). He described the development of panic attacks as a psychological response to physiological changes in carbon dioxide serum levels following overbreathing. More specifically, during overbreathing an excess of carbon dioxide is exhaled at a rate faster than the body can manufacture it. This decreases the composition of carbon dioxide relative to oxygen in the blood and lungs. As a result, the blood pH level alters to become more alkaline. This blood alkalosis leads to the physiological symptoms of hyperventilation which can include, dizziness, paresthesias, and dyspnea (Barlow, 1988). These changes are then misattributed by the person with panic disorder as a sign that a perceived medical or physiological emergency is occurring (Ley, 1987). As symptoms continue to increase due to this misattribution, dyspnea is experienced which decreases symptom escalation and prevents loss of consciousness.

This process initiates a negative feedback loop leading to the termination of the panic attack (Ley, 1987).

Support for Ley's theory has been inconsistent. Panic provocation studies have provided some support for hyperventilation theory. A study by Garssen, van Veendaal, and Bloemink (1983) found that of 28 panic disordered patients who were asked to hyperventilate, 61% reported symptoms similar to their usual panic attacks. Similarly, Rapee (1986) found that compared to individual's with generalised anxiety disorder, panic disordered patients reported greater distress and a greater number of symptoms in response to 90 seconds of voluntary hyperventilation.

Although a clear relationship between hyperventilation and panic has been found (Margraf, 1993; Rapee, Brown, Antony, & Barlow, 1992) there are several factors which question the rationale of hyperventilation theory. For example, a study by Ruiters, Garssen, Rijken, & Kraaimaat (1992) found that not all panic attacks were precipitated by or involved hyperventilation. Also, breathing retraining which is aimed at correcting hyperventilation was no more effective than a placebo in reducing panic frequency and severity. In addition, other researchers investigating alternative treatments for panic disorder which do not involve breathing retraining have been effective in significantly reducing panic frequency and severity (Gould, Clum, & Shapiro, 1993). In sum, Ley's theory has not been consistently supported by the research. Although this may be due to methodological problems in the studies it appears more probable that the theory is not sufficient in itself to account for the development and maintenance of panic disorder. Ley's theory however, provided a

new framework for future investigations into the mechanisms underlying the development of panic disorder.

### ***Cognitive model***

Very closely linked to the psychophysiological model is the cognitive model of panic disorder which emphasises cognitive misinterpretations of bodily sensations as the most crucial component in the disorder (Barlow, 1991). Clark (1986) re-examined the results of the lactate-infusion and CO<sub>2</sub> inhalation studies and concluded that the panic attacks were not the result of a biochemical dysfunction but rather a catastrophic misinterpretation of those sensations involved in panic, such as palpitations, breathlessness and dizziness.

Thus, cognitive theorists have proposed that the anxious response to biological challenge tests seen in individuals with panic disorder is in fact mediated by cognitive processes. Specifically, they propose that it is the manner in which one interprets various stimuli (in this case the physiological symptoms induced through biological challenges) that is central to the development and maintenance of panic attacks (Barlow, 1988; Beck & Emery, 1985; Clark, 1986). According to this view, panic attacks result from the catastrophic misinterpretation of somatic sensations and not simply the occurrence of those sensations themselves (Barlow, 1988). These misinterpretations involve the perception that the somatic sensations experienced are a signal of some type of impending physical threat (e.g. heart attack).

Catastrophic misinterpretation is most likely when the cause of bodily sensations is ambiguous and least likely when there is a plausible benign explanation for them. A large body of evidence has accumulated which lends support to the notion of catastrophic misinterpretation (Harvey, Richards, Dziadosz, & Swindell, 1993; Kenardy, Evans, & Oei, 1988; Ottaviani & Beck, 1987; Westling & Ost, 1993). The essential component of these studies is that individuals with panic disorder have been found to attach dangerous or harmful explanations to various physical symptoms. The study by Westling & Ost (1993) found that 91% of 285 panic attacks experienced by 36 subjects contained distressing cognitions characterised by catastrophic misinterpretations relating to interoceptive cues or the possible consequences or meaning of those cues. Similarly, Rachman, Levitt & Lopatka (1987) were unable to identify any subjects who experienced panic attacks in the absence of fearful cognitions.

Salkovskis & Clark (1986) added another dimension to this model by including an overbreathing phase in the model in recognition of the many individuals with panic disorder who tend to hyperventilate. According to this model, as a consequence of feeling apprehensive, the individual tends to overbreathe which in turn produces a number of extra bodily and Central Nervous System (CNS) symptoms including dizziness, shakiness, tachycardia, palpitations and numbness. If these sensations are interpreted by the individual as threatening, then a further increase in apprehension will result. Once again, this adds to the spiralling cycle by causing an increase in overbreathing.

***Interoceptive acuity***

It has been proposed that perceptions of visceral change can trigger panic attacks (Clark, 1986). Misinterpretations of visceral change sensations as being potentially harmful or dangerous elicit fear and anxiety which, in turn, lead to further visceral change and further elevation of fear and anxiety. The frequent association between the bodily sensations and the fear elicited by these sensations may cause people with panic disorder to become hypervigilant to minor variations in visceral activity. That is, individuals may acquire and maintain an enhanced interoceptive acuity for visceral sensations.

In an early study, Tyrer, Lee, & Alexander (1980) found that people with anxiety neurosis and those with hypochondriasis more accurately estimated their heart rates than did people with phobias. However, in another study by Ehlers, Margraf, Roth, Taylor, & Birbaumer (1988) people with agoraphobia were found to be no better than normal subjects at estimating their heart rates. In a more recent replication of this study using slightly different methodology, Ehlers (1990) found that panic disorder subjects were more accurate than non-anxious controls in estimating their heart rates. In this later study subjects were asked to count the number of heart beats they experienced over a given period of time. This estimation was then compared to the actual number of heart beats measured using an electrocardiogram.

Ehlers & Breuer (1992) investigated cardiac perception in panic disorder with both self-report and objective measures and concluded that panic disordered patients



show increased cardiac awareness in both cases. However, they pointed out that it is not possible to decide whether increased cardiac awareness is present before the onset of panic attacks or whether it is acquired later in the course of the disorder, for example through frequent pulse taking or a change in attentional focus.

McNally (1990) has suggested that the contradictory results in this area may be a function of methodological problems with the studies. Specifically, most of the studies investigating perception of heart rate required the subjects to estimate heart rates or count heart beats and he argues that this ability may be affected by prior knowledge of heart rates. Adding to the methodological problems in this area is the lack of consistency across studies which have used different types of recording procedures to assess cardiac awareness.

In an attempt to eliminate the possibility of individuals using prior knowledge of heart rates, Asmundson, Sandler, Wilson, & Norton (1993) used an objective heart rate discrimination procedure to compare people with panic disorder and people without panic disorders' awareness of cardiac sensations. This procedure ensures that if the person does not have perceptual sensitivity for his or her heartbeat, they will be unable to distinguish between two sets of feedback stimuli. The authors noted that more objective procedures such as this one, if used more consistently across studies would permit more reliable and valid assessments of cardiac awareness.

The results from this study indicated that individuals with a history of panic attacks did not demonstrate enhanced interoceptive acuity for cardiac sensations.

However, the authors argued that although their results did not support the proposal that panic attacks are associated with enhanced interoceptive acuity, enhanced perceptual acuity for cardiac sensations may not be necessary for the initiation of panic episodes. In fact, Ehlers et al. (1988) found that false feedback indicative of an elevated heart rate was sufficient to increase anxiety and physiological arousal in panic disorder patients who believed the feedback was accurate. They suggested that heightened awareness for visceral changes reported by panic disorder patients may merely be a reflection of their pre-existing beliefs regarding the harmful consequences of such sensations.

A recent study by Richards, Edgar, & Gibbon (1996) further examined this issue by comparing the cardiac acuity of people with panic disorder with a group of non-panickers, since cardiac symptoms are the most commonly reported cluster of symptoms among the panic disordered population. Comparisons were made under three conditions: during relaxation; immediately following physical exercise; and during a restricted breathing exercise. Subjects were required to give continuous rather than intermittent feedback of their perceived heart rate during each of these conditions. Heart rate was monitored using a finger clip which had been specially constructed to prevent any awareness of pulse from the clipped finger.

Results indicated that although heart rates increased most after the exercise, panickers were better able to estimate heart rate changes than normal control subjects during the restricted breathing condition. No significant difference in cardiac acuity was found between panickers and non-panickers in the relaxation and exercise

conditions. The authors concluded that people with panic disorder are more accurately aware of their heart rate only in situations where they feel unsafe and not in control. That is, they have enhanced cardiac acuity only in situations where they are unsure of the reasons for increased autonomic arousal. These results support the cognitive model of panic disorder since physiological arousal was higher in the exercise condition, but cognitions were different in the restricted breathing condition.

### ***Anxiety sensitivity***

The cognitive predisposition to interpret arousal as threatening has been termed anxiety sensitivity by Reiss and McNally (1985). Individuals with high anxiety sensitivity may be more likely than others to panic when experiencing these symptoms because they believe that anxiety or arousal has harmful social or physical consequences beyond its immediate unpleasantness. Reiss (1987) has proposed that high anxiety sensitivity increases the risk of panic attacks, and panic attacks reciprocally increase the level of anxiety sensitivity. Therefore, according to Reiss and McNally (1985), individuals with high anxiety sensitivity believe that anxiety has harmful physical or social effects and this belief is associated with a propensity to misinterpret ambiguous somatic stimuli. However, the theory that misinterpretation of interoceptive cues is based specifically upon anxiety sensitivity has not received strong support (Harvey, et al., 1993; McNally & Lorenz, 1987; McNally, et al., 1987). In the study by Harvey et al. (1993) no evidence was found to associate cognitive misinterpretation with higher levels of anxiety sensitivity. Rather, the cognitive bias was more closely associated with activation of cognitive threat schema involving ambiguous interoceptive cues.

***Focus of attention***

Mathews and his associates proposed that anxiety states are characterised by attentional biases for processing threat information (MacLeod, Mathews & Tata, 1986; Mathews & MacLeod, 1985). Mathews (1988) suggested that the attentional bias towards threat may result in a maintenance of anxiety states, as the individual would be more likely to detect any potential source of danger in their environment. Dichotic listening and stroop colour-naming tasks have been used by investigators to test the proposal that anxiety states are characterised by attentional biases.

Burgess, Jones, Robertson, Radcliffe, & Emerson (1981) used a dichotic listening procedure to demonstrate attentional bias to threat cues in panic patients. Subjects were presented with two different prose passages one to each ear, and had to repeat aloud one passage to the exclusion of the other. Participants were then asked to detect threat words which occurred out of context in either passage. Panic patients detected more threat words than neutral words in the unattended passage, thus suggesting an attentional bias for detecting threat information.

Further evidence for selective processing of threat cues in panic disorder has been obtained in the modified Stroop colour-naming paradigm (Ehlers, Margraf, Davies & Roth, 1988; Hope, Rapee, Heimberg, & Dombeck, 1990). In this paradigm, subjects are shown words of varying emotional significance and are asked to name the colours in which the words are printed, while ignoring the meaning of the words.

Delayed colour-naming occurs when the meaning of the word automatically attracts the subject's attention despite the subject's effort to attend to the colour of the word.

McNally, Riemann & Kim (1990) using a computerised stroop paradigm that presented words one at a time, found that panic disordered patients as opposed to normal control subjects exhibited delayed colour-naming of words related to fear (e.g. fearful), bodily sensations (e.g. dizzy ) and catastrophe (e.g. insane). McNally, Riemann, Louro, Lukach & Kim (1992) extended this study to include emotional material of a positive as well as threat-related nature. They found that panic disordered patients exhibited greater Stroop interference for words associated with feared catastrophes than for the emotional words which were positive in nature. They also found that positive words produced as much interference as threat words when they were associated with fear and bodily sensations. Finally, physiological arousal did not enhance interference for threat words in panic-disordered patients, at least when the source of arousal was obvious. Ehlers, et al. (1988) found that people with a clinical diagnosis of panic disorder and those with non-clinical panic disorder, but not normal control subjects, exhibited stroop interference to physical threat, separation and embarrassment.

Although these findings suggest that anxiety states are associated with selective processing of threat information, it is possible that threat words are selectively processed not because they are threatening but merely because they are familiar to patients. Thus, the familiarity hypothesis predicts that as concepts become more familiar to individuals, they will be more likely to attend to them. Inconsistent

with this hypothesis, Foa (1989) reported that rape victims with post-traumatic stress disorder, as opposed to rape victims without post-traumatic stress disorder, exhibited Stroop interference for rape-related words. Both groups would have been equally familiar with the concepts, yet the groups differed on attention to threat.

Another explanation could be that anxious patients might selectively process any emotionally evocative material, not just that associated with threat. In support of this hypothesis, Martin, Williams, & Clark (1988) reported that patients with generalised anxiety disorder exhibited as much Stroop interference to positive words as to threat words. Other studies (McNally, Kapsi, Riemann, & Zeitlin, 1990; Richards & Millwood, 1989) have failed to provide support for this explanation, suggesting that attentional biases are not simply attributable to emotionality artefacts.

Some studies have shown that certain somatic symptoms may be more likely than others to be interpreted by people with panic disorder as signalling impending threat. Rapee, Sanderson, McCauley & Di Nardo (1991) found that compared to subjects with other anxiety disorders, subjects with panic disorder were more likely to report paraesthesia, dizziness, faintness, unreality, dyspnea, fear of dying and fear of going crazy/losing control. The results taken together suggest that reports of unexpected panic attacks associated with panic disorder are characterised by a different symptom profile to reports of specific fear reactions that are part of a phobic disorder or obsessive-compulsive disorder.

Rapee et al. (1991) questioned whether the symptomatic differences identified in the study reflect a qualitative difference in the nature of the obtained reports or simply a quantitative difference with panic attacks reflecting a greater degree of fear than situational fear/anxiety reactions. On the basis of the evidence from this study, the authors concluded that panic disordered individuals self-report their fear in a qualitatively different fashion to other anxiety disorders. As a group, panic disordered individuals were more likely to report a specific set of sensations than individuals with social phobia, simple phobia or obsessive-compulsive disorder. They go on to propose that panic disordered individuals are hypervigilant for a specific set of sensations. Presumably, the symptoms for which these individuals are particularly vigilant would be those associated with immediate impending threat.

### ***Diathesis-stress model***

As discussed above, there is a considerable body of evidence supporting the cognitive model of panic disorder. Building upon Salkovskis & Clark's (1986) proposition, Barlow (1991) suggested that the distinguishing feature of individuals suffering from panic disorder was the development of anxious apprehension over the next panic attack. Thus, according to this conceptualisation, individuals with panic disorder anticipate the next panic attack with great apprehension, perceive these attacks as uncontrollable, and become highly vigilant to somatic sensations which may indicate the beginning of a forthcoming attack.

Barlow (1991) suggested that a model such as this more appropriately exemplifies the multidimensionality of panic disorder in which both psychological and biological factors would contribute to causation interacting in the context of a feedback loop. According to Barlow, panic attacks are experiences of the normal emotion of fear at unexpected times (Barlow, Brown, & Craske, 1994). Individuals with panic disorder are considered to be responding to chronic stress in their environment. After a period of prolonged and chronic stress, an individual experiences an event of some kind (such as a death, a relationship break-up, moving house, etc.) which acts as a trigger and causes the person to experience chronic hyperarousal. It is proposed that this hyperarousal results in increased sensitivity to interoceptive cues. These cues are misinterpreted by the individual who is in a state of hyperarousal as catastrophic and it is this reaction which results in a panic attack (Barlow and Craske, 1994). Similar to some biological models, this model highlights the distinction between panic and general anxiety although it differs from biological models in that it does not consider the phenomenon of panic to be related to a neurological dysfunction.

### ***Cognitive-Perceptual Model of Somatic Interpretation***

Based on the principles of attribution theory set out by Jones et al. (1971) a number of studies have been completed in which both the perception of a somatic change and the attributions for it were experimentally manipulated (e.g. Ross, Rodin, & Zimbardo, 1969; Schachter & Rodin, 1974). Overall, this research demonstrated that the perception of somatic information was profoundly influenced by the situation, by the behaviour of others and by the beliefs, assumptions and attributions of the



perceiver (Cioffi, 1990). The findings of these studies have led to an elaboration of the process of somatic interpretation by Cioffi (1991).

The cognitive-perceptual model of somatic interpretation (Cioffi, 1991) is a relatively recent model which has emerged within the health psychology literature and may offer an alternative way of conceptualising and understanding the experience of panic disorder. This model is similar to the diathesis-stress model in that it is multidimensional and incorporates both physiological and cognitive factors. However, it differs from the models already discussed in some important ways.

First, Cioffi's model attempts to explain the type of behavioural response an individual might make following the interpretation of a physical symptom. In this sense the model provides a comprehensive framework with which to consider the processes involved in the interpretation of somatic sensations. The model differs from previous models due to its emphasis on behaviour. The cognitive models place emphasis upon the interpretation of sensations and offer less explanation regarding the subsequent behaviour of a person following the interpretation of a sensation. For example, behaviours such as attending specialists and calling ambulances are not explained by this model. Rather, the focus is more specifically on the cognitive processes involved in the interpretation of panic symptoms.

Although the stress-diathesis model offers predictions regarding the behaviour of people in response to panic sensations it specifically focuses on the behaviours of avoidance and anxious apprehension and does not include more general behavioural

responses. This model does not make reference to variables closely linked to behaviour such as a person's goals and other mediators. Although these models provide quite specific and useful conceptualisations regarding the experience of panic disorder they are of less use in explaining other types of behaviour likely to be characteristic of people with panic disorder.

The experience of panic sensations in panic disorder is not a straight-forward process. For many people, the sensations are often not associated with fear in the first instance and this seems to result in confusion as to the origin of panic-related physiological sensations. The similarity between panic sensations and common medical conditions results in many sufferers over-using health care services. This behaviour appears to be unique to people with panic disorder and results in great personal and economic costs to the sufferer as well as larger economic costs for the community (Katon, 1992).

Cioffi's model of somatic interpretation is drawn from the field of health psychology and is therefore a more general model used to describe factors which explain a person's response to a physiological sensation. As the symptoms of panic disorder are very similar to the symptoms of general medical conditions the model may offer a particularly useful explanation of the health utilisation behaviour of these individuals.

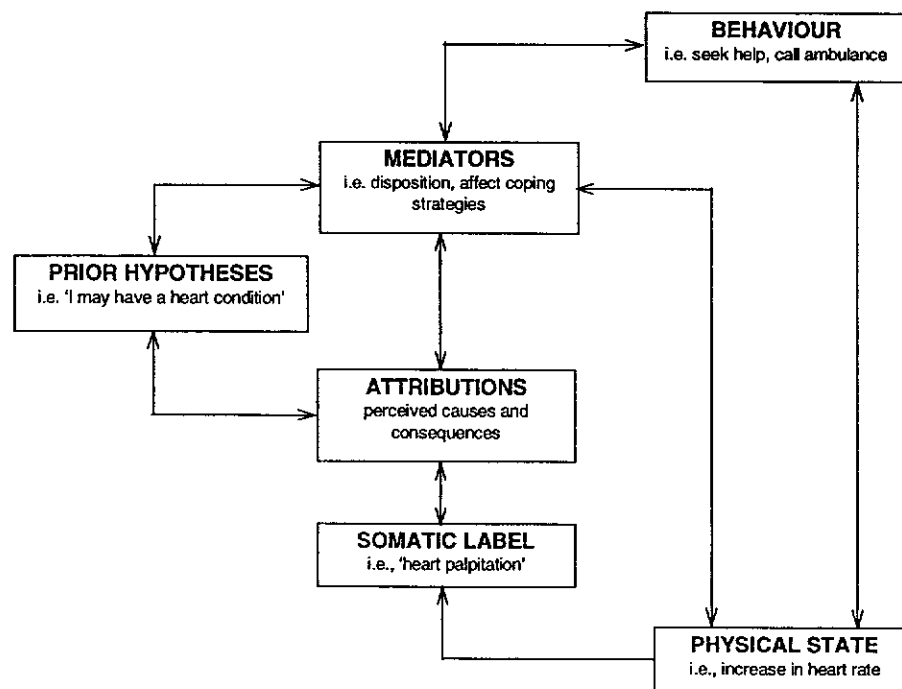
As with the psychological theories of panic disorder already discussed, Cioffi's model stems from the notion that the biomedical model alone is unsatisfactory in

explaining the relationship between symptom perception and behaviour. Physical symptoms it is argued, are better explained as cognitive-perceptual phenomena, that is, stimuli that are subject to complex psychosocial processes and therefore susceptible to influences beyond those explained by biosensory mechanisms alone. Rather, it is proposed that medical and psychosocial models together can provide more useful information. The model is quite complex in that it refers to many factors which are likely to influence an individual's response to a somatic sensation. Cioffi explains that, "these processes can interact to produce multiple somatic interpretations, given the same physical stimulus..." (Cioffi, 1991, p.29).

Figure 1 shows Cioffi's model represented as a flow-chart which illustrates the various levels of interpretation of a somatic sensation. The arrows go in both directions indicating that the various stages of the model can influence other stages either in an upward or downward direction. Unfortunately, as Cioffi explains, this makes the model difficult to test empirically as "any stage in this process from becoming aware of a physical state to labelling, interpreting and responding to it - could plausibly affect several others..." (Cioffi, 1991, p.29). However, the model does offer a useful framework for conceptualising an individual's response to somatic sensations and it is possible to illustrate the model using panic disorder as the example.

According to the cognitive-perceptual model, an individual with panic disorder first experiences a sensation, for example, a heart palpitation. This basic 'somatic label' becomes part of the individual's attentional field. Once noticed, the

sensation is attributed to an event. If it is attributed to poor health, for example a weak heart, it becomes a symptom or evidence that there is something wrong with the individual. This attribution could come about in two ways. First, the heart palpitation could confirm a pre-existing belief (that of a weak heart). This pre-existing hypothesis about one's health is proposed to influence both the awareness of, and attribution for the sensation. Alternatively, the perceived physical sensation could become the event for which an attributional search is launched.



**Figure 1:** Cioffi's Model of Somatic Interpretation

The model also points out that physical sensations experienced are not necessarily interpreted as symptoms. The individual may view the sensation as an appropriate response to the environment (i.e. a normal physiological reaction to stress). Even given a fixed somatic perception and an attribution for it, an individual's behavioural response according to this model would depend upon the mediators of thought and action, such as mood, coping repertoire and choices, and general or

situation-specific goals. In this example, the individual who has attributed the heart palpitation to a weak heart is likely to have few coping skills and some negative memories relating to the experience of similar sensations (e.g. parental death from heart attack). The final behavioural response will therefore be dependent upon each of these factors and in this case might be to call an ambulance.

In accordance with Cioffi's model, the panic disorder literature indicates that individuals attend to their bodily sensations, fail to find an obvious cause for them and go on to misinterpret the sensations catastrophically. According to the cognitive-perceptual model, people with panic disorder would be likely to search for information to confirm their pre-existing illness hypothesis. It is currently understood that people with panic disorder are hypervigilant to bodily sensations (Rapee, et al., 1991). When a sensation is noticed and an explanation is not readily available, the sensation is usually interpreted as threatening. This results in the sensation becoming more intense which is the basis for the positive feedback loop used to describe the panic attack cycle (Barlow, 1986; 1988). Therefore, Cioffi's model may provide a useful way of encompassing recent psychological theories of panic disorder and offering a framework with which to understand the subsequent behaviour of these individuals in response to their problem.

The model also offers some promise in understanding the difference between those individuals with panic attacks who catastrophise and continue to panic and those who do not. Specifically, the model argues that in some cases sensations are correctly interpreted as normal physiological responses to the external environment.

Cioffi (1991) suggests that information as to the background of sensations helps produce a hypothesis of fitness rather than illness. In this case, the sensations are not interpreted as symptoms. Similarly, it is argued that sensory monitoring can be adaptive with individuals learning to feel in control of their body's sensations. Indeed, it is proposed that somatic representations are dynamic, they can be created, changed or maintained and a physical sensation initially perceived in the light of one hypothesis can eventually become evidence for another. This model suggests the importance of the educational component of cognitive-behavioural treatment programs for panic disorder.

Cioffi argues that understanding interpretative processes is a difficult task which results in many researchers getting caught in interpretative tangles. The complexity of the task is highlighted by Cioffi who argues that, “top-down influences of prior hypotheses, attributions, perceived consequences, goals and coping repertoires can themselves affect, among other things, the degree of subsequent attention that is deployed to the actual somatic sensation...” (Cioffi, 1991, p.30).

Cioffi acknowledges the subjectivity of her model arguing that its value is in promoting research into the likely factors influencing somatic interpretation. However, she argues that in certain circumstances it may be possible to make firmer predictions regarding the behaviour of people in response to physical sensations. She writes, “if a person’s health hypothesis is clearly pathological, the perceived consequences are particularly pernicious, and the coping skills are particularly weak - in other words, if the top-down bias is strongly negative then attention to the physical

sensation component of this construal is more likely to increase distress...” (Cioffi, 1991, p.30). Therefore, in the case of a person with a clinical diagnosis of panic disorder a strongly negative top-down bias would more than likely be operating and such an individual would be expected to interpret somatic sensations negatively.

Cioffi's model (1991) attempts to explain how an individual will behave in response to the interpretation of a physical sensation. When applied to panic disorder it opens up many possibilities for investigating the model in relation to the symptoms of panic. It is well established that those people who develop panic disorder are interpreting their physical symptoms differently to those who experience similar sensations but do not panic (Borden, et al., 1993; Harvey, Richards Dziadosz, & Swindell, 1993). The mediators likely to affect an individual's response to a somatic sensation are most likely to be negative, that is, low self-esteem, depression, avoidance and fear. When these mediators are negative it follows that both the subsequent behaviour and ongoing attributions are less likely to change and most likely to continue to be 'catastrophic' in nature.

The model also offers a number of possibilities for explaining the health utilisation behaviour of individuals with panic disorder. For example, those people who currently fulfil the criteria for panic disorder are regularly experiencing a number of ambiguous physiological symptoms. A number of these individuals are able to accept their sensations as being the product of high anxiety and their behaviour is most often characterised by some attempt at controlling the anxiety and hence visiting a mental health professional. On the other hand there are a group of people with panic

disorder who appear to attribute their panic symptoms to potential underlying medical conditions. As a result, this group continue to search for medical explanations for their symptoms and tend to over-use the health care system.

The model proposes that attributions for a sensation can change and hence the resultant behaviour will also change. For example, it is possible to alter the prior 'illness' hypothesis and transform it into a hypothesis of wellness. The individual can therefore be educated about panic and have their attribution changed. As a result, the type of behaviour this person would be exhibiting would be a reflection of a new interpretative process. This section of the model does not suggest anything new to the realm of psychological treatments except that it places primary importance on attributions and suggests that it is possible to change them. The educational component of cognitive-behavioural treatments for panic has been used for some time but this model suggests that it may be an essential component toward altering the behaviour of a person experiencing somatic sensations of panic.

### ***Psychological Treatments for Panic Disorder***

Cognitive-behavioural treatments for panic disorder compare favourably when matched against established pharmacological treatments (Margraf, Barlow, Clark, & Telch, 1993). For example, when compared to alprazolam, panic control treatment has resulted in 87% panic-free patients compared to 50% for a medication group (Klosko, Barlow, Tassinari, & Cerny, 1990). In addition, cognitive-behavioural treatments have been shown to be superior to a wait-list condition, brief supportive therapy, and a pharmacological placebo (Barlow, Craske, Cerny, & Klosko, 1989;



Beck, Sokol, Clark, Berchick, & Wright, 1992; Klosko, et al., 1990). Most cognitive-behavioural treatments for panic disorder include (a) education about the nature of anxiety and panic, (b) cognitive restructuring of patient's faulty threat appraisals, (c) controlled breathing to prevent hyperventilation, and (d) graduated interoceptive exposure (Telch, Schmidt, Jaimez, Jacquin, & Harrington, 1995).

Barlow, et al. (1989) compared the efficacy of interoceptive exposure and cognitive restructuring with progressive relaxation, a combination of progressive relaxation, interoceptive exposure and cognitive restructuring and a wait-list condition. They found that the interoceptive exposure and cognitive restructuring group and the group which included all of the components produced the greatest number of panic-free patients (85% and 87% respectively) following 15 sessions of treatment. These results were maintained at a two-year follow-up. In another study by Klosko, Barlow, Tassinari & Cerny (1990), 'panic control treatment' consisting of exposure, cognitive restructuring and relaxation was compared to alprazolam, a tablet placebo and a wait-list group for 15 sessions. Similar results were obtained with the panic control treatment group yielding 87% panic-free patients compared to 50% for the alprazolam group, 36% for the placebo group and 33% for the wait-list control group.

Despite impressive success rates with this treatment, conservative estimates of successful alleviation of panic in participants indicates that 25% do not become panic-free. This has prompted a number of investigations into the individual components of treatment in an attempt to identify the most effective aspects and so improve success

rates (Barlow, Brown, Craske, Rapee & Antony, 1991; Barlow et al., 1989; Craske, Brown & Barlow, 1991). The general finding of studies investigating the efficacy of cognitive behavioural treatment is that interoceptive exposure and cognitive therapy represent the essential components of treatment (Craske et al., 1991; Margraf & Shneider, 1991; Margraf et al., 1993).

Various types of relaxation-based treatments for panic disorder have also been investigated. The two major procedures compared have been progressive relaxation which involves the individual tensing and relaxing each of the major muscle groups and applied relaxation which involves the individual simply applying the technique of relaxation without tensing and relaxing each of the muscle groups. Taylor, Kenigsberg, & Robson (1982) found that progressive relaxation over 5 sessions was more effective than a pharmacological placebo, diazepam or a wait-list control. Ost (1988) compared applied relaxation with progressive relaxation and found that the applied technique produced 100% panic-free patients compared to 71% for the progressive technique. A study by Clark, et al. (1994) compared applied relaxation, imipramine and cognitive therapy. At a 3-month follow-up cognitive therapy was superior to both imipramine and applied relaxation. However, at a 6-month follow-up cognitive therapy did not differ from imipramine but both were superior to applied relaxation. Finally, at a 15-month follow-up cognitive therapy was once again superior to both of the other treatments. It was also noted that between 6 and 15 months a number of imipramine patients relapsed.

Ost & Westling (1995) have conducted a recent investigation aimed at replicating the Ost (1988) study but comparing applied relaxation with cognitive behaviour therapy rather than progressive relaxation. The applied relaxation technique resulted in 65% panic-free patients compared to 74% for the cognitive behaviour therapy. An increase in the success of both treatments was found at a one-year follow-up with 82% of the applied relaxation group and 89% of the cognitive behaviour group being panic-free. The authors suggest that therapist variables such as experience with applied relaxation could explain the different success rates found for applied relaxation in this study compared to the earlier study. Overall, applied relaxation appears to be an effective treatment component but does not produce results as great as those obtained with cognitive behavioural approaches.

Unfortunately, it has been reported that less than 25% of panic disorder sufferers seek treatment for the problem (Weissman & Merikangas, 1986). A study from National Institute of Health (1991) found that certain barriers such as accessibility and affordability help to explain the small number of sufferers who seek help. In consideration of these findings, recent studies have investigated the efficacy of cognitive-behavioural treatments for panic disorder which require either minimal or no therapist contact (Cote, Gauthier, Laberge, et al., 1994; Gould & Clum, 1995; Lidren, et al., 1994). Overall, the results of these studies have found that cognitive-behavioural treatments with reduced therapist contact produce results comparable to similar treatments involving therapist contact. The availability of this type of treatment could prompt more sufferers to seek help. Given the need for cost-effective, brief treatments for panic disorder it is surprising that studies have not

directly examined the individual contribution of the information-giving component of cognitive behavioural therapy. This component forms the foundation of the subsequent treatment program yet its individual contribution towards the success of the overall treatment is currently unknown.

### ***Summary***

At this stage the existing research into the major components of the panic reaction suggests that individuals with panic are at first predisposed to panicking partly as a function of inherited biological factors. Second, the individual experiences a trigger event in the context of chronic anxiety or hyperarousal. Individuals respond to acute interoceptive cues with catastrophic cognitions relating to impending harm as a result of these ambiguous somatic sensations. Indeed, it is fairly well established that panic disordered people allocate excessive attention to somatic stimuli (Rapee, Ancis, & Barlow, 1988). These negative interpretations result in an intense rush of anxiety which leads to a panic attack. Consequently, the individual fears the occurrence of another attack and may begin avoiding situations in which an attack has occurred or where they may not be able to escape should it occur. The psychological theories discussed share in common the general belief that ongoing panic attacks occur as a result of how the physiological sensations of anxiety or arousal are interpreted. A model which has not been applied specifically to the area of panic disorder is the cognitive-perceptual model of somatic interpretation (Cioffi, 1991). This is a more general model attempting to explain a person's behavioural response to physical sensations and has been developed for application to medical conditions. However, as

the symptoms of panic disorder have similarities with medical conditions it may be a useful model to apply.

Cognitive behavioural treatments for panic disorder have high success rates and studies indicate that this is mostly a function of the exposure and cognitive therapy components. Investigations aimed at isolating the effective components have not however measured the influence of the information-giving process. Based on clinical observation, this appears to be an important factor in an individual's successful treatment.

### ***Fundamental Issues***

There are two fundamental issues pertaining to the symptomatology of panic disorder which require clarification. First, there are a few different methods which are used to ascertain the essential symptoms of panic attacks and these methods have questionable validity. Second, there has been speculation in the literature on panic disorder that the symptoms of panic attacks form into meaningful physiological clusters. These are two important issues which require further research as they potentially influence the understanding of aetiology and treatment in panic disorder.

### ***Panic Symptomatology - Recording Methods***

The symptomatology of panic has been investigated in a number of ways, including interviews, self-monitoring exercises and laboratory induced panic. However, most studies have been based on retrospective accounts of panic and are

therefore likely to be distorted in some way (Rapee, Craske, & Barlow, 1990). Barlow, Brown, & Craske (1994) have suggested that concurrent observation of behavioural and emotional events would be a more reliable and valid procedure. Similarly, Dijkman-Caes, Kraan, & DeVries (1993) argued for the use of daily life studies in panic disorder in order to provide clear phenomenological descriptions of panic. Barlow et al. (1994) also argue that a thorough understanding of retrospective reporting procedures is vital as this is the usual method by which an individual is given a diagnosis of panic. Both authors suggest that until these reporting devices are more thoroughly investigated, the phenomenology of panic will remain unclear.

### ***Panic Symptomatology - Symptom Clustering***

A related issue is whether or not certain clusters of panic symptoms exist. Indeed it has been suggested that the somatic symptoms of panic can be broken down into respiratory, cardiovascular, gastrointestinal and neurological clusters (Katon, 1991). This proposal has been based mostly on clinical observation as no comparable empirical investigations have been conducted. It is surprising that this issue has not received attention given the implications for clarifying basic phenomenological issues such as those discussed above.

Clearly, much work is still required in fundamental areas of panic disorder research. As highlighted above, basic methods of recording the phenomena of panic

itself have questionable reliability and validity. As a result, the symptomatology of panic disorder remains unclear.

### ***General Aims of this Project***

The general aim of this project is to investigate the nature and structure of the physiological symptoms of panic attacks and to examine the relationship between the experience of these somatic sensations and the use of health care services. As this project is primarily concerned with the physiological symptoms of panic, Cioffi's model of somatic interpretation drawn from the field of health psychology will be explored in relation to its applicability to the area of panic disorder. Although the efficacy of this model will be explored in this project this can only be done indirectly as the model itself precludes testing. That is, the model is described in such a way that it can explain both positive and negative effects as each of the components in the model influence each other in a forward and backward direction. As such, the model is difficult to falsify. However, the basic concepts within the model can be examined with regard to its ability to clarify issues relating to the behaviour of people with panic disorder.

### ***Explanation of the Studies***

The first aim of this project is to investigate the hypothesis that panic symptoms form into separate physiological clusters. Although individuals with panic disorder have been identified in specialist clinics with particular physiological symptom clusters the question of panic clusters has received little research attention.

In addition, a large amount of research has demonstrated that individuals with panic disorder incur higher than average costs for medical consultations and generally over-utilise medical services (Bass, 1992; Katon, 1991;1992; Siegal, Jones, & Wilson, 1990). These high costs are not surprising given the ambiguous nature of panic symptoms. However, if panic attacks do form into meaningful physiological clusters it may open up a number of possibilities for reducing these high medical costs. For example, educating relevant health professionals in the recognition of these types of panic attacks.

As a general aim of this project is to investigate health care costs in relation to panic symptomatology, the first part of the second study is aimed at comparing the utilisation and costs for people with panic disorder with those of people with social phobia. Although it has been well established that people with panic disorder over-use the health care system relative to members of the general population, no studies have compared anxiety disorders. This comparison is important because the experience of panic symptoms may be similar for both groups but the lack of an obvious explanation for symptoms experienced by people with panic disorder suggests that they are more likely to search for valid explanations from physicians. Therefore, the aim of this study is to examine whether such differences in the use of the health care system exist for these two groups. The second part to this study is aimed at exploring the relationship between the physiological symptoms of panic attacks and the type of health care specialists consulted as this will help to clarify the most likely specialists consulted by people based on their panic symptoms.



The aim of the third study is to investigate whether or not people with panic disorder who report a predominant cluster of physiological symptoms interpret these symptoms as more threatening than the other physiological symptoms of panic. This study will further clarify the behaviour of people in response to their physiological symptoms. One possibility is that people with panic disorder do not necessarily interpret their most predominant symptoms as most threatening and hence seek help for other symptoms. Alternatively, those symptoms reported as most predominant may be the ones which people interpret as the most threatening and hence seek treatment for those symptoms.

The fourth study is aimed at investigating the influence of recording methods on the symptoms reported during panic attacks. As the source for most panic symptomatology comes from retrospective methods this study will examine panic symptomatology using concurrent measurement and using descriptive as well as structured recording forms. As many studies have examined panic symptoms in the laboratory this study will compare symptoms produced via voluntary hyperventilation with symptoms recorded in the natural environment.

The final study is aimed at examining the effectiveness of a brief information-giving intervention for panic disorder. As the central thesis is concerned with how panic symptoms are associated with high costs and use of the health care system this study provides a way of gauging the potential efficacy of information regarding the symptoms of panic. If successful it would highlight the importance of eliminating

confusion among these individuals who are prone to misinterpretation of their panic symptoms.

As discussed, a central theme in this project is the examination of the physiological symptoms of panic attacks and how these symptoms impact upon the sufferer in terms of their use of health care services. The recording of these symptoms and examination of how these symptoms are interpreted will provide further information as to the nature of physiological symptoms in panic disorder. The final study is a clinical intervention to examine the efficacy of information-giving as an intervention for people with panic disorder. Specifically, this will involve providing clients with information regarding the nature and causes of their physical symptoms of anxiety. The overall aim of this project is to add to the literature in this area which highlights the need for early identification and treatment of panic disorder. The major implication would be potentially substantial reductions in personal and economic costs for the sufferer and the general community.

### ***Methodological Issues***

#### ***Selection of participants***

Participants for this project will be recruited from the Curtin Centre for Anxiety and Fear Research. This centre receives referrals from the general community, government and non-government organisations, general practitioners and self-referrals. It is staffed by post-graduate clinical psychology students for teaching and research purposes.

All participants in this project will be assessed using the Anxiety Disorders Interview Schedule - Third Edition (Revised) (ADIS-III-R). The ADIS-III-R is a semistructured interview schedule designed to permit differential diagnosis among the anxiety disorders according to DSM-III-R criteria, and to provide detailed information for functional analyses of the anxiety disorders (Di Nardo, Moras, Barlow, Rapee, & Brown, 1993).

Adequate reliabilities can be obtained from this measure for the DSM-III-R depressive disorders and anxiety disorders (DiNardo, et al., 1993). The content and wording of questions as well as the general arrangement of the interview are based on several years' experience in interviewing and diagnosing anxiety disordered patients using both DSM-III and DSM-III-R criteria. This is one of the most frequently used assessment devices for ascertaining whether or not an individual meets the criteria for panic disorder (Beck, Berisford, Taegtmeier, & Bennett, 1990; Rapee, et al., 1991; Westling & Ost, 1993; Zinbarg et al., 1994 ).

This schedule requires the clinician to make ratings as to the severity of the person's symptoms and also the degree to which the symptoms are interfering with their life. These ratings are made on the basis of answers to questions contained in each of the following sections: Panic Disorder, Agoraphobia, Social Phobia, Generalised Anxiety Disorder, Obsessive-Compulsive Disorder, Specific Phobia, Post-Traumatic Stress Disorder/Acute Stress Disorder, Major Depression, Dysthymia, Mania/Cyclothymia, Hypochondriasis, Somatization Disorder, Mixed

Anxiety-Depression, Alcohol Abuse/Dependence, Substance Abuse, and Psychosis.

The ratings are made using 9-point scales which are completed for each of the above sections. A rating of 0 on the scale indicates that the symptom is absent; a rating of 2 indicates that the symptom is of mild severity and only slightly disturbing; a rating of 4 indicates that the symptom is of moderate severity and definitely disturbing; a rating of 6 indicates that the symptom is severe and markedly disturbing; and a rating of 8 indicates extreme severity and a very disabling problem.

A checking system is used at the clinic to ensure the validity of all ADIS-III-R assessments. Two clinicians are required to arrive at a diagnosis which is compatible and within 2-points on the final severity rating scale used to determine the severity of the primary diagnosis and any secondary diagnoses. When any discrepancies occur, a third clinician is required to observe a video of the assessment and complete a diagnosis within 2-points of another clinician. No diagnoses are made until this assessment criterion is met. This is the procedure recommended by the authors of this assessment schedule (Brown, Di Nardo, & Barlow, 1994). Each person therefore receives a primary diagnosis and possibly one or several secondary diagnoses.

Participants in study 2b and 3 will be a randomly selected sub-set of those who participate in study one. This will enable a comparison of the symptoms identified in the first study with variables to be assessed in these later investigations. Participants in all of the other studies will be independent samples.

***Inclusion/Exclusion Criteria***

Any person with a secondary diagnosis less than two points away from their primary diagnosis will not be included in any of the studies. This will prevent confounding of results due to the potential for overlap of symptoms from other disorders. People with psychosis and/or current alcohol or substance abuse will also be excluded from all studies.

All participants in this project will undergo medical screening and any people with serious medical conditions (e.g. angina) will be excluded. All clients at the centre are asked to complete this medical screening as part of the standard set of procedures used.

Only people with mild or no agoraphobia will be included in this study. That is, people with severity ratings up to 3 on the clinician rating scale will be included in the studies. This is to ensure that the sample represents people with panic disorder as the symptoms associated with moderate to severe agoraphobia would be expected to be different.

## CHAPTER TWO

### STUDY ONE - SYMPTOM CLUSTERS IN PANIC DISORDER

#### Introduction

##### *Overview*

Panic attacks are often described as sudden, spontaneous and discrete periods of intense fear and anxiety (Apfeldorf, Shear, Leon, & Potera, 1994) and seemingly uncued panic attacks are a defining feature of panic disorder. Research into panic disorder increased following its specific delineation in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) (American Psychiatric Association, 1980). Despite a number of differing theories regarding the aetiology of panic disorder and differing approaches to its treatment, most psychological research is grounded within the overall framework of a diathesis-stress model. This model provides an explanation of panic disorder which incorporates biological factors (genetic predisposition) and environmental factors (stressful events) (Barlow, 1988).

Although there is reasonable agreement regarding this diathesis-stress model of panic disorder, there is less consensus about the nature of the specific physiological symptoms of panic. The physiology of a panic attack is most commonly described via the 'fight or flight' response. This reaction occurs when an individual is confronted

with real or perceived danger. As a result, the body alters its physical state to accommodate the possible need to fight or run from danger. Barlow and Craske (1994) presented a detailed account of this reaction in their client treatment manual, Mastery of Your Anxiety and Panic II.

### ***Physiology of Panic***

When an individual is faced with real or perceived danger the body responds automatically via the autonomic nervous system with a number of well-orchestrated physiological changes. The sympathetic nervous system becomes activated and facilitates the release of adrenaline and noradrenaline from the adrenal gland situated on the kidneys. These chemicals instruct the body to maintain the changes for a period of time. Activity in the sympathetic nervous system causes an increase in heart rate and strength of heart beat. This is vital to help speed up the blood flow so that oxygen can be supplied to the tissues requiring extra energy. As well as changes in the heart, blood flow alters and begins to be directed towards the vital organs and away from the periphery, for example, hands, toes and skin. As a result of these major changes, other physical sensations are experienced. Pale and cold skin, cold fingers and toes, and numbness and feelings of weakness in the hands and feet can be experienced. There is also an increase in the speed and depth of breathing which can cause the individual to feel breathless, have choking or smothering sensations, dizziness, disorientation and pain and tightness in the chest. As a side effect of increased breathing, especially if no actual fight/flight activity occurs, the blood supply to the head is decreased and can produce unpleasant symptoms such as

dizziness, blurred vision, and confusion. The pupils of the eye dilate to allow more light for improved peripheral vision, which can produce side effects such as sensitivity to light and spots in the visual field. A decrease in salivation and in digestive processes also occurs and as a result individuals can experience a dry mouth, nausea, constipation or have a heavy feeling in the stomach. Many of the muscle groups tense in preparation for danger which often results in muscular aches and pains and trembling or shaking. The body will also sweat to prevent overheating and to make it difficult to be held by a predator. All of these reactions are mediated by the parasympathetic nervous system which restores balance in the body when the danger perceived or real has abated. The body is left with some residual arousal as a precaution should any danger return. Thus, it can be some time before the body returns to a fully relaxed state (Barlow & Craske, 1994).

This kind of physical reaction is both complex and common. Unlike the experience of panic as a reaction to real danger in the environment, individuals with panic disorder experience the symptoms of fear in what many people would consider to be neutral or non-threatening situations. For many people the attacks appear to come 'out of the blue', seemingly from nowhere. The very fact that such individuals are most often stationary or in apparently 'relaxed' settings, for example shopping, makes the changes even more noticeable and frightening. Experiencing a racing heart, for example, without being able to locate the cause, often results in an individual believing they may be having a heart attack.



It was Freud (1894) who first described what we recognise today as panic disorder. He used the term 'anxiety-neurosis' and even at this early stage, highlighted that an anxiety attack might or might not be accompanied by 'recognisable anxiety'. Instead the patient frequently emphasised psychological and physical disturbances. For example, disturbances in respiratory and cardiac functioning were oftentimes not consciously associated with anxiety at all but were experienced solely as physical ailments (Frances, et al., 1993).

That individuals in a state of panic experience the physiological changes outlined above is indisputable. However, there is some disagreement as to which of these sensations are necessary to be included in the symptom lists for diagnosis of panic disorder (Frances, Pincus, Widiger, Davis, & First, 1990). Furthermore, some authors have made the clinical observation that the symptoms of panic attacks form into separate physiological clusters (Katon, 1991; Lydiard, et al., 1994).

### ***Homogeneous or Heterogeneous Phenomenon?***

Careful examination of panic symptomatology is crucial for a number of reasons. First, it may be that individuals with panic disorder do not make up an homogeneous group. It cannot be concluded that all individuals meeting the criteria for panic disorder will experience the same symptoms. Indeed the controversy surrounding this issue would suggest that this is not the case.

### ***Symptom Lists in Panic Disorder Classification***

Frances et al. (1993) argued that the validity of a psychological classification system depends upon how well the diagnostic criteria capture the core features of disorders. Although DSM-III (American Psychiatric Association, 1980) and DSM-III-R (American Psychiatric Association, 1987) introduced a more thorough description of the symptoms of panic disorder, there was confusion as to which symptoms were to be included as indicative of panic. The former manual used 12 symptoms, omitting nausea/abdominal distress and combining fear of dying with fear of going crazy and losing control. The latter specified 13 symptoms, including abdominal symptoms, splitting the two 'fearful' symptoms but combining faintness with dizziness. Although in general, DSM-IV (American Psychiatric Association, 1994) has been more rigorous in applying empirical research to its classification procedures, the symptom list used for diagnosis of panic attacks has not been altered. This is of concern since the symptoms included have mainly been derived from clinical judgement and discussion, and less from empirical studies examining the issue. This is perhaps mostly due to the lack of empirical studies which have examined the symptomatology of panic attacks.

Frances et al. (1993) have argued that many patients complain of symptoms that are not covered in these classificatory systems, such as blurred vision, headache, tinnitus and urinary frequency. Similarly, Aronson and Logue (1988) suggested that certain subtypes of people with panic disorder exist who are not identified by these

criteria. Furthermore, in a survey of opinions about DSM-III-R's criteria for classification of panic disorder from 127 psychiatrists and psychologists, 40% felt that there were important symptoms which were not currently included. The symptom areas most frequently mentioned as important but not included in DSM-III-R, were a) sensory/perceptual disturbances, b) catastrophic cognitions, c) generalised anxiety, and d) a desire to flee (Norton, Cox & Schwartz, 1992). Consequently, there is considerable controversy surrounding the issue of whether panic disorder constitutes a discrete syndrome.

### ***Symptom Clusters in Panic Disorder***

There is general agreement in the literature that the phenomenon of panic consists of four general clusters of symptoms which can be broken into 1) cardiovascular symptoms (e.g. heart palpitations) 2) gastro-intestinal symptoms (e.g. nausea) 3) neurological symptoms (e.g. dizziness) and 4) other miscellaneous autonomic symptoms (e.g. hot or cold flushes, sweating) (Lydiard, Greenwald, Weissman, et al., 1994). Again, despite general agreement on these categories, they have been based on clinical observation rather than on empirical research.

### ***Studies Investigating Panic Symptoms***

Only a few empirical studies have been conducted which have directly investigated the autonomic symptomatology of panic disorder. Most have compared the symptoms of panic disorder with other anxiety disorders (Clark, Beck & Beck, 1994; Rapee, Sanderson, McCauley & DiNardo, 1991) or have focused on

comparisons between physiological and cognitive symptoms within panic disorder (Rachman, Levitt & Lopatka, 1987; Rapee et al., 1991; Westling & Ost, 1993). These studies have mostly found that the cognitive symptoms experienced during panic attacks such as fear of dying, consistently and reliably discriminate panic disorder from other anxiety disorders.

### ***Studies Comparing Panic Disorder and other Anxiety Disorders***

A few studies exist which suggest that panic attack symptoms experienced by individuals with panic disorder are qualitatively different from those experienced by people with other mood disorders. One study compared panic attacks occurring in panic disorder with panic attacks occurring in specific phobias during behavioural approach tests. Rachman, Levitt, & Lopatka (1987) administered 69 exposure trials to 20 people with panic disorder and found that 43.5% of the trials resulted in panic attacks. In a contrasting sample of claustrophobics, situationally-bound panic attacks occurred during 36% of the trials. The subjects with panic disorder tended to report palpitations, hot flashes, and trembling more frequently than did claustrophobics.

Clark, Beck & Beck (1994) suggested that panic disorder may be distinguished by a hypervigilance to bodily sensations, especially respiratory and cardiovascular symptoms. This was supported by a study of the symptoms of major depression, dysthymia, panic disorder and generalised anxiety disorder in 298 outpatients. They used empirically derived symptom dimensions based on items from standardised self-report and clinician-rated symptom rating scales. Principal

components analysis revealed 12 orthogonal symptom components which differentiated panic disorder from major depression. The presence of specific autonomic, cardiovascular, and respiratory symptoms differentiated panic disorder from generalised anxiety disorder.

Similarly, Rapee et al. (1991) provided evidence to suggest that the presence and severity of panic symptoms does not differ between those with mild, moderate or severe agoraphobia, thus suggesting that panic disordered individuals make up a homogenous group. They went on to compare this panic disordered group with a group of other anxiety disordered subjects. Compared to the group of individuals with social phobia, simple phobia and obsessive-compulsive disorder, those with panic disorder seemed to experience their panic attacks as qualitatively different phenomena. The authors reported that the panic disorder group had panic attacks which were more likely to include fears of dying or going crazy/losing control, and the somatic sensations of paraesthesia, dizziness, faintness, unreality and dyspnea. They suggested that the qualitative differences in symptoms may be a result of unexpected or uncued attacks resulting in a different fear reaction amongst panic disorder sufferers. They argued that to clarify this point future studies need to include a measure of intensity of fear. This finding has been supported elsewhere (Anderson et al., 1984; Rapee, 1985).

### ***Studies of Panic Symptoms within Panic Disorder***

Empirical studies examining symptom variation within panic disorder itself have produced varying results. The lack of consistency between studies could be partly due to the different theoretical backgrounds of the various researchers. Norton et al. (1992) found that psychiatrists considered trembling, sweating and nausea as significantly more important than did psychologists in diagnosing panic disorder. Indeed, it has been suggested that physicians tend to describe anxiety symptoms from the perspective of their own specialty (Skerrit, 1977). For example, cardiologists focus on atypical chest pain, pulmonologists on hyperventilation, and gastroenterologists on irritable bowel symptoms when, in fact, these various symptoms may all be manifestations of a panic disorder.

Rachman, Levitt & Lopatka (1987) examined the nature of symptoms experienced by individuals with panic disorder. Panic episodes were found to be accompanied by more fearful cognitions and bodily symptoms than non-panic episodes of anxiety and several understandable links between the bodily sensations and cognitions experienced emerged. For example, the bodily sensation of 'faintness' was correlated with the cognition, 'I'm going to pass out' and shortness of breath and choking were both correlated with a fear of suffocating.

Westling & Ost (1993) used a self-monitoring technique to investigate the nature and relationship between distressing cognitions and symptoms experienced

during panic attacks prospectively. A total of 36 patients recorded their panic attacks over a two-week period. Analysis of these records indicated that 91% of the full-blown attacks contained catastrophic cognitions, whereas only 57% of limited symptom attacks did so. Panic attacks with catastrophic cognitions were experienced as more severe and contained more symptoms. Cognitions reported were meaningfully related to the bodily sensations experienced during the attacks. They pointed out that it is impossible from their data to ascertain whether the cognitions led to more symptoms and higher anxiety levels or whether the symptoms and higher anxiety level led to catastrophic cognitions. They suggested that to answer this question the sequence of events in panic attacks must be studied in more detail by letting a patient wear a portable tape recorder and directly describe the symptoms and cognitions experienced in a panic attack.

De Ruiter, Garssen, Rijken & Kraaimaat (1992) reviewed the literature in an attempt to establish the central symptoms of a panic attack. In general the symptoms of dizziness, palpitations and trembling were rated as most severe. Although Ley (1985) has proposed dyspnea as the central symptom in panic attacks this was not supported by a review of the literature. Dyspnea and palpitations were reported frequently but trembling, sweating and derealisation were reported with the same frequency.

Pollard and Frank (1990) examined the catastrophic cognitions and physical sensations experienced during panic attacks by 148 agoraphobics. Using a panic symptom checklist, a mean of 12 different symptoms were reported by each subject,

but no single sensation was reported by everyone. A factor analysis revealed the presence of six factors including pseudo-syncopic sensations, thermal discomfort and gastro-intestinal distress. It is unclear how representative this sample is of people with panic disorder due to the emphasis in this study on people with agoraphobia.

Two fairly recent studies have been conducted which examined both cognitive and physiological symptoms in panic disorder using factor analytic approaches. Whittal, Suchday, and Goetsch (1994) conducted a factor analysis of panic symptoms reported by female undergraduates using the Panic Attack Questionnaire (PAQ) which is a self-administered assessment device designed to identify individuals with a history of panic. They found four factors which they described as 'theoretically meaningful' and which were identified as; 1) cognitive aspects of panic, 2) physiological/sensory aspects of panic, 3) autonomic aspects of panic, and 4) respiratory/cardiovascular aspects of panic. There are limitations as to how far one can generalise from the results of this study because the subjects used for the analysis were people with infrequent panic attacks and did not have a clinical diagnosis of panic disorder, the sample only included females and a self-report measure was used to assess subjects. This sample is therefore not representative of people in the community with a clinical diagnosis of panic disorder. In fact, their sample only included 3.22% of people with a DSM-III-R diagnosis of panic disorder.

Briggs, Stretch & Brandon (1993) also investigated the symptoms of panic attacks amongst a sample of 1,168 patients with panic disorder. Based on the results of a principal components analysis, they broke symptoms down into two main groups.



The first group of symptoms contained five predominantly respiratory symptoms (choking/smothering sensations, shortness of breath, chest pain/discomfort, numbness/tingling sensations, fear of dying); the remaining nine symptoms were in the second group (palpitations, trembling/shaking, chills/hot flushes, sweating, nausea, dizziness, derealisation, fear of going crazy, fear of doing something uncontrolled). These groups were named on the grounds of 'clinical usefulness'. They argued that these latter symptoms may be late effect symptoms (symptoms not occurring in the first 10 minutes of a panic attack), or they may represent quite a different form of anxiety such as anticipatory anxiety.

Once again, there are limitations as to the generalisability of this study.

People with secondary diagnoses of simple and social phobias were included in the sample. In fact, 27% of the sample had simple phobias and 15% of the sample had social phobia.

Rapee et al. (1991) also offered support for a possible respiratory cluster of symptoms in panic disorder. They explained qualitative differences found between individuals with panic disorder and individuals with other anxiety disorders as a possible physiological difference. They noted that the symptoms which were reported more frequently by individuals with panic were, paraesthesia, dizziness, faintness, unreality, and dyspnea, which are usually associated with the alkalosis produced by overbreathing.

In summary, a limited number of empirical studies have been conducted which have examined the symptom structure of panic disorder. The studies conducted to date have investigated the structure of both cognitive and physiological symptoms. No studies have directly investigated the issue of physiological symptoms clustering in panic disorder. The studies reviewed also have limited generalisability due to the methodological limitations already discussed.

### ***Early Identification in Panic Disorder***

A second important reason for clarifying the nature of panic symptoms is that by improving descriptions, identification of the problem will become more accurate and efficient. To facilitate this, screening procedures need to be developed. Antony, Brown & Barlow (1992) have identified panic disorder as a good candidate for the development of a screening program. They outline a number of criteria which a "disease" should meet in order for a screening program to be in order. First, the disease should be an important public health problem effecting a sizeable proportion of the general population. Indeed, the Epidemiological Catchment Area Program found that the lifetime prevalence of panic disorder was 1.5% in the general population of US adults (Eaton, Dryman, & Weissman, 1991). Second, there should be a period in which the disease is present but unrecognised. This is the case with panic disorder, as many individuals spend several years searching for an explanation for the symptoms of the disorder, yet significant impairment occurs (Anthony, Brown, & Barlow, 1992). Third, treatments should exist that may be instituted once the diagnosis is established. Both pharmacological and psychological treatment

approaches can alleviate the symptoms and impairment of panic disorder. Clearly, panic disorder fits all the essential criteria for the development of a screening program.

### ***Modifying Psychological Treatments for Panic Disorder***

A third reason for concentrating on this area is that by clarifying the nature of symptoms experienced by these individuals, existing psychological treatments may be improved. Currently, cognitive-behavioural treatments for panic disorder have high success rates which persist at follow-up assessments. The efficacy of such treatments comes from many controlled studies (Barlow et al., 1984; Barlow, Craske, Cerny & Klosko, 1989; Klosko, Barlow, Tassinari & Cerny, 1990; Ost, 1988). Although these results are very promising, the compound nature of the treatment programs makes it difficult to isolate which components contribute to success. Researchers have attempted to isolate the critical elements of cognitive-behavioural treatments in an attempt to compare their relative efficacy in improving outcome (Margraf, Barlow, Clark, & Telch, 1993; Margraf & Schneider, 1991). If however, individuals with panic disorder do not represent a homogenous group, it follows that specific aspects of existing cognitive-behavioural treatment will be most effective for sub-groups of sufferers. For example, breathing re-training might be most effective for those individuals with predominantly respiratory symptoms. A study by Eldridge, Walker & Holborn (1993) applied this principle in the treatment of a 25 year old woman with predominant gastro-intestinal panic symptoms. They administered cognitive behavioural treatment which focused upon correcting misinterpretations about normal

bowel functioning, graduated in vivo exposure to external stimuli associated with loss of bowel control, establishment of regular eating patterns and bowel control training. This treatment resulted in a significant decrease in self-ratings of avoidance and distress, frequency of panic attacks and diazepam use which persisted at 18-month follow-up.

Finally, some authors have criticised the use of retrospective reports of panic attacks as opposed to prospective recording procedures (Dijkman-Caes, Kraan, & De Vries, 1993; Margraf, Taylor, Ehlers, Roth, & Agras, 1987; Rapee et al., 1990). Nevertheless, despite valid concerns regarding the influence of memory bias on retrospective reports they currently remain the most widely used procedure for establishing the initial diagnosis of panic disorder. Barlow, Brown, & Craske (1994) have recently argued that although retrospective reports have a number of limitations, understanding more about the procedure and in particular the accompanying somatic symptoms is important. For example, the particular symptoms reported may not be those actually 'physiologically' experienced but rather those which are more readily noticed and feared or remembered by the individual. In either case, this information may have implications for modifying diagnostic criteria.

### ***Summary and Aims of this Study***

In summary, panic disorder is a common mental health problem which is characterised by the experience of sudden, intense episodes of fear. Panic attacks consist of a number of physiological sensations as a result of the body preparing to

fight or flee. Unfortunately, for the person experiencing the attack the mechanisms behind the particular sensations are not clear. Although there is general agreement as to the process of the panic cycle, there is much confusion surrounding which symptoms are central to panic disorder. Studies to date have examined the cognitive symptoms of panic disorder but not the issue of physiological symptom clusters in panic disorder. Most researchers have relied on clinical observation and have speculated about the existence of these various physiological clusters. Therefore, the emphasis of this study is to focus upon the physiological symptoms of panic disorder only. This narrowing of focus upon physiological symptoms is aimed at providing useful information for settings in which the physiological manifestations of panic disorder are likely to present.

Clearly, there are a number of important reasons for clarifying the nature of panic symptomatology. The present study is aimed at providing an investigation of panic symptoms from a substantial number of individuals diagnosed with panic disorder according to DSM-III-R criteria and using the Anxiety Disorders Interview Schedule - Third Edition- Revised (ADIS-III-R) assessment schedule which is a commonly used measure. It is hypothesised that the physiological symptom severity ratings obtained from this measure will form into meaningful clusters as suggested by the literature.

## Method

### *Subjects*

Subjects consisted of 153 people with a primary diagnosis of panic disorder with mild or no agoraphobia (see chapter 1 - subject selection), who presented for treatment at the Curtin Centre for Anxiety and Fear Research. A total of 32 individuals were excluded from the initial subject pool of 185 as they did not meet the inclusion criteria.

The mean age of participants was 40 years, with 75% being female and 25% male. The most common secondary diagnosis was generalised anxiety disorder (30.1%), followed by social phobia (26.1%), depression (16.3%), post-traumatic stress disorder (7.2%), specific phobia (5.9%), obsessive-compulsive disorder (5.2%), mania (3.3%) and dysthymia (1.3%). Of the total subject pool, seven (4.6%) individuals did not have any secondary diagnosis. Seventy eight percent of the participants had mild agoraphobia with the remaining 22% having no agoraphobia. All subjects' secondary diagnoses were at least 2 points less than their primary diagnosis of panic disorder using the clinician's 9-point severity rating scale in the ADIS-III-R (see Appendix A).

### **Measures**

The symptom checklist rating scales from the panic disorder section of the ADIS-III-R were used to assess the severity of each panic attack symptom reported by participants. This checklist includes all of the panic symptoms outlined in DSM-III-R and requires the clinician to rate the severity of each symptom at 0 (not present), 1 (mild), 2 (moderate), 3 (severe) or 4 (very severe intensity). A copy of the symptom checklist appears in Appendix B.

### **Procedure**

All prospective subjects were interviewed by the author and other graduate clinical psychology students trained in the administration of the ADIS-III-R according to the standards used at the Centre for Stress and Anxiety Disorders at the State University of New York at Albany, USA.

For each subject meeting the inclusion criteria, data from the symptom checklist rating scales within the panic disorder section of the ADIS-III-R were collected and analysed.

## **Data Analysis**

### **Stage One**

The ratings for each of the 11 somatic symptoms across subjects were analysed using principal components analysis (SPSS for Windows Version 6.0). Principal components analysis is the most appropriate technique to use when investigating clustering of symptoms as it enables the researcher to establish which components together account for the greatest proportion of the variance. In contrast, common factor analysis establishes a factor solution based only on common variance (variance in a variable that is shared with all other variables in the analysis) and is most suitable when exploring the relationship between underlying latent variables and observed variables (Floyd & Widaman, 1995). Principal components analysis is based on the total variance which includes common variance as well as specific and error variance. The inclusion of the total variance was selected in this study as the purpose was to determine the minimum number of components needed to account for the maximum portion of the variance represented in the original set of variables. In other words, the variables being explored in this study (symptom ratings) are not necessarily driven by common underlying mechanisms. Rather, the purpose of the analysis is to investigate the clustering of the symptoms in and of themselves. Hence, principal components analysis was selected in favour of common factor analysis as the model does not presume that the variables are driven by common underlying mechanisms. No other studies have directly investigated the clustering of



et al., 1992). The standard rule is that components with loadings of +.30 are considered significant, +.40 are more important and +.50 are considered very significant. These guidelines are considered appropriate when the sample is 50 or larger and will therefore be used in this study.

The next stage consists of naming the components derived from the analysis. The naming of components is a more subjective process which will depend upon the a priori knowledge of the researcher. The analyst attempts to assign a name or label to a component that accurately reflects to the greatest extent possible what the several variables loading onto that component represent. This is intuitively developed based upon its appropriateness for representing the dimensions of that particular component.

### ***Stage Two***

As the symptoms from stage one of the analysis formed 5 meaningful components, the next stage consisted of a cluster analysis using K-cluster in SPSS for Windows (Romesburg, 1984) to investigate the possibility of particular sub-groups clustering according to the 5 components identified. Using the components identified in the first analysis this part was aimed at determining whether the same symptom clusters could be used to identify separate groups of people with panic disorder according to their predominant symptoms. That is, using the same sample, it was possible to investigate the clustering of people as well as symptoms. Using the sub-command 'initial' cluster centres were specified for the analysis. The program was

instructed to test for clusters if centres were two standard deviations above or below the mean for each separate component. For example, component 1 (respiratory symptoms) was given a value of 2.0, and all the other components a value of -2.0.

## Results

### *Stage One*

The overall mean severity rating for the primary diagnosis of panic disorder was 5.8 with a standard deviation of 1.1. A rating of 5 on the clinician's rating scale falls into the moderate to severe range of dysfunction. Table 1 shows the mean severity and standard deviations for each symptom recorded.

**Table 1:** *Severity Ratings for each of the 11 Somatic Symptoms*

Symptom	Mean	Std dev
Chest pain	1.046	1.304
Choking sensations	0.876	1.359
Depersonalisation	1.908	1.532
Dizziness/faintness	2.261	1.432
Flushes/chills	1.693	1.383
Nausea/abdominal distress	1.608	1.531
Numbness/tingling	1.229	1.426
Palpitations	2.549	1.164
Shortness of breath	1.967	1.350
Sweating	1.928	1.372
Trembling/shaking	1.693	1.452

Principal components analysis to investigate clustering of the symptoms revealed a five component orthogonal solution in that a rotated primary matrix using an orthogonal rotation produced clinically meaningful clusters of items. The decision to select a five component solution was based on a number of criteria. First, items were excluded if the cluster loading was less than 0.50. The decision to select a five component solution was supported by the eigenvalues of the clusters which were all greater than or close to 1. A scree test using the eigenvalues also supported this decision. The components identified were described by; 1) choking and shortness of breath, 2) palpitations and trembling, 3) sweating, nausea and flushing , 4) depersonalisation and dizziness and, 5) chest pain and numbness. The process of naming components consisted of identifying those symptoms which made substantive sense according to what has been suggested by the literature. For example, the decision to name component 1 as respiratory was based on the presence of two symptoms which are associated with breathing difficulties. Component 2 was named as a cardiovascular component as trembling and heart palpitations are often associated with cardiovascular conditions. Component 3 was considered most likely to represent a gastrointestinal component as nausea has been associated clinically with an increase in body temperature. Component 4 was named as a neurological component as it clearly consisted of symptoms localised to the head and component 5 was best described as a sub-type of the cardiovascular group. This component consisted of symptoms often associated with myocardial ischaemia. Components were also selected on the basis of the proportion of variance explained. Table 2 shows the eigenvalues, percentage of variance explained and symptom loadings on each of the 5 components.

**Table 2:** Cluster Loadings, Eigenvalues and the Percentage of Variance Explained by each Component

Label	Symptom	Components				
		1	2	3	4	5
Respiratory	Choking	<b>0.853</b>	-0.074	0.110	0.122	0.041
	Shortness	<b>0.802</b>	0.177	.0006	0.130	0.060
Cardio I	Palpitations	-0.066	<b>0.796</b>	-0.045	0.193	0.095
	Trembling	0.263	<b>0.692</b>	0.204	0.034	0.072
Gastro	Sweating	0.090	0.262	<b>0.777</b>	0.003	-0.078
	Nausea	0.104	-0.210	<b>0.664</b>	0.164	0.256
	Flushing	-0.160	0.444	<b>0.506</b>	0.267	0.184
Neuro	Deperson	0.125	0.090	0.006	<b>0.885</b>	0.023
	Dizzy	0.026	0.236	0.362	<b>0.645</b>	0.082
Cardio II	Chest pain	-0.026	0.040	0.013	0.098	<b>0.913</b>
	Numbness	0.256	0.293	0.253	-0.049	<b>0.532</b>
EIGENVALUE		3.052	1.385	1.072	0.990	0.910
% VARIANCE		27.7	12.6	9.7	9.0	8.3

As illustrated in Table 2, Component 1 (Respiratory) accounted for the greatest percentage of the variance (27.7%) with Component 5 (Cardio II) accounting for the least (8.3%). The total variance explained by this factor solution is 67.4%. The correlation matrix is presented in Table 3 where the greatest association was between choking and shortness of breath ( $r = .51$ ), followed by depersonalisation and dizziness ( $r = .42$ ), flushing and dizziness ( $r = .40$ ) and palpitations and trembling ( $r = .38$ ).

**Table 3: Correlation Matrix of Panic Symptoms**

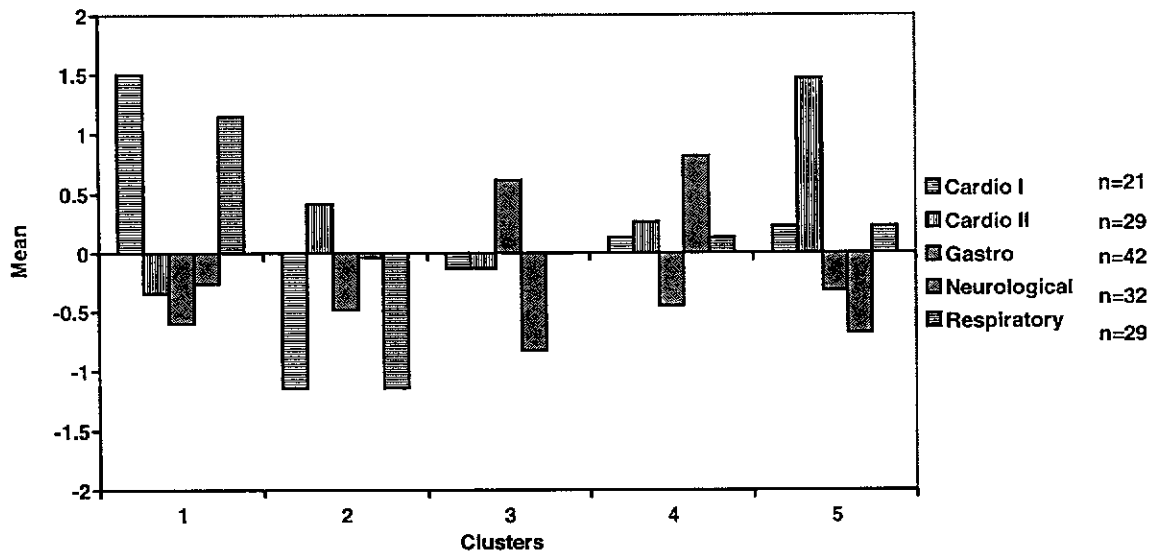
	Chest	Choke	Deper	Dizzy	Flush	Naus	Numb	Palp	Short	Sweat	Trem
<b>Chest</b>	1.000										
<b>Choke</b>	0.403	1.000									
<b>Deper</b>	0.094	0.219	1.000								
<b>Dizzy</b>	0.117	0.206	0.425	1.000							
<b>Flush</b>	0.215	0.014	0.194	0.399	1.000						
<b>Naus</b>	0.196	0.175	0.130	0.248	0.188	1.000					
<b>Numb</b>	0.266	0.205	0.127	0.302	0.243	0.126	1.000				
<b>Palp</b>	0.165	0.023	0.180	0.248	0.306	0.044	0.114	1.000			
<b>Short</b>	0.120	0.507	0.154	0.321	0.083	0.098	0.134	0.137	1.000		
<b>Sweat</b>	0.080	0.136	0.131	0.304	0.370	0.246	0.224	0.177	0.148	1.000	
<b>Trem</b>	0.084	0.167	0.227	0.254	0.287	0.194	0.317	0.377	0.226	0.233	1.000

### **Stage Two**

The final cluster centroids are illustrated in Figure 2. These centres represented 5 'pure' types by setting the starting centroids high (2 standard deviations above the mean of remaining groups) on the target symptom and low (2 standard deviations below the mean of the remaining groups) on the remainder. Table 4 displays the cluster centres specified for analysis by the program.

**Table 4:** Specification of Initial Cluster Centres for Analysis

Cluster	1	2	3	4	5
1	2.00	-2.00	-2.00	-2.00	-2.00
2	-2.00	2.00	-2.00	-2.00	-2.00
3	-2.00	-2.00	2.00	-2.00	-2.00
4	-2.00	-2.00	-2.00	2.00	-2.00
5	-2.00	-2.00	-2.00	-2.00	2.00

**Figure 2:** Final Cluster Centroids

At least one contrast between groups for each component was significant (Component 1,  $F(4,148)= 34.52$   $p<0.001$ ; Component 2,  $F(4,148)= 43.17$   $p<0.001$ ; Component 3,  $F(4,148)= 12.93$   $p<0.001$ ; Component 4,  $F(4,148)= 14.76$   $p<0.001$ ; Component 5,  $F(4,148)= 50.00$   $p<0.001$ ). In order to establish which group means were significantly different, post hoc analyses using the Duncan Multiple Range Test

were completed. For each physiological cluster, the target component was significantly different to all of the remaining components (Component 1,  $t(148)= 9.82$   $p<.001$ ; Component 2,  $t(148)= 10.36$   $p<.001$ ; Component 3,  $t(148)= 5.12$   $p<.001$ ; Component 4,  $t(148)= 5.75$   $p<.001$ ; Component 5,  $t(148)= 12.82$   $p<.001$ ).

## Discussion

Five clinically meaningful groups of panic symptoms emerged from this analysis which coincided with major physiological reactions often associated with fear and anxiety. They were a respiratory component (shortness of breath and choking sensations), a neurological component (dizziness and depersonalisation), a gastrointestinal component (nausea, sweating and flushing), a cardiovascular component (palpitations and trembling) and a second cardiovascular component, similar to the symptoms of myocardial ischaemia (chest pain and numbness). The component which explained the greatest proportion of the variance in the present study was the respiratory group of symptoms which supports the findings of Briggs, Stretch & Brandon (1993) who found a strong respiratory component emerging from a principal components analysis of 1,168 students with panic.

The identification of each of the five groups of symptoms from this study was straightforward as the items loading onto each component clearly represented meaningful groups. For example, choking and shortness of breath represent respiratory symptoms and dizziness and depersonalisation represent neurological symptoms. Although the present study was exploratory, the existing literature

suggested the existence of four principal clusters and the individual symptoms which correspond to each (cardiovascular, respiratory, gastro-intestinal, neurological)(Katon, 1971; Lydiard, et al., 1994). The present decision to identify the second component as "cardiovascular" was based on the known physiological sensations associated with cardiac ischaemia; namely, tightness and pain across the chest and tingling in the extremities. Bass (1992) has highlighted the overlap between angina and the chest pain associated with a panic attack. Specifically, these pains are reported in the left inframammary region but may be pectoral or more central. As more information is gathered in this area it will be possible for future investigators to use confirmatory factor analysis to test out the stability of the symptom groups identified.

As with other exploratory studies the process of naming components is by its nature somewhat subjective and hence open to interpretation. Even if the items found to load together in this study were named differently, they are still statistically meaningful relationships. The decision to name components as representing particular physiological conditions will become more important should future studies find similar components. The validity of the components identified in this study was also supported by the results of the cluster analysis which found people could be identified according to the same physiological components as found in the principal components analysis.

The process of naming the components in this study was based primarily on the face value of the items loading on components and from observations in the



literature. The process of naming groups in the Whittal, Suchday, & Goetsch (1994) study was less straightforward. The authors described four sets of variables as 'theoretically meaningful' and labelled them as cognitive, physiological/sensory, autonomic and respiratory/cardiovascular. The naming of groups was justified by pointing out that the symptoms noted would be expected to covary with panic-related autonomic activation. In other words, during a panic attack a number of physiological changes are understood to occur simultaneously. The authors have partitioned these sensations according to where in the body they are thought to originate. For example, the head for one set and the heart and lungs for another. This makes intuitive sense although it is still possible to use these criteria and arrive at different names for the factors which emerged. This difficulty can be illustrated by consideration of the third factor identified by Whittal and colleagues (1994). This has been referred to as a general autonomic factor consisting of the symptoms of sweating, trembling and palpitations. It could instead be argued that the symptom of palpitations would be expected to fall into their fourth cardiovascular/respiratory group.

There are difficulties in making comparisons between this study and others. As already discussed no studies were found which examined physiological symptoms in panic exclusively. Also, a variety of different assessment devices have been used to obtain the panic symptoms. Although most measures cover the relevant symptoms, some are self-report panic attack questionnaires and others are obtained through clinical interviews (ADIS-III-R). Before any meaningful comparisons can be made studies need to be consistent in their use of these devices. Ideally, an assessment device enabling panic symptoms to be recorded as they occur would provide a more

accurate description of symptoms than retrospective accounts. In addition, the use of a common severity rating scale would assist in making meaningful comparisons.

Studies could also be improved by providing detailed subject information to enable future replication. The Whittal et al. (1994) study did not mention any relevant secondary diagnoses nor whether they excluded subjects with serious medical conditions. These variables need to be specified so as to rule out the possibility of their confounding results. An additional factor which makes comparison of this study with others difficult is that it was conducted on an Australian rather than American sample on whom most studies have been conducted. These differences in nationality may be important.

In support of the principal components analysis which revealed a five component solution, the second stage of analysis indicated that the current sample of people with panic disorder form into five separate clusters corresponding to the particular groups of panic symptoms reported. That is, the first part of the analysis indicated that the symptoms of panic attacks formed into meaningful physiological components and the second part indicated that individuals clustered on the basis of their most predominant physiological symptoms. These individuals could be identified on the basis of the same physiological components which emerged from the first part of the analysis. Therefore, the analysis supports the existence of sub-groups of panickers as well as sub-types of panic symptoms. The subgroups included two cardiovascular groups, a respiratory group, a neurological group, and a gastro-

intestinal group. This finding provides some support for the existence of sub-groups of people with panic disorder.

The existence of sub-groups of people with panic disorder suggests some immediate implications for treatment. The present study confirms the results of Briggs et al. (1993) who identified a predominant respiratory cluster of symptoms in their sample of people with panic disorder. For those individuals whose predominant symptoms are respiratory, the provision of a tailored treatment package consisting of breathing re-training would seem the most appropriate. It may be that the efficacy of such an approach is dependent upon its applicability to the specific somatic sensations of panic experienced by the individual. Therefore, the efficacy of the various components of cognitive-behavioural treatment could vary greatly depending upon the sample of people with panic disorder to which it is applied. Rather than dismiss a component as being less effective than another it may depend on the 'match' of a given treatment component to a particular type of client.

Currently, most programs offer a general explanation of each of the symptoms that can be experienced by an individual. As well as applying the most relevant cognitive-behavioural treatment for the individual, it would also be possible to provide an educational component which specifically details the physiological mechanisms behind the particular set of symptoms experienced by the person. For a person with panic disorder with mainly neurological symptoms this might consist of specific attention to the causes of dizziness and the sensation of depersonalisation. In addition, education about the differences between the sensations felt by someone with

a slow-growing tumour as opposed to the headaches often experienced as a function of increases in muscle tension would be helpful. Indeed, the existence of sub-groups within panic disorder opens up a realm of possibilities for tailoring treatment. Most clinicians agree that existing treatments should be modified to suit the individual (Bass, 1992; Siegal, Jones & Wilson, 1990). The current investigation may provide information which will facilitate this approach more directly.

A second major implication is that by clarifying panic symptomatology improvements can be made in early identification of the problem. Indeed, it has been suggested that panic disorder is an ideal candidate for the development of a screening program (Antony, Brown, & Barlow, 1992). Such programs could reduce the cost and discomfort experienced by people who are searching for explanations for their somatic sensations. The literature suggests that a number of sufferers with panic disorder over-utilise the health care system, in particular, general medical services (Boyd, 1986; Katon, Vitaliano, Russo, Jones, & Anderson, 1987; Siegal, et al., 1990; Weissman, 1991). The nature of their symptoms makes them difficult to discriminate from general medical conditions and as a result expensive diagnostic tests are typically undertaken. Studies of patients presenting to specialists such as cardiologists and gastroenterologists indicate a high percentage of patients with panic disorder and no diagnosable physical conditions. For example, a study by Beitman et al. (1993) found that thirty-two of 94 subjects (34%) with chest pain of uncertain origin and normal coronary arteries met the criteria for panic disorder, (according to the more conservative DSM-III criteria), of at least one panic attack per week for the last three weeks.

Some authors (Beitman et al., 1993; Katon, 1992; Leibowitz, 1992) have argued for the training of primary care physicians and cardiologists in the recognition of the broad panic disorder spectrum. The findings of the present study indicate that it would be beneficial to highlight to relevant specialists who are likely to come across individuals with panic disorder, the existence of these particular clusters of panic symptoms and types of people with panic disorder. Currently, panic disorder is considered to consist of an array of symptoms with which an individual is likely to present. The results of the present study indicate that this is not necessarily so and in fact most people may have a predominant set of physiological symptoms which correspond with some major physical conditions. Given that an individual may be for example, a gastrointestinal panicker it is understandable that their panic and anxiety may remain unidentified in the context of a gastro-intestinal investigation. This is illustrated in a study by Katon (1984) who suggested that individuals present to specialists such as cardiologists because they selectively focus on cardiovascular symptoms. With patients undergoing cardiological or neurological investigations, it has been reported that 23-41% of individuals with negative medical findings acknowledge recurrent episodes of physical discomfort that resemble the somatic symptomatology of panic. Unless physicians are made aware of the various ways that panic disorder can manifest itself, individuals with the disorder may continue to go largely unnoticed. Without accurate diagnosis, patients often move from one physician to another looking for an answer and usually incurring high costs for nonconclusive evaluations. Early identification of the problem would enable referral to a mental health practitioner and the most appropriate treatment. Therefore,

accurate diagnosis will be likely to lead to effective treatment with a consequent reduction in social and work morbidity and in medical care costs.

This study provides some evidence that individuals with panic disorder may fall into various sub-groups on the basis of their predominant physiological symptoms. However, much work is needed to substantiate this finding. Studies investigating panic symptoms using more than one type of measure (retrospective versus prospective) would enable firmer conclusions to be made. Similarly, a longitudinal design allowing panic symptoms to be monitored for change across time would be beneficial. Although the generalisability of this study is limited due to the nature of the reporting of panic symptoms, it does provide valuable information as to how panic symptoms emerge from retrospective recording procedures. As this is the most widely used method for establishing the initial diagnosis of panic, this type of information is essential.

The results of the present study have confirmed the existence of five distinct sub-groups of people with panic disorder who can be identified on the basis of the predominant set of physiological symptoms experienced during a panic attack. As discussed above, a major implication of this finding is that by clarifying the nature of the symptoms of panic disorder, it may be possible to enhance early identification of the problem. Specifically, it has been noted that many individuals with panic disorder report to specialists for treatment where they are difficult to distinguish from patients with true organic conditions.

Despite the existing knowledge about the number of these individuals who present to specialists, no studies to date have examined the relationship between a person with panic disorder's predominant set of physiological symptoms and the type of specialists he or she visits. For example, it could be hypothesised that a neurological panicker would be more likely to seek assistance from a neurologist than a gastroenterologist. This question will be directly examined in the second part of the following study based on the clusters which have emerged in the present study. This type of investigation represents an important step in the process of developing effective screening procedures. Specifically, it will assist the development of a screening device which could target the kind of symptoms most likely to be experienced by a person with panic disorder presenting to a particular specialist. Assuming that the symptom clusters identified are valid, this study represents an important step in the process of developing effective screening procedures for panic disorder.

The first part of the following study is aimed at investigating medical utilisation and costs for people with panic disorder in Australia to further demonstrate the need for appropriate screening devices in general medical settings. It will also compare the utilisation and costs of this group with another group of people with social phobia as no studies have directly compared two groups of anxiety disorders on these measures.

## CHAPTER THREE

# STUDY 2 (A) A COMPARISON OF MEDICAL UTILISATION AND COSTS IN PANIC DISORDER AND SOCIAL PHOBIA

### Introduction

#### *Overview*

"A 38 year old Puerto Rican woman admitted to the emergency department reported chest pain, dizziness, shortness of breath, and the fear that she was dying. The electrocardiogram showed no abnormalities. She had no cardiac risk factors." (Tommasini & Federici, 1992, p.319). This example is one of many similar cases in which panic disorder often remains unidentified in the context of other physical conditions. For people with the disorder, the experience of high anxiety symptoms can occur without the person being able to identify any obvious cause. As a result, the meaning of the symptoms experienced are ambiguous, particularly during the initial panic attack. The frightening symptoms of palpitations, tachycardia and chest pain, result in many sufferers seeking treatment at emergency departments afraid that they are dying of a heart attack.

Weissman (1991) reported that compared to patients with other psychological disorders, those with panic disorder have the highest use of the emergency department for emotional problems. Indeed, Katon, et al. (1987) highlighted that



people with panic disorder frequently seek medical care services for a wide variety of complaints which includes a high number of visits to various medical practitioners and use of emergency rooms, clinics and hospitals. Sheehan, Ballenger and Jacobsen (1980) reported that in the United States 100 million dollars was spent in 1980 on health care costs and related employment losses for people with panic disorder. These authors noted that despite the current emphasis on cost-containment and escalating health care expenditure, few studies have investigated the costs of panic and other anxiety disorders. Unfortunately, no studies investigating health care costs for people with panic disorder in Australia have been conducted.

#### ***Panic Disorder - Utilisation and Cost***

In a recent study by Simon, Ormel, Vonkorff and Barlow (1995) primary care patients with DSM-III-R anxiety or depressive disorders were found to have health care costs that were one and a half to twice as high as those people without a DSM-III-R diagnosis. These large cost differences were found after adjustment for medical morbidity.

The National Ambulatory Medical Care Survey gathered information on approximately 90,000 patient visits to a sample of physicians from nine medical specialty groups in the United States. It was found that anxiety accounted for 11% of all visits (Schurman, Kramer & Mitchel, 1985). Despite a large number of visits to general practitioners and associated specialists, the search for an explanation for the symptoms of panic typically results in frustrating and costly misdiagnoses. Indeed, the

statistics relating to medical costs reflect this pattern. In the United States it has been estimated that 33 million dollars per year is spent on medical care utilisation in individuals with panic disorder (Katon, 1992). Sheehan (1982) noted that referral to psychiatrists or other mental health professionals typically occurs late in the course of the illness as patients remain preoccupied with their somatic symptoms which tend to override the emotional component of their disorder. Delays in proper diagnosis are therefore costly both for the individual and for the health care delivery system.

The National Institute of Mental Health Epidemiologic Catchment Area (ECA) program was the first major epidemiological study to incorporate the DSM-III criteria for panic disorder. The study sample originated from the populations of five metropolitan areas in the United States. In one study of the ECA, Boyd (1986) reported that in comparison with other mental disorders, those with panic disorder had the highest number of general and mental health visits. Panic disordered patients were also found to receive about three times more mental health treatment than those with specific phobias, alcohol dependence and drug dependence.

Siegal, et al. (1990) found that people with panic disorder had seven times the number of average medical visits expected for the general population. The 1985 National Health Interview Survey in the United States reported 4.4 visits annually for males and 6.1 visits for females. In comparison, those individuals with panic disorder had an average of 37.3 visits per year. The authors offered a conservative estimate of annual charges for physician visits for these sufferers at \$1,068 in 1990. This was compared to the \$403 for physician expenditures in the general population.

Salvador-Carulla, Segui, Fernandez-Cano & Canet (1995) assessed the costs associated with panic disorder before and after the diagnosis and provision of effective treatment. They included 61 people with a primary diagnosis of panic disorder who were assessed over a period of 24 months. The authors found significant improvement in the quality of life of the patients as indicated by a decrease in the number of panic attacks, the number of symptoms related to panic disorder, and the level of restriction due to agoraphobia. They also reported a strong offset effect of 94% which refers to the reduction in use of non-psychiatric services following the provision of appropriate psychiatric care.

The results of this study strongly support the need for the provision of appropriate psychiatric treatment for people with panic disorder as a means of reducing overall health care costs associated with the problem.

Studies have focused primarily on health care use in panic disorder compared with the general population rather than comparisons with other anxiety disorders such as specific phobia or social phobia (Katon, 1992; Siegal, et al., 1990). Although these anxiety conditions are characterised by similar somatic symptoms, the context in which the symptoms are experienced is quite different. For example, individuals with panic disorder are more likely to attribute their somatic symptoms to an underlying medical problem rather than anxiety as the symptoms often appear to 'come out of the blue'. By contrast, panic attacks experienced in the context of specific phobias or social phobia usually have a clearer causal path for the sufferer to recognise. For

example, panic attacks experienced in the context of a person's feared social situation are more easily explained and are therefore less likely to be misinterpreted as a medical problem. Therefore, it is possible that people with panic disorder would be more likely to incur higher medical costs than people with social phobia due to the basic differences in how their symptoms are interpreted. Although this makes intuitive sense, no studies have actually compared these two anxiety disorders groups on their use of the health care system.

### ***Aim of Study***

The aim of this study is to compare the health utilisation rates and costs for individuals with panic disorder with those of another anxiety disorder, social phobia. Currently, data on health utilisation and costs has been predominantly carried out on American samples. No studies are available which provide information about health utilisation and costs in Australia for people with panic disorder and without such information generalisations from existing studies are limited. This study will therefore investigate these issues with an Australian sample.

The specific hypothesis to be tested is that people with panic disorder will report higher rates of medical utilisation and associated costs than people with social phobia.

## Method

### Subjects

A total of 99 subjects were included in the study of which 65.7% were female and 34.3% male. The mean age of participants was 34. Three comparison groups were identified:

**GROUP 1:** (N=41) Principal diagnosis of Panic Disorder (PD) without agoraphobia or with limited agoraphobia.

**GROUP 2:** (N=15) Principal diagnosis of Social Phobia (SP).

**GROUP 3:** (N=43) Normal Controls (NC).

The mean age of the PD group was 35, the SP group 36, and the NC group, 33. Analysis of variance was used to compare these means and revealed no significant difference between any of the groups on age ( $F(2,96) = .6458, p=.5265$ ). An analysis of variance comparing the groups on gender was also non significant ( $F(2,96) = .4844, p= .6176$ ). Therefore the three groups were comparable on the variables of gender and age.

All subjects were recruited via the Curtin Centre for Anxiety and Fear Research at Curtin University. As for all other studies, individuals in the anxiety disorder's groups underwent medical screening prior to inclusion in the study. They were also excluded if they had a secondary diagnosis less than two points away from their primary diagnosis according to the clinician's 9-point rating scale on the ADIS-

III-R. The secondary diagnoses for the people with a primary diagnosis of panic disorder were; social phobia (27.3%), generalised anxiety disorder (15.1%), depression (11.2%), specific phobia (8.7%) and post-traumatic stress disorder (6.7%) with 31% of this group having no secondary diagnosis. Of the 41 participants with panic disorder, 35 had mild agoraphobia (a rating of 3 or less on the ADIS-III-R clinician's scale) and 6 had no agoraphobia. Secondary diagnoses for people with social phobia were; generalised anxiety disorder (31%), panic disorder (10.3%) and depression (4.4%) with 54.3 % having no secondary diagnoses.

The normal control subjects were recruited via Curtin University and included the friends and families of staff and students. This group was therefore a non-academic sample as it did not include any staff or students of the university. They were asked if they would complete a short questionnaire regarding their use of the health care system. As with the anxiety disordered subjects any control subjects reporting serious medical conditions were excluded from the study. The control subjects were also screened for an anxiety disorder using the Beck Anxiety Inventory (BAI) (Beck, 1990) (See appendix C). Any individuals scoring more than 5 on the scale were excluded as potential normal controls. Of the 60 individuals screened, 13 were excluded on the basis of their BAI score and four due to the presence of a serious medical condition. The inclusion of the control group was primarily for the purpose of obtaining a baseline of utilisation and costs for a non-anxiety group. Participants in the control group were therefore not matched to participants in the anxiety disorders groups as the essential comparisons for this study were between the panic disorder and social phobia subjects.

## **Measures**

A Health Utilisation Questionnaire (HUQ) was designed for the purposes of this investigation to provide information about a person's specific utilisation of the general health care system over a 12 month period (See Appendix D). The questionnaire also covered areas such as the person's current medication and initial explanations given by general practitioners as to the cause of their physiological panic symptoms. As the frequency of visits to a general practitioner is typically much higher than for specialist visits a reduced time period of 6 months was used for this question to facilitate more accurate recall. The questionnaire was administered by clinical interview and covered three main areas:

1. General Practitioners - including number of visits in last 6 months, medication prescribed, reason for the visit, etc.
2. Specialists - including number and type of specialists seen in last 12 months, etc.
3. Diagnostic Tests - including number and type of tests undertaken in the last 12 months, use of ambulance and emergency departments, etc.

## **Verification of Estimates**

All subjects signed a consent form allowing their general practitioner to be contacted in order to verify their estimates. A copy of the consent form appears in Appendix E. Of the 50% of subjects' estimates randomly checked, on average 95% of their estimations were correct.

### ***Procedure***

All potential participants were invited to the clinic for an assessment using the ADIS-III-R (Brown, et al., 1993). All assessments were conducted by post-graduate clinical psychology students trained in the administration of the ADIS-III-R to the recommended standard (see previous study).

Following the ADIS-III-R assessment, subjects attended a feedback session where they were provided with information regarding their diagnosis by the therapist who conducted the assessment. This session occurred prior to the commencement of cognitive-behavioural treatment at the clinic.

Shortly after the provision of feedback regarding the person's diagnosis, the author was introduced and used the remainder of the time to conduct the HUQ. The questions required an individual to discuss their use of the health care system over the last 6-12 months. The clinical interviews using the HUQ were all conducted by the author who remained blind to the subject's primary anxiety disorder diagnosis. Each interview took approximately 30 minutes to complete, after which individuals were offered cognitive-behavioural treatment at the Centre.

All potential control subjects were administered the BAI by the author. This inventory yields an estimate of an individual's overall severity of anxiety symptoms and requires between 5 and 10 minutes to administer. The BAI total score is the sum of the total ratings given by the individual for the 21 symptoms. The maximum score



is 63 points. Scores of 0-7 are considered to reflect a minimal amount of anxiety; scores of 8-15 indicate mild anxiety; scores of 16-25 reflect moderate anxiety; and scores of 26-63 indicate severe anxiety. When the scale is used to maximise the detection of individuals with anxiety it is recommended that the upper level of each range of scores be lowered to minimise false negatives (Beck, 1990). This method was used in the present study by reducing the cut off score for inclusion in the control group to five. Individuals meeting the inclusion criterion for the control group were then administered the HUQ by the author.

### ***Calculation of Direct Costs***

An estimation of the costs of diagnostic tests was priced using the Medicare Schedule (1995) which includes the total cost of all diagnostic tests available in Australia. For each test the minimum fee was taken to avoid inflating the cost estimates of the individual tests. Visits to casualty departments or transport in an ambulance were included in this estimate. The standard call-out fee for an ambulance was used for each estimate and was obtained from St John's Ambulance Service.

The second cost estimate made was for number of visits to a general practitioner in the six months prior to the interview. Again, the minimum cost for a standard consultation to a general practitioner in Australia was used for this estimate, although the actual cost would have been substantially higher. The initial visit to a general practitioner for medical screening was subtracted from the overall estimation of the number of visits.

The Medicare Schedule (1995) was also used to estimate the cost of visits to specialists. As participants were unable to specify whether they visited consultant physicians or medical specialists an average fee was calculated to account for the discrepancy between the two different charges for these services (e.g. consultant physician fee: \$110.10, medical specialist fee: \$63.60). Cost estimates for specialists not covered by the Medicare system in Australia (e.g. physiotherapists, naturopaths) were obtained by randomly selecting three of the same kind of specialists from the telephone book and asking for their standard consultation fee over the telephone. The three fees were then averaged to obtain the cost estimate for that type of specialist. Costs incurred from seeing mental health specialists were not included in the calculation of costs for specialists. However, for interest, data on the frequency of visits to these types of specialists will also be presented.

A final total direct cost estimate for medical services over one year was calculated for each group by including all of the direct costs outlined above. As the cost of visits to general practitioners was only obtained for a period of 6 months, each person's estimate was doubled to allow for the calculation of estimated total costs per annum.

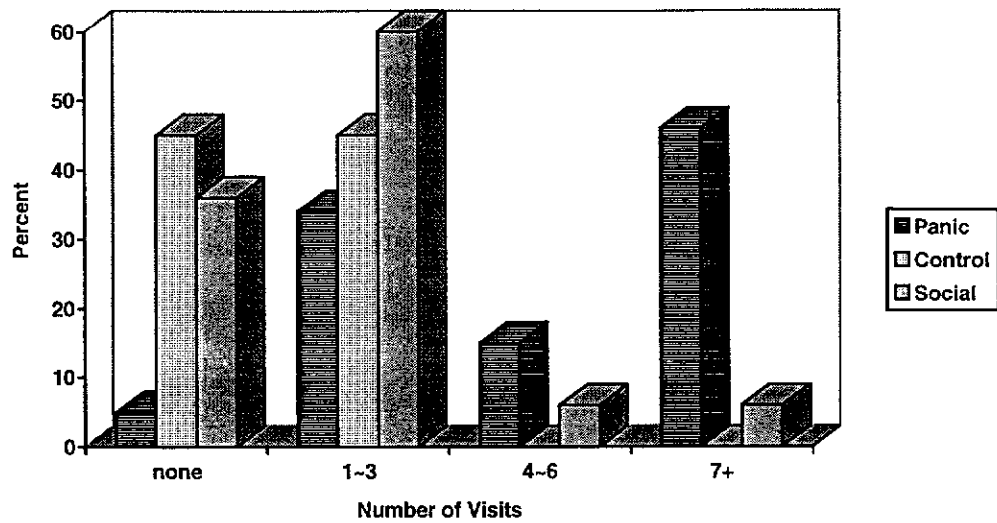
### ***Statistical Analysis***

Analyses of variance (ANOVA) was used instead of multivariate analysis of variance to compare the three groups on the dependent variables from the Health Utilisation Questionnaire. This choice was due to the independent nature of the variables being analysed. The independent variable was group membership (Group 1= Panic Disorder, Group 2 = Social Phobia, and Group 3 = Normal Control) and the dependent variables were costs of GP visits, costs of diagnostic tests (including ambulance and emergency department fees), costs of specialist consultations, total number of visits to a GP, total number of diagnostic tests and a total direct cost estimate.

## **Results**

### ***General Practitioners***

Over the two-week period prior to interview, 58.5% of the panic group had seen a GP. None of the social phobia group or control group had seen a GP in this time period. Figure 3 shows the rates of GP attendance over the previous 6 months for the three groups. As shown, almost half (46.3%) of the PD group had seen a GP more than 7 times in the previous 6 months compared to 6.7% of the SP group and none of the NC group.



**Figure 3:** Number of Visits to a G.P. in 6 Months

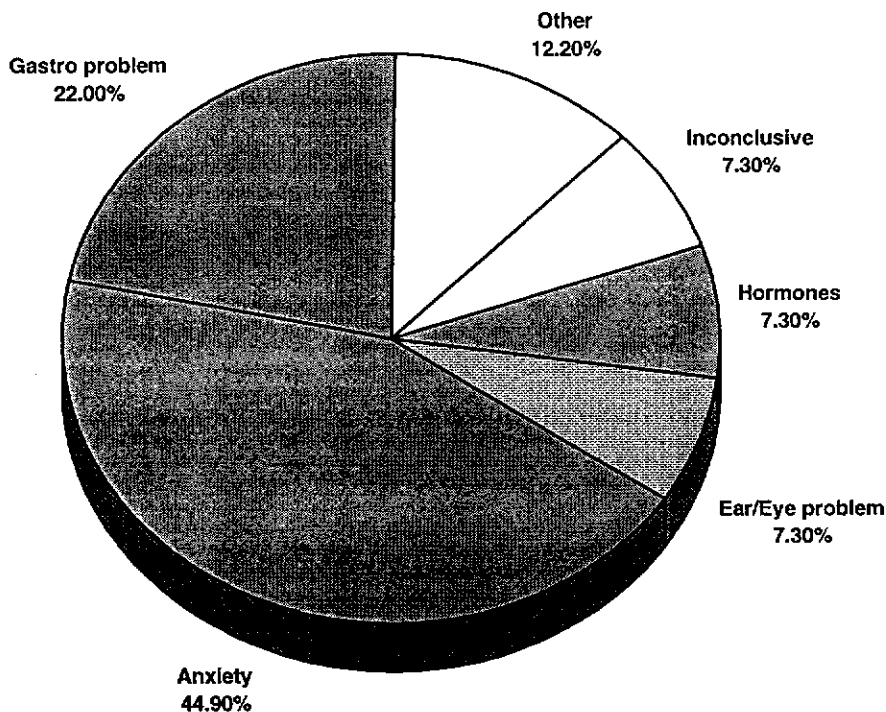
Table 5 shows the average cost of visits to a GP for each group. As the cost data appeared to be positively skewed (2.204), the non-parametric equivalent of analysis of variance was used. Kruskal-Wallis ANOVA revealed that the costs for the three groups were significantly different ( $\chi^2 = 38.94, p < 0.001$ ). Paired comparisons using the Mann-Whitney U - Wilcoxon Rank Sum Test indicated that the costs of visits to a GP for the PD group were significantly higher than both the control group ( $z = -6.1055, p < 0.001$ ) and the social phobia group ( $z = -3.1991, p < 0.005$ ).

**Table 5:** Mean Costs of Visits to a G.P. Over 6 Month Period

	Mean	St Dev	Median	Skew	SE Skew
Panic Disorder	\$148.86	158.37	90.60	2.201	.369
Social Phobia	\$58.89	113.50	22.65	3.397	.580
Control	\$19.49	21.87	22.65	.791	.361

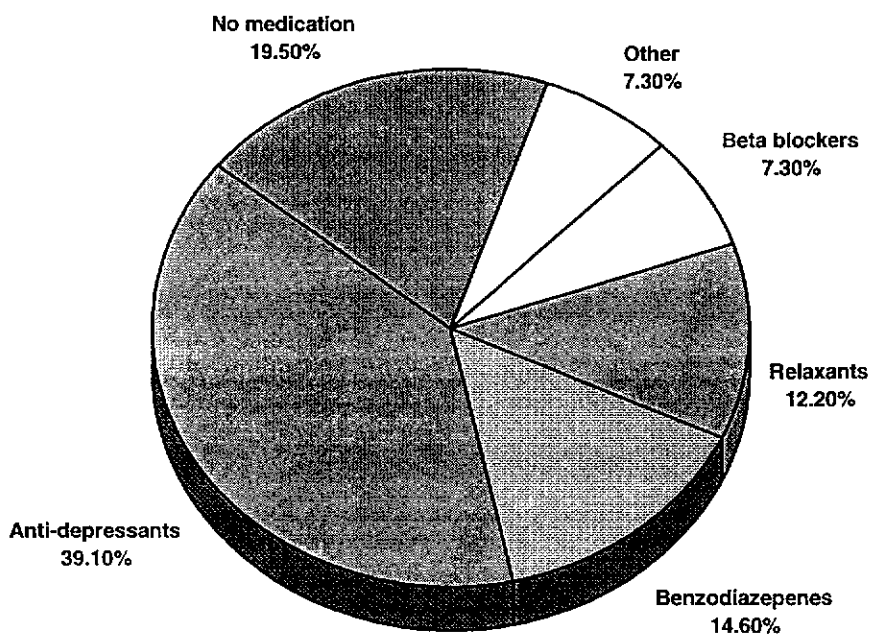
Anxiety accounted for 70.7% of the panic disorder group's visits to a GP. Only 6.7% of the SP group visited their GP for anxiety. Figure 4 shows the current medication prescribed and initial explanations given by GP's to the PD subjects. As shown, anti-depressants were the most common current medication for the panic disorder group (39%) and the most frequent initial explanation given for their anxiety symptoms by a GP was that of an anxiety condition (44.9%).

**G.P. Explanation**



**Figure 4:** G.P Explanation and Medication Prescribed for Panic Group

### Medication Prescribed



**Figure 4:** G.P Explanation and Medication Prescribed for Panic Group (cont)

### Specialist Consultations

All subjects in the PD group had seen at least one specialist in the previous 12 month period compared with 86.7% of the SP group and 55.8% of the NC group. Table 6 shows the distribution of specialists seen by each group over the previous 12 months. As indicated in the table, psychiatrists and psychologists were the most frequently visited specialists for both the panic (39%) and social phobia (40%) groups. The most frequently seen non-mental health specialists for the panic group were cardiologists (36.67%) and gastroenterologists (36.60%). The most frequently visited specialists for the control group were physiotherapists and chiropractors (18.6%).

**Table 6:** *Distribution of Specialists Seen by Each Group Over 12 Months*

	Panic	Control	Social
Cardiologist	36.67 (7.3)	4.7	13.3
Gastro	36.60 (4.9)	2.3	6.7
Neuro	34.10 (2.4)	7.0	0.0
Respiratory	14.60	2.3	0.0
Optometrist/ENT	14.60 (2.4)	4.7	0.0
Psych	39.00 (12.2)	2.3	40.0
Endochronologist	14.60	0.0	0.0
Naturopath	14.60	0.0	0.0
Radiologist	4.90	0.0	0.0
Chiro/physio	12.20 (2.4)	18.6	13.3
Gynaecologist	7.30	14.0	13.3

N.B. Figures in parentheses denote percentage of individual's seeing specialists three or more times in the preceding 12 months.

The average costs of specialist consultations for the three groups is shown in Table 7. This costing did not include visits to mental health specialists. Kruskal-Wallis one way ANOVA revealed that the three groups were significantly different on this measure ( $\chi^2 = 66.23$ ,  $p < 0.001$ ). Paired comparisons indicated that the mean costs of specialist consultations were significantly higher for the PD group than both the SP group ( $z = -5.23$ ,  $p < 0.001$ ) and NC group ( $z = -7.59$ ,  $p < 0.001$ ).

**Table 7: Mean Cost of Specialist Consultations**

	Mean	St Dev	Median	Skew	SE skew	Sum
Panic Disorder	\$ 378.65	181.14	392.20	.097	.369	\$15,524.80
Social Phobia	\$ 66.86	56.37	86.80	.576	.580	\$1,003.00
Normal Control	\$ 36.97	45.68	0.00	1.09	.361	\$1,589.80

Table 8 shows the percentage of each group who used ambulance and emergency department services in the previous 12 months. As illustrated, approximately half (51%) of the PD group had visited an emergency department in the last 12 months compared to 16.3% of the NC group. ANOVA of the frequency of visits to the emergency department indicated that the PD group had significantly more visits than the other two groups ( $F(2,96) = 11.85, p < .001$ ). A total of 22% of the PD group had travelled in an ambulance compared to 4.7% of the NC group. None of the SP group had used either of these facilities in the last 12 months. ANOVA of the frequency of ambulance use revealed no significant differences between the three groups.

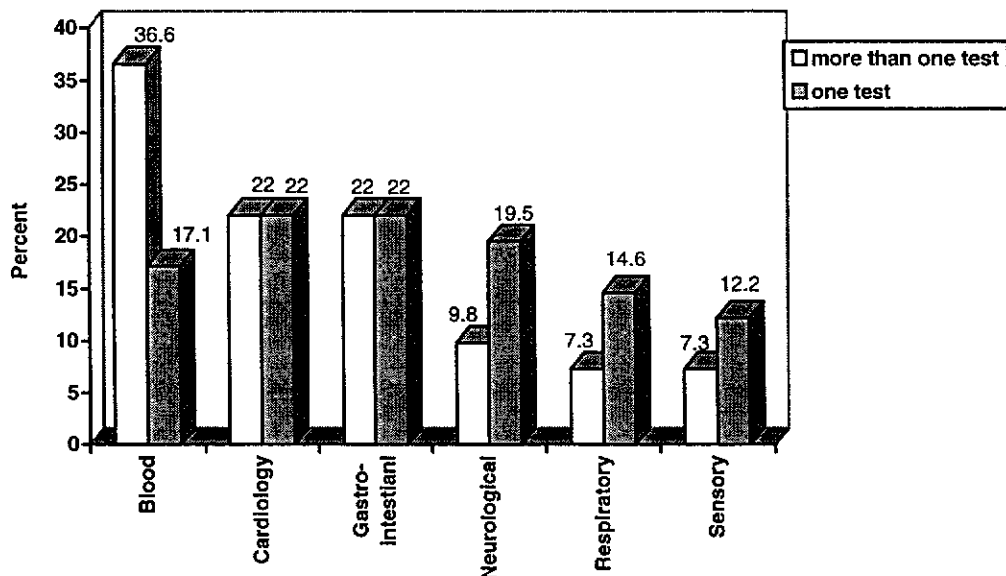
**Table 8: Percentage of each Group Using Ambulance and Emergency Department Services**

	Ambulance	Emergency Department
Panic Disorder	22.0%	51.2%
Social Phobia	0%	0%
Normal Control	4.7%	16.3%



### Diagnostic Tests

A total of 85.4% of the panic disorder group had at least one diagnostic test in the last 12 months, compared to 20% of the social phobics and 41.9% of the control group. For the panic group, 9.7% had more than 10 tests in the previous 12 months. Figure 5 shows the frequency and type of tests undertaken by this group. The average costs of the diagnostic tests for each group are shown in Table 9. A Kruskal-Wallis ANOVA was applied to these data and found a significant difference between the three groups ( $\chi^2 = 46.89, p < 0.001$ ). Paired comparisons using the Mann-Whitney U-Wilcoxon Rank Sum test revealed that the costs of diagnostic tests for the panic disorder group were significantly higher than both the control group ( $z = -6.3163, p < 0.001$ ) and the social phobia group ( $z = -4.5315, p < 0.001$ ).



**Figure 5:** Percentage by Frequency of Tests Undertaken by Panic Group in 12 Months

**Table 9: Mean Costs of Diagnostic Tests**

	Mean	St Dev	Median	Skew	SE skew	% Having Tests
Panic Disorder	\$441.27	553.99	258.60	2.46	.369	85.4
Social Phobia	\$19.63	30.50	0.00	1.44	.580	20.0
Normal Control	\$22.94	38.68	0.00	1.63	.361	41.9

### **Total Direct Cost Estimate**

Table 10 shows the mean total direct cost estimates for the three groups.

Using Kruskal- Wallis ANOVA the mean total direct cost estimate was found to be significantly different for the three groups ( $X^2 = 66.30$ ,  $p < 0.001$ ). Paired comparisons revealed that the mean total cost for the panic disorder group was significantly higher than both the social phobia group ( $z = -4.94$ ,  $p < 0.001$ ) and the control group ( $z = -7.75$ ,  $p < 0.001$ ).

**Table 10: Mean Total Direct Cost Estimates**

	Mean	St Dev	Median	Skew	SE skew
Panic Disorder	\$1,117.65	845.28	876.20	1.77	.369
Social Phobia	\$204.28	256.71	132.10	2.74	.580
Normal Control	\$98.89	86.69	90.60	0.777	.361

## **Discussion**

As hypothesised, individuals with a primary diagnosis of panic disorder had rates of medical utilisation and associated costs which were significantly higher than individuals with a primary diagnosis of social phobia. These differences were found for non-mental health specialist consultations and tests and therefore provide a clear picture of the tendency for people with panic disorder to over-use the general health care system. These results confirm the findings of earlier American studies examining the medical utilisation and costs of individuals with panic disorder (Katon et al., 1987, 1992; Sheehan et al., 1980; Siegal et al., 1990; Weissman, 1991). This study represents the first using Australian data and the first to directly compare panic disorder with another anxiety disorder.

The total direct cost estimate (including the cost of visits to a GP, specialist consultation, diagnostic tests and ambulance and emergency department services) for the panic disorder group was found to be approximately 5 times higher than the social phobia group. This significant difference between groups was also identified for each of the separate cost estimates. For example, the estimated yearly cost of consultations by a general practitioner were significantly higher for the panic disorder group compared with the social phobia group. The large differences noted in this study are conservative estimates given that in all cases the minimum fee for consultation was

used in the calculations. The use of the minimum fee ensured that the differences found were in all cases conservative estimates.

The findings on diagnostic tests are equally as important. A large percentage of the individuals in the panic group had more than one diagnostic test of the same type in the 12 month period. This would suggest that people with panic disorder remain unconvinced that they do not have an underlying medical problem despite negative test results and continue to hold the same illness hypothesis to explain their symptoms over time. This may help to explain the large differences between the groups on this variable. Rather than undergoing a diagnostic test once, the current findings suggest that these individuals return for a similar procedure three or more times.

The high rates of attendance at emergency departments and in the use of ambulances in the panic disorder group also reflect this pattern. Over half of the panic group in this study had attended an emergency department at least once in the previous 12 month period. A small number of these individuals had attended more than 4 times. This supports the finding of Weissman (1991) that people with panic disorder use the emergency department significantly more often than people with other psychological disorders. As discussed above, these people appear to be continuing to attribute their somatic symptoms to an unidentified serious medical condition (e.g. heart disease).

Over 50% of the people with panic disorder in this study were initially given a non-anxiety explanation for their symptoms by their general practitioner. In fact, a variety of explanations ranging from gastrointestinal problems to ear problems were given. Of concern is the finding that some individuals were given no explanation whatsoever for their symptoms. Given the number of initial misdiagnoses noted in this sample it is not difficult to understand why the majority of people with panic disorder sampled underwent multiple diagnostic tests in the search for an explanation.

This study relied on individuals recalling information regarding their attendance to medical professionals over the last 6 - 12 months. Although the estimations regarding visits to general practitioners were accurate, this study was not able to establish the accuracy of estimations about visits to specialists as most individuals could not provide a reliable contact name or number for the specialists seen. The validity of the data could have been improved by having individuals provide receipts and keep a record of attendances to their GP and specialists.

The results of this study identified sufferers with panic disorder as unique in their use of medical services when compared to people with at least one other anxiety disorder. Although people with social phobia have panic attacks which consist of virtually identical symptoms, they appear to be able to attribute these symptoms to the frightening situation at hand rather than an underlying potential medical problem. This is supported by the significant differences found in the rates of utilisation and costs between the social phobia group and panic group. It should be noted however, that

the sample size used in this study was relatively small which may limit the generalisability of results. Future studies using larger samples would be important.

The present study together with similar studies conducted overseas highlight the need for panic disorder to be actively targeted for early intervention in an attempt to reduce the costs associated with misdiagnosis. Currently, suitable screening instruments for panic disorder for use in general medical settings have not been developed. Until these are developed, many individuals will remain unidentified and subsequently most likely to continue searching for an explanation for their symptoms.

Identification of these individuals early in the course of their disorder would allow more prompt referral for appropriate treatment. Cognitive-behavioural treatments for panic disorder have been shown to be highly effective in reducing the frequency of panic attacks experienced by an individual and also in improving end-state functioning (Margraf, Barlow, Clark, & Telch, 1993). Such treatments are therefore known to improve an individual's quality of life as a result of these changes. However, there are other likely benefits from successful cognitive-behavioural treatments such as the potential to reduce medical utilisation and costs which have been generally overlooked.

The above studies indicate there are significant personal and economic costs to the community as a result of individuals searching for explanations for their unrecognised panic disorder. Therefore, following successful psychological treatment individuals may be less likely to continue to utilise medical and allied health services

to the same degree. It could be argued that early identification and prompt referral for cognitive-behavioural treatment for individuals with panic disorder could significantly reduce health care costs in the community.

## **CHAPTER FOUR**

### **STUDY 2 (B) THE RELATIONSHIP BETWEEN SYMPTOM CLUSTERS AND TYPE OF SPECIALIST SERVICES SOUGHT BY INDIVIDUALS WITH PANIC DISORDER**

#### **Introduction**

##### *Overview*

It is now well established that individuals with panic disorder over-utilise the health care system (Boyd, 1986; Katon et al., 1987,1992; Sheehan et al., 1980; Siegal et al., 1990). The previous study confirmed this for an Australian sample of people with panic disorder. As discussed, panic disorder may be difficult to distinguish from a variety of other physical illnesses (cardiac, neurological, gastrointestinal) and as a result, expensive medical diagnostic procedures typically follow. Attention is often focused towards the somatic complaints of chest pain, palpitations, dizziness, nausea, diarrhoea, dyspnea, sweating and flushing and hence away from the possibility of panic disorder existing (Lydiard, 1994).



## ***Symptom Clusters***

Katon (1984) reported that the three most common symptoms with which patients with panic disorder presented were: 1) cardiac symptoms (21%) 2) gastrointestinal symptoms (33%) and 3) neurological symptoms (44%). He argued that the fact that patients seek physical explanations for their prominent symptoms is undisputed. For example, a person may focus on headaches and dizziness and subsequently contact a neurologist.

### ***Cardiac Symptoms***

Cardiologists have long recognised that many patients with chest pain may not suffer from demonstrable organic disease. Palpitations are among the most common complaints encountered in general medical practice. They are also frequently encountered in cardiology where they are a serious source of excessive medical-care utilisation, discomfort and disability (Jones, Dinoff & Jones, 1983). Palpitations are also common among people with panic disorder. Katon (1984) found that 89% of individuals with panic disorder presented initially with somatic symptoms, and palpitations were the most prevalent of these symptoms.

Similarly, chest pain is one of the most commonly reported symptoms in all surveys of general populations and patients in ambulatory care (Bass, 1992). However, it is not clear what percentage of these individuals suffer from panic disorder. For example, in a recent study by Kroenke & Mangelsdorff (1989) only

11% of patients presenting with chest pain at an internal medicine clinic had an established organic diagnosis. Bass (1992) noted that patients with chest pain who eventually receive a psychiatric diagnosis, characteristically present with chest pain and breathlessness as well as other somatic symptoms. These symptoms include palpitations, fatigue, dizziness and paraesthesia.

In a study of patients with chest pain without a prior history of organic heart disease, Katon (1988) found that those with negative coronary arteriograms were more likely to have panic disorder than those with positive coronary angiograms. With patients undergoing cardiac investigations, it has been reported that 23-41% of individuals with negative medical findings acknowledge recurrent episodes of physical discomfort that resemble the somatic symptomatology of panic. Bass (1992) found that many of these individuals continue to report symptoms and disability despite medical reassurance. In a 6-month follow-up study of patients with chest pain, subsequently shown not to have heart disease, the majority continued to report problems. Three-quarters described continuing limitations of activities, concern about the aetiology of symptoms, and dissatisfaction with medical care. Therefore, despite a good physical outcome many patients report persistent pain, impairment of everyday activities, emotional distress and continuing use of medical resources (Chambers & Bass, 1990).

### ***Gastro-intestinal Symptoms***

Medically unexplained gastro-intestinal complaints are common presenting problems in primary care settings. Patients with these symptoms account for 13-52% of new referrals to gastroenterology clinics and are frequently diagnosed as having irritable bowel syndrome (Walker, Katon, Jemelka & Roy-Byrne, 1992). In a recent study by Walker et al. (1992) individuals with irritable bowel syndrome were found to have lifetime prevalence rates of major depression (61%), panic disorder (29%) and generalised anxiety disorder (54%) which were well above the rates found in the medically ill comparison group and the general population.

A study by Lydiard, et al. (1986) reported that 42% of consecutively admitted patients with panic disorder volunteered the information that gastrointestinal symptoms were their most bothersome panic-related symptom. This information was obtained during structured interviews using DSM-III criteria for panic disorder that did not elicit gastrointestinal symptoms as part of the interview. Twelve percent of these individuals were being seen at the time by gastroenterologists for irritable bowel syndrome and all experienced resolution of gastrointestinal symptoms with successful pharmacological treatment for panic.

### ***Neurological Symptoms***

In a study of individuals seeking physician care for headaches in the United States, Stewart, Shechter, & Liberman (1992) found that both females and males

meeting the criteria for panic disorder were over represented. The headaches experienced by this group were reported to be considerably more frequent and disabling and of a longer duration than those people without a history of panic. This study also lends support to the findings of Stewart, Linet, & Celantano (1989) that in the population, migraine headache is three times more likely to occur in females and seven times more likely to occur in males with panic disorder compared to those without panic.

Syncope is another common clinical condition and one that is difficult to diagnose as well as consuming considerable medical resources. Syncope refers to a transient loss of consciousness with loss of postural tone. Although panic disorder is the most frequent diagnosis in psychiatric syncope patients, psychiatric disorders as a cause of the condition have for the most part been neglected. Recent work by Linzer, Felder & Hakel (1990) suggest that the prevalence of psychiatric disorders responsible for syncope may be as high as 26%. Symptoms present in psychiatric syncope patients as reported in a Duke University study (1990) were: light headedness, shortness of breath, dizziness, palpitations, tinnitus, chest pain and tingling in the limbs. In an earlier Duke University study (1988-1989) 30 patients were assigned a psychiatric diagnosis for syncope. Fourteen of these had undergone three or more medical diagnostic tests before the psychiatric diagnosis was established. Kapoor, Fortunato, Sefuk & Schulberg (1989) suggested that a considerable proportion of patients with unexplained syncope may have a psychiatric disorder as the cause for their syncope and that a large number of these patients are unrecognised by medical evaluation. The most frequent diagnosis was panic disorder

with or without agoraphobia (63%). In patients with a psychiatric diagnosis of syncope, psychiatric treatment can result in the complete alleviation of syncope symptoms. This establishes the importance of routine psychiatric evaluation of patients with unexplained syncope.

Katon (1992) has suggested that people with panic disorder selectively focus on a particular symptom and seek assistance from specialists for this symptom. Based on the reports taken from the cardiology, gastroenterology and neurology clinics discussed above this does seem to be evident although it has not been tested empirically.

### ***Somatic Interpretation***

Cioffi's (1991) model predicts that an individual will respond to the experience of a somatic sensation according to how that sensation is interpreted. This interpretation is described as being influenced by factors such as the individual's prior hypothesis about the sensation and other mediators influencing the attribution made for the sensation. Cioffi highlighted the importance of socially influenced interpretations of physical symptoms. She proposed that people act on their internal representations of their symptoms and although their construal of what has caused the symptom may not always be accurate it is possible to predict from a social-psychological point of view (Cioffi, 1990). Further, it is proposed that having a particular illness hypothesis in mind causes people to selectively search for sensations

associated with that illness and to interpret incoming sensory information as consistent with it (Anderson & Pennebaker, 1980; Pennebaker & Skelton, 1981).

As well as assigning a label to their physical sensations, people also develop inferences relating to the causes and potential consequences of their symptoms. These inferences then affect what people do in response to their perceived health threat. For example, if a person has experienced heart palpitations and has developed an illness hypothesis regarding these symptoms, on the basis of their attribution it should be possible to predict their subsequent behaviour. If the palpitations are attributed to a potential heart problem Cioffi's model would suggest that this individual would be most likely to visit a related specialist.

The components of Cioffi's model outlined above appear to offer an explanation for the medical utilisation behaviour of individuals with panic disorder. For example, the previous study found that many people responded to their physiological sensations by attending medical specialists. As none of the participants had an organic basis for their sensations it follows that the re-attendance was most likely the result of the individual continuing to hold an illness hypothesis. Therefore, the decision to consult specialists for explanations for their sensations suggests that they were misattributing the source of those sensations.

The concept of catastrophic misinterpretation also implies that people with panic disorder attribute the cause of ambiguous somatic sensations to an underlying medical problem, the consequences of which are considered catastrophic. Thus,

according to the concept of catastrophic misinterpretation individuals who consult specialists do so as a result of their misattribution of sensations and fear of a medical catastrophe. This concept is therefore similar to Cioffi's notion of the relationship between interpretation and behaviour.

The nature of Cioffi's model does not lend itself to direct tests of its validity. However, the model does suggest some relevant factors to consider when attempting to predict an individual's response to the somatic sensations of panic disorder which can be explored empirically.

According to the model, an individual would be likely to respond to sensations according to the particular hypothesis and attribution they are making regarding those sensations. Therefore, the model predicts that there would be a relationship between the type of sensations experienced by the individual and the type of specialist care sought. For example, if a person experiencing an increase in heart rate relates this to an illness hypothesis that they may have a weak heart they would be likely to attribute this sensation to a heart problem. The model then proposes that this person would seek help for that particular problem and thus would be most likely to visit a cardiologist as opposed to a neurologist. This proposal is supported by Katon (1992) who has also suggested a similar relationship.

### ***Current Findings***

Part of the difficulty with investigations of this type has been the issue of panic symptoms themselves. Specifically, it has been suggested that panic symptoms experienced by an individual can be broken down into various clusters (Briggs, et al., 1993). The clusters which have been proposed by various researchers closely correspond to the major symptoms with which people with panic present to physicians. These clusters have been proposed as: 1) cardiovascular symptoms, 2) neurological symptoms, 3) gastro-intestinal symptoms, and 4) respiratory symptoms.

Despite general agreement as to the existence of these clusters in the literature, only a few studies have examined the issue empirically thus limiting the strength of conclusions about their existence. From these studies however, some evidence for separate physiological 'clusters' of symptoms has been found (Briggs, et al., 1993; Whittal, Suchday & Goetsch, 1994) with the most consistent finding being the existence of a respiratory cluster of symptoms. The results obtained in study 1 of this project also provide evidence for the existence of major physiological symptom groups in panic disorder.

Therefore, knowledge of an individual's predominant panic symptoms may enable the prediction of the most likely type of specialist consultation. If such a relationship does exist it would assist with the identification of sub-groups of people with panic disorder in the relevant settings where they would be most likely to



present. The major implication of this would be the potential reduction in health care costs for this group of people as a result of improved identification of the disorder in medical settings and more prompt referral for treatment.

### ***Aim of Study***

The present study aims to directly investigate this issue by comparing a person's predominant cluster of panic symptoms as identified in study 1 with the type of specialist health care services sought. This will enable Katon's (1992) proposal to be tested empirically and also provide a test of the ability of Cioffi's model of somatic interpretation to explain the behaviour of a person with panic disorder in response to the experience of physical sensations. It is hypothesised that there will be a direct relationship between the individual's predominant symptom cluster and type of specialist medical care sought.

### **Method**

#### ***Subjects***

Subjects consisted of 53 people with a primary diagnosis of panic disorder with or without agoraphobia. Of the 53 people included in the study, 67% had mild agoraphobia with 33% having no agoraphobia. Assessment and selection of subjects was conducted according to the same criteria used in the previous studies. Of the total subject pool, 77.36% were female and 22.64% were male. The average age of participants was 38. Secondary diagnoses consisted of; generalised anxiety disorder

(27.1%), followed by social phobia (21.1%), specific phobia (7.6 %) and depression (5.9%). Of the total subject pool 38.3 % of individuals did not have any secondary diagnosis.

### ***Procedure***

Based on the findings from the previous study (study 1 - Symptom clusters in panic disorder), each individual completing the ADIS-III-R assessment had assigned five component scores corresponding to the major physiological clusters emerging from the principal components analysis of symptom severity ratings. These components consisted of respiratory, two sets of cardiovascular, gastro-intestinal and neurological symptoms. For each subject included in this study, five component scores were calculated and retained for comparison with the dependent variables. The sub-command SCORES of the FACTOR program in SPSS for Windows (version 6.0) was used to calculate the component scores for each subject according to the principal components analysis. This sub-command calculates the component scores using a standard regression method and allows the scores to be retained as new variables in the data file.

Following clinical interviews using the Health Utilisation Questionnaire (study 2a), questionnaires were collected and scored either '1' or '0' for each specialist seen in the last 12 months. Each specialist consulted was identified as falling into one of four groups; 1) cardiovascular, 2) neurological, 3) respiratory and, 4) gastro-intestinal.

## ***Design***

Logistic regression analysis was used to compare each subject's component scores with the number of visits to each specialist. This type of analysis was selected as the response variable (type of specialist seen) was dichotomous (e.g. 1=yes, 0=no) (Retherford & Choe, 1993). The dependent variables were the type of specialists seen and the independent variables were the five component scores. The program used for this was SPSS for Windows - Version 6.0. All variables were entered simultaneously as a single block with separate logistic regression analyses conducted for each specialist group. Rather than combining the two cardiological groups, the original five groups were retained for comparative purposes. This decision was based on the unique nature of these two groups. Despite both being representative of general cardiovascular symptoms they each consist of different types of symptoms and therefore retention of these individual groups was considered the most comprehensive way of analysing the data.

## **Results**

### ***Specialists***

Of the total sample of 53 subjects, 63.6% had visited a cardiologist in the last 12 months followed by 45.4 % visiting gastroenterologists, 34.6% visiting neurologists and 27.3% visiting a respiratory specialist.

**Logistic Regression Analysis**

The logistic regression analysis indicated that out of the five component scores, the respiratory component was able to predict a significant number of the individuals who consulted a respiratory specialist ( $R^2 = .3826$   $p < .05$ ). The respiratory component correctly predicted 77.36% ( $N=41$ ) of individuals from the total sample. None of the other components were able to significantly predict attendance at associated specialists (cardiovascular ( $F(1,51) = 1.512$ ,  $p = .204$ ); neurological ( $F(1,51) = 1.34$ ,  $p = .262$ ); gastro-intestinal ( $F(1,51) = 1.178$ ,  $p = .334$ ).

An analysis of power for the non-significant components was conducted and found to be low (cardiovascular, power = .48, neurological, power = .43, gastro-intestinal, power = .38). Therefore, the sample size may have affected the power of the study to detect significance for the remaining components. Table 11 shows the classification tables for each of the dependent variables with the number of predicted and observed subjects in each cell.

**Table 11: Classification Tables for the Five Predictor Variables**

		Respiratory (Component 1)		% Correct
		Predicted		
		Didn't attend	Did attend	
Observed	Didn't attend	36	3	92.1%
	Did attend	9	5	35.71%
		Overall correct		77.36%

Gastrointestinal (Component 3)

		Predicted		% Correct
		Didn't attend	Did attend	
Observed	Didn't attend	21	7	75%
	Did attend	10	15	60%
Overall correct				67.92%

Cardiovascular (Component 2)

		Predicted		% Correct
		Didn't attend	Did attend	
Observed	Didn't attend	4	14	22.22%
	Did attend	2	33	94.29%
Overall correct				69.81%

Cardiovascular (Component 5)

		Predicted		% Correct
		Didn't attend	Did attend	
Observed	Didn't attend	2	16	11.11%
	Did attend	0	35	100%
Overall Correct				69.81%

Neurological (Component 4)

		Predicted		% Correct
		Didn't attend	Did attend	
Observed	Didn't attend	29	5	85.29%
	Did attend	17	2	10.53%
Overall Correct				58.49%

## **Discussion**

This study investigated the relationship between an individual's predominant physiological symptoms of panic disorder and their use of specialist medical care. The hypothesis that predominant panic symptoms would predict specialist attendance was only partially supported. Only one of the five physiological symptom groups could successfully predict the type of specialist care sought by the individual. The respiratory symptom component correctly predicted the behaviour of 77.36% of the total sample of individuals. The present study had limited power due to the relatively small number of subjects included in the analysis so that larger numbers may have resulted in the other components reaching significance.

The results of this study provide only partial support for both the proposals of Katon (1992) and Cioffi (1991). Only one of the physiological components was able to predict attendance to specialists. According to Cioffi's model this relationship would be due to the respiratory group attributing their symptoms to an underlying respiratory problem. However, as this relationship was not found for the other groups some other explanations need to be considered.

Respiratory symptoms may represent the only distinct sub-set of physiological panic symptoms. In the initial study (study 1) this component accounted for the greatest proportion of the variance. Other studies have also highlighted the existence of predominant respiratory symptoms in panic disorder (Briggs, et al., 1993; Rapee et

al., 1991). Some authors have argued that individuals with respiratory symptoms make up a sub-group of those suffering with panic disorder (Ley, 1985, 1987). Therefore, the significant findings for this component in the present study may indicate that the respiratory group consists of a more valid sub-set of symptoms than the other components.

A second possibility pertaining to the nature of respiratory symptoms is that due to their localised nature they are perhaps more easily recognised and explained than the other physiological symptoms of panic disorder. The symptoms which correspond with this component are predominantly shortness of breath and choking or smothering sensations. In contrast, gastrointestinal symptoms tend to be more general such as sweating and nausea and as such may not necessarily be associated with a possible gastrointestinal condition. Therefore, locating the most appropriate specialist to consult may be more difficult for people experiencing more generalised symptoms.

The above considerations make it difficult to draw any firm conclusions regarding the capacity of Cioffi's model to account for an individual's attendance at specialists. However, an important factor incorporated into Cioffi's model may help to clarify the results. The model proposes that mediators such as a person's coping mechanisms, disposition, mood and various other factors can influence the type of attribution made for their sensations and the final behavioural response to those sensations. Some relevant mediators may have been influencing the interpretation of symptoms in this study. For example, high general levels of anxiety, low self-efficacy

and hypervigilance represent a few. The results of this study suggest that other mediators need to be considered also.

One potential mediating factor is the emphasis within the community at any given time on particular kinds of illnesses. Currently, asthma is a medical condition receiving much publicity and media attention. Therefore, the participants in this study whose predominant symptoms were respiratory may have been attributing their symptoms to a potential asthma condition.

Indeed, based on observations made in clinical settings, many individuals with panic disorder carry ventilators and other asthma medications with them at all times, whether or not they have asthma. Differentiating between the symptoms of asthma and the respiratory symptoms of panic represents a challenge for medical professionals. Spinhoven, Ros, Westgeest, & Van der Does (1994) studied 100 patients with panic disorder and found that both the past and current frequency of respiratory diseases was significantly higher in this group than a normal control group. The authors argued that anxiety appears to be more closely related to intermittent respiratory problems (such as asthma), whereas depression is more likely to be associated with continuous lungway obstruction (such as bronchitis). At this stage it is not known how many of these individuals have an organic basis for their asthma symptoms as no research data could be found. Therefore, it is a possibility that the individuals in this study visited respiratory specialists to test for asthma as this is currently a very commonly diagnosed condition.



A further consideration is the issue of interpretation. Cioffi's model proposes that individuals attributing their sensations to an underlying medical problem are in effect interpreting their sensations in a threatening manner. This interpretation then results in the individual seeking medical care. The present study made the assumption that the symptoms reported by individual's as the most predominant (study 1) would also be those which were interpreted as the most threatening. The lack of support for Cioffi's explanation of behaviour in this study could be due to a discrepancy between the symptoms identified as most predominant and those considered as most threatening by the person.

Despite the limitations discussed, the current finding has some important implications. As previous studies have shown, individuals with panic disorder over-utilise the health-care system (Katon, et al., 1987; Weissman, 1991). In particular, a number of individuals have been identified in specialist clinics presenting with what at first appears to be a medical condition but which after a number of diagnostic evaluations reveals itself to be panic disorder. Given the high costs associated with numerous diagnostic tests and multiple visits to general practitioners and specialists there is an urgent need for an effective means of correctly diagnosing these individuals more efficiently.

The findings of this study suggest that by knowing that an individual's predominant cluster of symptoms is respiratory it may be possible to predict the type of specialist they will visit. The ability to predict the type of specialist consulted by people with panic disorder may enable the effective use of screening measures in

specialist clinics. By providing the relevant specialist with knowledge about how panic symptoms may present, those with panic symptoms which may have gone unnoticed can be identified and referred on. For example, the result of this investigation indicates that respiratory specialists should be made aware of the respiratory symptoms of panic disorder and for those individuals where no organic cause for the symptoms can be identified a screen for panic disorder could be given.

Currently, work has been done on a brief screen which would represent a useful measure for this purpose. Apfeldorf, et al. (1994) have derived a new four-item Brief Panic Disorder Screen, which appears to be effective in discriminating panic disordered patients from other anxiety disordered patients. Although this measure is not designed to distinguish panic disorder from other physical problems it represents an essential starting point in the overall process of designing an ideal measure. It is this type of bold approach to the diagnosis of panic disorder which is required in order to reduce costs within the health-care system and for the individual with the disorder. Katon et al. (1992) argued that better recognition and treatment of panic disorder could result in large cost savings to these patients.

At this stage more work is needed in establishing the relationship between the predominant symptoms of panic disorder and medical utilisation. However, this investigation has shown that even with limited subject numbers, an individual's predominant symptom cluster may predict medical utilisation. This study was limited as it did not determine whether the person's predominant symptoms were the ones being interpreted as the most threatening. The aim of the following study is to

examine this issue in order to better test the applicability of Cioffi's model applied to panic disorder.

## **CHAPTER FIVE**

### **STUDY 3 - THE RELATIONSHIP BETWEEN PREDOMINANT PANIC SYMPTOMS AND THE INTERPRETATION OF AMBIGUOUS SOMATIC SENSATIONS IN PANIC DISORDER**

#### **Introduction**

##### *Overview*

Central to most psychological theories attempting to explain the development of panic disorder is the notion of somatic interpretation. In particular, the cognitive model of panic disorder proposes that these individuals interpret ambiguous bodily sensations as threatening ( Ahmad et al., 1992; Beck et al., 1992). It is further proposed that in processing information about bodily sensations, panic patients access harmful rather than benign interpretations (Clark, 1986). Cognitive models therefore propose that panic results from catastrophic misinterpretation of bodily sensations (Beck, 1988; Clark, 1986, 1988). Proponents of cognitive conceptualisations posit that people with panic disorder experience physiological sensations, interpret them in a catastrophic manner, and consequently experience a spiral of physiological arousal and cognitive attributions resulting in a panic attack (Borden et al., 1993). For example, Clark (1988) argued that a panic attack may result from the misinterpretation of tachycardia as an impending heart attack or the misinterpretation of dizziness as an impending stroke.

The traditional method of investigating this proposal has been to use self-report measures (e.g. Hibbert, 1984). However, self-report methods provide only indirect support for the hypothesis as they provide information about cognitions only from verbal reports. More recently, in an attempt to gather direct support for the hypothesis, information processing paradigms and examination of interpretations of ambiguous events have been used.

### ***Interview studies***

Interview studies have identified themes of harm in the thoughts of individuals with panic disorder (Beck, Laude & Bohnert, 1974; Ottaviani & Beck, 1987). Rather than rely on memory of previous panic attacks with its associated distortions, laboratory studies inducing anxiety (e.g. CO<sub>2</sub> inhalation) have been conducted where participants are questioned about their thoughts immediately following the induction of anxiety. These studies have revealed that panic patients report more catastrophic thoughts than other anxiety disordered patients (Holt & Andrews, 1989; Rapee, Mattick, & Murrell, 1986).

### ***Information-Processing Research***

Information processing research provides an alternative to self-report measures for investigating the cognitive biases of people with panic disorder in their interpretation of bodily sensations. The two most common methods have been dichotic listening tasks (e.g. Burgess, Jones, Robertson, Radcliffe, & Emerson, 1981)

and modified stroop colour-naming tasks (e.g. Ehlers, Margraf, Davies, & Roth, 1988). These studies have mostly found that people with panic disorder have an attentional bias towards threat-related cues.

### ***Attentional Bias for Threat Information***

The study by Ehlers et al. (1988) found that individuals with panic disorder showed greater interference in colour-naming words related to physical threat (e.g. disease, fatal) compared to non-threatening words (e.g. leisure, alert) than control subjects. Similarly, Hope et al. (1990) found that patients with panic disorder took longer than control subjects to colour-name physical threat words than neutral words. McNally, Riemann, & Kim (1990) found that panic patients had a greater attentional bias to words representing fear (e.g. panic), bodily sensations (e.g. dizzy) or physical or mental catastrophes (e.g. death) than a sample of clinicians involved in the treatment of panic disorder. Baptista & Figueira (1989) found that panic disordered patients did not exhibit stroop interference for general threat words (e.g. coffin) which produced interference in individuals with generalised anxiety disorder. Taken together, these results suggest that panic disorder is associated with an attentional bias for information directly related to the sufferer's physical fears.

### ***Memory Bias***

In discussing cognitive biases associated with anxiety, Butler and Mathews (1983) suggested that overestimation of the probability of danger by anxious individuals may be partly due to the ease with which they retrieve danger-related

memories. Several studies have addressed memory biases associated with panic (Cloitre & Liebowitz, 1989; McNally, Foa, & Donnell, 1989; Norton, Schaefer, Cox, Dorward & Wozney, 1988). However, the evidence for memory bias in panic disorder is inconsistent. Nunn, Stevenson, & Whalen (1984) found that people with panic disorder showed enhanced recall of fear-relevant information, whereas Pickles & van den Broeck (1988) were unable to replicate this finding. McNally et al. (1989) hypothesised that people with panic disorder would exhibit a memory bias for anxiety-related information and that physiological arousal would enhance this bias. Subjects were asked to rate anxiety and non-anxiety adjectives and then entered either a low-arousal or high-arousal condition. They were then asked to recall the previously rated words from memory. They found that the panic patients recalled more anxiety than non-anxiety words. The high arousal condition did not significantly alter this bias. This result was supported by Cloitre & Liebowitz (1989) who found that in contrast to normal subjects, people with panic disorder exhibited enhanced recall of anxiety information.

Overall, the evidence from these studies suggests that people with panic disorder exhibit an attentional bias for information related to threat to their physical and mental health and possibly an enhanced retrieval of such information (McNally, 1990). Another approach which has been used to investigate bias in the interpretation of threat is the examination of panic patients' interpretations of ambiguous events.

### ***Bias in the Interpretation of Threat***

Butler and Mathews (1983) proposed that anxious individuals are more likely than non-anxious individuals to interpret ambiguous information as threatening. They further proposed that these individuals are more likely than others to exaggerate the cost and probability of unpleasant events. To test this hypothesis they asked 12 anxious patients, 12 depressed patients, and 12 normal controls to interpret ambiguous scenarios, to evaluate the subjective cost of various negative events, and to estimate the probability of both positive and negative events in reference to themselves and others. The results supported their hypothesis as anxious subjects interpreted ambiguous information as more threatening and rated unpleasant events as more costly than normal.

Based on the work of Butler and Mathews (1983), McNally & Foa (1987) constructed a booklet containing ambiguous scenarios involving either internal stimuli (e.g. "You feel discomfort in your chest area. Why?") or external stimuli (e.g. "You wake up with a start in the middle of the night, thinking you heard a noise but all is quiet. What do you think woke you up?"). People with agoraphobia, and normal controls were asked to write down the first explanation which came to mind for each scenario. After writing their response to the open-ended question, subjects turned the page and rank-ordered three forced-choice explanations in terms of the likelihood of their coming to mind in a similar situation. For each scenario one explanation was anxiety-related (e.g. 'You feel dizzy due to hyperventilation') and one, harm-related



(e.g. 'You feel dizzy due to a brain tumour'). They found that in contrast to the people recovered from agoraphobia and normal controls, the people with agoraphobia were more likely to interpret ambiguous external stimuli as well as ambiguous internal stimuli as threatening.

In a replication and extension of this study, Clark, et al. (1988) found that panic patients without agoraphobia interpreted only ambiguous bodily sensations as threatening and not the more general scenarios such as social events or symptoms not having a sudden onset. This suggests that for panic disordered patients the bias in interpreting ambiguous situations as threatening may be more specifically related to ambiguous bodily sensations rather than more general ambiguous cues.

A study by Harvey, Richards, Dziadosz, & Swindell (1993) also used this paradigm to compare the interpretation of somatic sensations by individuals with panic disorder and social phobia. Using the Interpretation Questionnaire (McNally & Foa, 1987) the authors found that individuals with panic disorder chose threat explanations for ambiguous interoceptive stimuli more often than the social phobia group. This difference however was only found on the forced-choice section of the questionnaire. The authors offered the explanation that when the threat-related cognitive schema of people with panic disorder was directly activated, they were more likely to choose threat explanations for the experience of ambiguous interoceptive stimuli.

In an attempt to explain the tendency for people with panic disorder to interpret ambiguous bodily sensations in a threatening manner, Borden et al. (1993) have argued that individuals who panic engage in a cognitive process of self-focus with a hypothesised narrowing of attention directed toward internal physiological cues. That is, they suggested that a shift of attention must occur when physiological sensations are experienced so that rival plausible attributions are not salient. For example, when an individual experiences an acceleration of heart rate, that individual could generate a variety of plausible hypotheses to account for the physiological change including strenuous exercise, fear, caffeine, or a heart attack.

### ***Cioffi's Model of Somatic Interpretation***

Cioffi's model of somatic interpretation offers an alternative explanation of the process by which individuals with panic disorder interpret physiological symptoms. In accordance with Borden et al's (1993) explanation, Cioffi's model also suggests that individuals may generate a number of possible explanations for the experience of a somatic sensation. For example, the experience of a drop in hand temperature could be attributed to cold weather, fear or poor circulation. Cioffi's model suggests that the attribution will depend upon a person's prior hypothesis about illness as well as other mediators such as their disposition, coping strategies and goals and in doing so, it highlights many of the same factors stressed by cognitive theory. For example, the notion of a memory bias in interpretation corresponds to Cioffi's notion of the prior hypothesis.

Although it is well established that people with panic disorder tend to interpret ambiguous bodily sensations in a threatening manner the specific types of bodily sensations typically interpreted this way have not been directly investigated. For example, it may be that cardiovascular sensations are more likely to elicit an interpretation of threat than gastro-intestinal sensations. Indeed a study by Eifert (1992) suggests that this may be the case. He described a sub-group of people with panic disorder labelled as 'cardiophobics' who appeared to focus on changes in the chest area and interpret them in a catastrophic way as a sign of an impending heart attack or some other heart problem. Eifert proposed that cardiophobia is distinct from panic disorder in that the attentional focus and symptom interpretation is based on previous learning experiences involving cardiac death as well as the cardiac pathology of others and self. He suggests that heart-related interpretation of a false alarm would be even more likely if the person had recently been confronted with cardiac disease and death. This proposal matches Cioffi's explanation of the interpretation of somatic sensations. Eifert's description of individuals having had previous experiences with cardiac death and disease produces a prior hypothesis which leads to an increased likelihood that they will interpret cardiovascular symptoms in a catastrophic way.

Eifert (1992) noted some interesting implications for the treatment of such individuals. He suggested that treatment be individualised to focus on the particular set of problems identified in a given client. For example, he proposed that in addition to standard muscle relaxation training, the chest muscles could be targeted specifically because of their likely contribution to chest pain.

An extension of Eifert's proposal regarding specific cardiovascular sensations would be to investigate the possibility of other physiological groups also being focused upon and interpreted in a catastrophic way. However, it is not clear whether all physiological symptoms of panic are potentially interpreted as threatening. Some symptoms such as sweating may be less likely to be interpreted catastrophically. At this stage studies have not examined this aspect of somatic interpretation. What is threatening for one individual may not be for another.

### ***Aim of Study***

Previous studies have demonstrated that the symptoms of a panic attack form into separate physiological clusters. Indeed, it appears that there may be sub-types of people with panic disorder who report the experience of particular panic symptoms over others (see study 1). At this stage it is unclear whether these symptoms are reported because they are considered the most threatening by the individual. According to Borden (1993), Cioffi (1991) and Eifert (1992), an individual who has had prior experiences relating to particular kinds of sensations (e.g. loss of a loved one due to heart disease) may be more inclined to attend to these sensations and interpret them as threatening. If this is so an individual who reports predominantly gastrointestinal symptoms may do so because they are the symptoms they consider to be the most threatening. That is, this individual may show a bias for interpreting specific somatic sensations catastrophically.

The previous study (study 2 b) revealed that people whose predominant panic symptoms were respiratory tended to visit respiratory specialists. Cioffi's model can account for this finding as it proposes that these individuals were interpreting respiratory sensations catastrophically and hence sought the assistance of a relevant specialist.

The aim of the present study is to determine whether the predominant panic symptoms reported by individuals with panic disorder are interpreted as threatening. If this is the case it would provide some support for Eifert's (1992) proposal that certain sensations induce phobic reactions in individuals which may require alternative methods of treatment. Specifically, it would indicate that modifying treatment programs to target the specific symptoms feared by the individual would be beneficial. It would also support Cioffi's model of somatic interpretation which proposes that individual's interpretations of sensations are heavily influenced by their prior hypotheses.

## **Method**

### ***Subjects***

Participants consisted of 38 people of which 28 were female and 10 were male. The mean age of subjects was 33. These people were randomly selected from the original sample of 153 individuals with a primary diagnosis of panic disorder with mild or no agoraphobia. Out of the original sample of 153, only 51 people were potentially suitable for inclusion in the study as they had not yet commenced

treatment at the centre. Of the 51, ten were unwilling to participate and one person was unable to be contacted. The original sample consisted of 40 people, however two questionnaires were incomplete and were therefore not included in the study.

Participants were therefore not selected on the basis of their component scores but rather on the basis of availability. This enabled the author to remain blind as to each person's major physiological symptoms. All participants were previously assessed using ADIS-III-R. The same exclusion criteria was applied to this study as used in the earlier studies. Secondary diagnoses for this sample included; generalised anxiety disorder (25.4%), social phobia (23.1%), specific phobia (11.0%), post-traumatic stress disorder (9.8%), depression (9.5%) and obsessive compulsive disorder (6.4%). Of the total sample, 14.8% did not have a secondary diagnosis. Mild agoraphobia was present in 25 of the participants with the remainder having no identifiable agoraphobia.

### ***Measure***

The Interpretation Questionnaire- Revised used in this study was a modified version of the one used by McNally & Foa (1987). The only difference in the questionnaires was the exclusion of the external ambiguous scenarios and replacement of these with further ambiguous internal scenarios. A copy of the questionnaire appears in Appendix F. Otherwise the format and scoring of the responses was the same.

The questionnaire required participants to complete a number of items involving the interpretation of information pertaining to ambiguous interoceptive stimuli which could potentially be conceived of as threatening. The stimuli were presented as 13 brief ambiguous scenarios in booklet form. Each scenario described a somatic sensation commonly experienced during a panic attack (e.g. 'You feel discomfort in your chest area. Why?') In the first part of each question subjects were required to write down the first explanation that came to mind to account for the scenario presented. Responses to the scenarios were scored as either threat (e.g. heart attack = 1 ) or non-threat (e.g. indigestion = 0 ) answers.

As this part of the questionnaire was open-ended responses were scored by two independent raters. Interrater agreement, computed as the number of agreements divided by the number of agreements plus the number of disagreements was 98%. This compares favourably with 91% reported in a similar study by McNally and Foa (1987).

The second part to each question required the subject to turn the page and rank order three possible explanations presented within the questionnaire, according to which alternative would come to mind first, second or third. Of the three explanations provided one was always related to potential threat, and as such the order of presentation of the alternatives was randomised to account for possible positioning effects. Responses were scored according to whether the threat alternative was ranked first (score =2), second (score = 1) or third (score =0). For example, the three alternative explanations for the first scenario cited above were; (1)

"Something is wrong with your heart", (2) "You have a sore muscle" or (3) "You have indigestion". Therefore, each scenario consisted of one threat-related alternative and two non-threat alternatives.

Each of the 13 items in the questionnaire corresponded to the panic symptoms included in the ADIS-III-R symptom checklist. Items 1 and 8 were made up of the symptoms which were found in study 1 to load onto the second cardiovascular component. Items 2, 5 and 6 were similar to the symptoms which loaded onto the neurological component. Items 3, 4 and 12 were similar to the symptoms loading onto the first cardiovascular component. Items 7 and 11 loaded onto the respiratory component and finally items 9, 10 and 13 loaded onto the gastrointestinal component.

Two types of scores were calculated for each individual. An open score and a closed score. For the open section, each person had 5 separate scores corresponding to the five symptom components. These separate scores were calculated by summing the number of 'threatening' answers and then dividing that total by the number of questions making up that component. For example, those components made up of three items were divided by 3 and those with two items, by 2. This provided average scores to account for the different numbers of items making up the separate components.

Calculations for the closed section were completed using the same procedure except that scores were 2, 1 or 0 for the three options in this section.



### ***Procedure***

Subjects meeting the inclusion criteria were asked to complete the Interpretation Questionnaire - Revised prior to the commencement of cognitive-behavioural treatment at the Centre. All questionnaires were completed during a feedback session and were supervised by the author.

### ***Component Scores***

Each participant had 5 component scores based on the principal components analysis conducted in study 1. The components consisted of respiratory, two sets of cardiovascular symptoms, and gastro-intestinal and neurological panic symptoms. Component scores were calculated using the sub-command SCORES contained within the program FACTOR (SPSS for Windows - Version 6.0). Each person's component score was entered into a new data set for comparative purposes in this study.

### ***Data Reduction and Analysis***

Bi-partial regression analysis was used to analyse the data in this study. The program for the bi-partial regression analysis was written by Leigh Smith (School of Psychology, Curtin University) and was based on the work of Cohen & Cohen (1983). This analysis involves the use of set-partialled sets of variables which enable the influence of particular variables to be 'weighted' in the analysis. Unlike other techniques in which only the independent variables (set X) are partialled, this

procedure enables the set of dependent variables (set Y) to be partialled also.

Partialling of the two sets in the analysis makes it possible for the researcher to test highly specific associations between the data (Cohen & Cohen, 1983).

To use bi-partial regression analysis in this study ten correlation matrices were generated from the data (using the bivariate correlation program on SPSS for Windows - Version 6.0). This consisted of five square matrices for the 'open' questions and five for the 'closed' questions. The analysis involved ordering the entry of the independent and dependent variables of each correlation matrix. The dependent variables in this study were the threat scores for each physiological component on the interpretation questionnaire and the independent variables were the five component scores for each individual based upon the ADIS-III-R symptom ratings.

The closed or open question responses were entered into the matrix first with the primary variables followed by their covariates. For example, for the gastro-intestinal matrix, the threat scores were entered with the score for the gastro-intestinal symptoms first, followed by the remaining scores for the other groups. Next, the component scores were entered in the same order, that is, with the gastro-intestinal component first (component 3) followed by the remaining component scores (e.g. 3, 1, 2, 4, 5).

In order to investigate potential differences between threat scores made in response to the open and closed section of the questionnaire the scores for the closed section were re-calculated following the bi-partial regression analysis. This consisted

of re-coding scores of 1 or 2 on the closed section of the questionnaire to a value of 1 to correspond with the scoring method used for the open section of the questionnaire.

### Results

The mean threat scores for each of the physiological symptom groupings on the questionnaire were compared in order to investigate the possibility of particular symptom types being intrinsically more threatening than others. Table 12 shows the mean scores for each symptom grouping in both the 'open-ended' and 'closed' sections. Difference contrasts were conducted on the mean threat scores for both sections of the questionnaire. The mean threat scores for the cardiovascular interoceptive stimuli (symptom group 5) were significantly higher than the mean threat scores of the remaining symptom groups for both the 'open-ended' and 'closed' sections of the questionnaire (Open:  $F(1,37) = 6.65, p < 0.05$ ; Closed:  $F(1,37) = 27.49, p < 0.05$ ).

**Table 12:** Mean Scores for Each Symptom Group in the OPEN and CLOSED Section

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OPEN

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Symptom Group	Mean	StdDev
1(Respiratory)	.180	.291
2 (Cardio 1)	.228	.330
3 (Gastro)	.297	.317
4 (Cardio 2)	.210	.294
5 (Neuro)	.382	.393

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**Table 12: Mean Scores for Each Symptom Group in the OPEN and CLOSED Section(cont)**

CLOSED		
Symptom Group	Mean	StdDev
1 (Respiratory)	.484	.427
2 (Cardio 1)	.606	.431
3 (Gastro)	.509	.378
4 (Cardio 2)	.540	.413
5 (Neuro)	.829	.373

The bi-partial regression analysis of the individual's component scores with the open-ended threat scores was not significant for any of the five components (Component 1 (Respiratory),  $\eta^2 = .019$ ,  $F(1,32) = .676$ ,  $p > 0.05$ ; Component 2 (Cardio 1),  $\eta^2 = .007$ ,  $F(1,32) = .262$ ,  $p > 0.05$ ; Component 3 (Gastro),  $\eta^2 = .005$ ,  $F(1,32) = .182$ ,  $p > 0.05$ ; Component 4 (Cardio 2),  $\eta^2 = .004$ ,  $F(1,32) = .155$ ,  $p > 0.05$ ; Component 5 (Neuro),  $\eta^2 = .017$ ,  $F(1,32) = .717$ ,  $p > 0.05$ ).

Analysis of the relationship for the closed section was also non significant (Component 1 (Respiratory),  $\eta^2 = .050$ ,  $F(1,32) = 2.31$ ,  $p > 0.05$ ; Component 2 (Cardio 1),  $\eta^2 = .060$ ,  $F(1,32) = 2.38$ ,  $p > 0.05$ ; Component 3 (Gastro),  $\eta^2 = .055$ ,  $F(1,32) = 2.51$ ,  $p > 0.05$ ; Component 4 (Cardio 2),  $\eta^2 = .003$ ,  $F(1,32) = .129$ ,  $p > 0.05$ ; Component 5 (Neuro),  $\eta^2 = .043$ ,  $F(1,32) = 1.56$ ,  $p > 0.05$ ). These results therefore show that the individual's component scores were not significantly related to their interpretation of ambiguous interoceptive stimuli in either the open-ended or closed conditions on the interpretation questionnaire.

A comparison of the overall threat scores for both the open-ended and closed sections of the questionnaire was carried out using a paired T-Test. The overall mean

score for the open-ended section was 1.29 (SD = 1.13) compared to 4.60 (SD = 3.10) for the closed section. A paired T-Test indicated that these scores were significantly different ( $t(1, 37) = 7.66, p < 0.001$ ). The significant difference in threat scores across the two conditions indicates that individuals completing the questionnaire were significantly more likely to respond with an interpretation of threat when completing the closed section as opposed to the open section of the questionnaire.

## **Discussion**

This study investigated the relationship between an individual's predominant physiological symptoms of panic disorder and the interpretation of threat. Specifically, it was hypothesised that a person's predominant physiological panic symptoms would be the ones most likely to be responded to with threat interpretations. The results of the study did not support this hypothesis as no significant relationships were found.

As expected, the majority of individuals with panic disorder in this study interpreted ambiguous bodily sensations as threatening which is consistent with the findings of earlier studies (Butler & Mathews, 1983; Clark et al., 1988; Harvey et al., 1993; McNally & Foa, 1987). However, the results of the bi-partial regression analysis did not reveal any relationship between an individual's predominant physiological symptoms and the type of symptoms interpreted as threatening. Instead, the results indicated that in both sections of the questionnaire cardiovascular

symptoms specific to component 5 (chest pain and numbness) were interpreted as more threatening than the other panic symptoms. The items on the questionnaire corresponding to this component were; 'You feel discomfort in your chest area. Why?' and 'You are experiencing tingling and/or numbness sensations. Why?' Taken at face value the symptoms of chest pain and numbness stand out as the symptoms significantly most likely to be interpreted by people with panic disorder as the most threatening. The consistency of this finding across both settings indicates that certain cardiovascular symptoms are particularly threatening to people with panic disorder. This supports Eifert's (1992) proposal that certain symptoms are by their nature more likely to be interpreted in a catastrophic way by people with panic disorder.

A further finding was that the closed section of the questionnaire produced significantly more threatening interpretations than the open-ended section. This supports the study by Harvey et al. (1993) which found that threatening responses occurred significantly more often in the closed or forced-choice section of the questionnaire. They argued that this effect was due to activation of the threat-related cognitive schema of people with panic disorder by the forced choice nature of the questions. Similarly, the present study found that individuals were more likely to give threatening interpretations to ambiguous interoceptive cues when a threat schema was introduced.

Cioffi (1991) supports this notion in her model of somatic interpretation. She proposes that biasing causal attributions towards a particular somatic hypothesis results in the person selectively attending to information that will confirm that

particular hypothesis. For example, a study by Zimmerman et. al. (1984) involved a group of college students who were told falsely that their blood pressure was slightly high for their age. These individuals reported more hypertension-like symptoms in the previous three months than those who were told that their readings were normal. Thus, people with panic disorder in the present study were provided with specific hypotheses for the sensations thereby biasing their interpretation of the somatic sensations.

It is possible that external factors play an important part in determining whether or not a person with panic disorder responds to ambiguous sensations of panic in a catastrophic manner. External cues which may influence the likelihood of responding with threat could potentially include previous explanations given by medical professionals, history of medical problems in the family, the number of distractions in the individual's environment and many other factors. Cioffi (1991) refers to these factors as 'mediators' which she describes as impacting on the interpretation of ambiguous somatic sensations. Both the present study and that of Harvey et al. (1993) highlight the relevance of mediators in potentially determining whether or not an individual with panic disorder interprets their symptoms as threatening. In the present study the individual's interpretations were affected by the nature of the question presentation. Therefore, it appears that the forced-choice nature of the questions acted as a mediator to their responses, in this case activating their threat-related cognitive schema. It could be argued that similar mediators may influence the interpretations of people with panic disorder in the natural environment by activating threat-related cognitive schemas. The type of mediator (e.g. high

incidence of bowel cancer in family) may then affect the interpretation made (e.g. stomach distress attributed to probable bowel cancer).

Although cardiovascular symptoms were most often interpreted as threatening in this study, no relationship was found between individuals with predominant cardiovascular symptoms and interpretation of these symptoms as threatening. This suggests that individuals with panic disorder interpret a variety of symptoms as threatening and although cardiovascular symptoms were most commonly interpreted this way, threat interpretations were not restricted to those symptoms. There are a number of possible explanations for this finding. First, it may be that the threat-related cognitive schema of people with panic disorder once activated is relatively non-specific. In other words, a general threat-related cognitive schema may be present in which any ambiguous physiological sensation could be interpreted as potentially threatening. In the open-ended section of the questionnaire where individuals were asked to give their own explanations for symptoms, very few threat interpretations were made. However, in the closed section where individuals were given various choices which always included one threat choice significantly more threat interpretations were made. Therefore, it may be that even if an individual acknowledges a cardiovascular symptom as threatening and these symptoms may be the ones which they predominantly report, they may be just as likely to be vigilant of the possibility of other sensations as also being potentially threatening.

Therefore, it is possible that the individual with panic disorder who is hypervigilant to the experience of ambiguous somatic sensations, when prompted



could potentially interpret a variety of sensations as threatening. This would have interesting implications as it would suggest that individuals with panic disorder who attribute their sensations of panic to a particular physiological problem( e.g. heart problem) may potentially hold more than one catastrophic fear.

It is interesting that no relationship was found between interpretation of threat and physiological symptoms for individuals whose predominant symptoms were respiratory. This suggests that the relationship between predominant respiratory symptoms and attendance at respiratory specialists may be due to mediators rather than simply the interpretation of symptoms as threatening. This highlights the emphasis Cioffi (1991) places upon psychosocial factors in influencing an individual's response to a somatic sensation.

It would be useful to study such individuals over time to assess possible change in the interpretation of physiological symptoms. It may be that an individual has a hierarchy of fears and that although their central fear may be of cardiovascular symptoms they may have further fears which form a type of 'fear cascade'. After some time the initially feared symptoms may be replaced by another set of physiological symptoms.

The present study found that individuals with panic disorder do not necessarily interpret their most predominant physiological symptoms as most threatening. It appears however that mediators play an important part in determining which symptoms are responded to with threat. As suggested above, the length of time

suffering with panic symptoms and the type of medical intervention and explanation given are all potentially important variables to consider.

Future studies examining the issue of interpretation of panic symptoms would benefit from attempting to control some potentially important mediators such as change of symptom reports across time, length of time suffering, history of family illness, number and type of diagnostic tests undertaken and other important life events.

An important methodological consideration in this study is that the comparison between predominant panic symptoms and the interpretation of threat was based on the clusters found in the first study. Therefore, the results of this study depend partly upon the validity of these clusters, which do need to be replicated.

The clusters were obtained via a retrospective method of recording panic symptoms. It is important to investigate panic symptom clusters obtained by prospective recording of panic attacks. The following study is therefore aimed at examining the symptoms of panic attacks using prospective recording procedures.

## CHAPTER SIX

# STUDY 4 - STRUCTURED VERSUS UNSTRUCTURED METHODS IN THE RECORDING OF PANIC ATTACK SYMPTOMS

### Introduction

#### *Overview*

An essential prerequisite to the development of theories regarding the aetiology and treatment of panic disorder is a set of criteria which distinguish the disorder. These criteria consist of the symptoms which are considered most typical of that disorder. The Diagnostic and Statistical Manual of Mental Disorders is the most commonly used method for arriving at a diagnosis based on an individual's predominant symptoms. The current version of this manual DSM-IV (American Psychiatric Association, 1994) lists 13 symptoms of which an individual must have experienced at least four in order to meet the criteria for a panic attack. Of these symptoms, eleven are physiological (e.g. sweating) and two are cognitive (e.g. fear of dying). The current symptom list has not been revised since the previous version of the manual, DSM-III-R.

Since DSM-I, decisions about which symptoms to include were taken primarily from clinical judgement and opinion rather than empirical studies of panic symptomatology. The current symptom list covers the major symptoms experienced by individuals with panic disorder (based on clinical observation) however some authors have argued that it is not sufficiently comprehensive (Aronson & Logue, 1988; Frances et al., 1993). A further issue has been whether certain sub-groups of people with panic disorder exist who only experience specific types of physiological symptoms (Aronson & Logue, 1988; Briggs et al., 1993; Whittal et al., 1994).

A number of different approaches have been used to record panic symptoms including interview, self-monitoring and ambulatory physiological monitoring (Barlow et al., 1994). Two of the most frequently used procedures for investigating the nature of panic symptoms are biological challenge procedures and retrospective recording of panic attacks. Within both of these predominant approaches to the study of panic symptoms are complicating and confounding factors which must be considered in order to evaluate the ability of such studies to determine the essential symptomatology of panic attacks.

### ***Biological Challenge Procedures***

Many studies have shown that panic can be produced in the laboratory (Barlow, 1988; Gorman, et al., 1984; Rapee, 1986)). Pharmacological agents have been used in the provocation of panic for a long time. Many researchers have used biological challenge tests to produce anxiety in individuals with panic disorder.

Challenges that increase anxiety in individuals with panic disorder include infusions of sodium lactate (Liebowitz, et al., 1984) and isoproterenol (Rainey, et al., 1984); oral administration of yohimbine (Charney, Heninger, & Jatlow, 1985); inhalation of carbon dioxide (Griez, Lousberg, van den Hout & van den Molen, 1987) and forced hyperventilation (Rapee, 1986). A number of studies have found that people with panic disorder report a marked similarity between symptoms experienced during biological challenge procedures and their naturally occurring panic attacks (Gorman et al., 1984; Nutt et al., 1990; Rainey, et al., 1984; Rapee, 1986).

Rapee (1995) reviewed the various challenge procedures and concluded that the different procedures produce similar symptoms. Two studies provide detailed comparisons, in which subjects with panic disorder were retrospectively asked to indicate the symptoms they experience during a typical panic attack, and these were then compared with symptoms produced by biological challenge (Liebowitz et al., 1984; Sanderson et al., 1990). A largely similar set of symptoms was indicated for both phenomena, although symptoms produced by biological challenge were slightly less intense than in natural panic attacks (Rapee, 1995). Rapee argued that similar research using concurrent measurement of natural panic symptoms would be valuable.

The mechanisms behind the reaction to biological challenge procedures have been studied by a number of authors, most of whom have focused on biological factors. Rapee (1995) has noted that fewer studies have examined psychological factors mediating the response. He argued that biological challenge procedures work by producing peripheral somatic symptoms which in turn, are associated with

impending threat by certain individuals (i.e. the somatic symptoms produced by these procedures act as fear stimuli).

However, although individuals report sensations similar to panic attacks, they are not always actual reproductions of the usual panics experienced. In fact, it has been suggested that panic attacks experienced in the natural environment may represent qualitatively distinct phenomena to those experienced in the clinic. Indeed, laboratory panic attacks are generally rated as less severe than naturally occurring panic attacks (Rapee, Mattick & Murrell, 1986; Sanderson, Rapee & Barlow, 1989). This would suggest that there are other important mediating factors which influence the response to increased anxiety. Laboratory studies involving hyperventilation as a procedure for eliciting panic-like sensations have examined some possible variables mediating the response. These have included manipulating the person's sense of control over symptoms (Barlow, 1988) and manipulating the person's perceived level of safety (Rapee, Telfer, & Barlow, 1991).

A number of authors have highlighted the importance of hyperventilation in panic attacks (Ley, 1985; Lum, 1981; Salkovskis, Warwick, Clark & Wessels, 1986). Ley (1985, 1987) proposed that the physiological sensations experienced during a panic attack are the result of hyperventilation, that is, rapid increases in breathing rates which produce hypocapnia or blood alkalosis. In turn, associated increases in blood pressure and heart rate occur, followed by feelings of dizziness and apprehension. The lack of a satisfactory explanation for these symptoms produces

fear, thereby exacerbating the hyperventilation, leading to a recurring and accelerating cycle and a consequent panic attack.

While it has been found that subjects with panic attacks who are asked to hyperventilate for 90 seconds report a marked similarity of the resulting symptoms to their usual attacks, they do not always report an actual reproduction of their usual panic (Rapee, 1986). For example, some subjects have reported experiencing symptoms resembling those occurring during a panic attack but do not experience a true panic attack. Other subjects have even reported the experience as being enjoyable (Clark & Hemsley, 1982). Therefore, although hyperventilation usually plays a significant part in the production of panic attacks it is also clear that hyperventilation alone is insufficient to cause a panic attack (Barlow, 1988).

More consistent results have been obtained from objective peripheral physiological measures, where most studies have indicated few differences between groups in the response to biological challenge (Gaffrey et al., 1988; Rapee et al., 1992). These studies failed to find differences between panic disorder subjects and non-clinical controls on heart rate, respiratory rate, forearm muscle tension and blood pressure. Rapee (1995) suggested that these results indicate that the response to biological challenge in panic disorder is primarily an affective one.

One major factor which has been proposed as mediating an individual's response to biological challenge is perceived threat. It has been proposed that biological challenge procedures result in distress by producing somatic symptoms

which the individual associates with threat (Margraf, Ehlers, & Roth, 1986). Studies have been conducted which have attempted to establish an expectancy of threat in one group and a positive expectancy in the other (Margraf, Ehlers, & Roth, 1989; Salkovskis & Clark, 1989; van den Hout & Griez, 1982; van der Molen, van den Hout, Vroeman, Lousberg, & Griez, 1986). Two of these studies found higher anxiety in the group told to expect a negative experience than in subjects told to expect a positive experience (van den Hout & Griez, 1982; van der Molen, van den Hout, Vroeman, Lousberg, & Griez, 1986).

Rapee and colleagues (1986) manipulated prechallenge instructional sets by providing panic patients with either minimal information or a detailed account of the physiological effects of CO<sub>2</sub> inhalation. Results indicated that people provided with a detailed explanation reported fewer catastrophic cognitions and less panic than did those provided with minimal information, suggesting that cognitive processes can have an impact on the effects of CO<sub>2</sub> inhalation.

One recent study provides particular insight into potential mediators of response to biological challenge (Lelliot & Bass, 1990). In this study, two groups of panic disordered patients were asked to hyperventilate. One group reported that their typical symptoms were primarily cardiovascular and respiratory in nature. The other group reported gastrointestinal symptoms, and fears of faecal incontinence during panic. The former group showed more distress and a greater number of symptoms similar to their usual panic episodes than the latter, suggesting that distress in response to biological challenge may depend on a match between a subjects typically feared symptoms and the symptoms produced by the challenge. It follows that if the



gastro-intestinal group were given a challenge which activated their gastro-intestinal system they would have experienced a stronger fear reaction. Therefore, although individuals with panic disorder are more likely to respond dramatically to biological challenge tests than other individuals with general anxiety, not all subjects respond equally to the procedures.

An 'illusion of control' has been acknowledged by some authors as an important component of anxiety reactions (Barlow, 1988; Lang, 1985). Only one direct test of the control hypothesis has been conducted (Sanderson, Rapee, & Barlow, 1989). In this study, 15 inhalations of 5.5% CO<sub>2</sub> in air were given to 20 subjects meeting the DSM-III-R criteria for panic disorder. Subjects in control reported less subjective anxiety, fewer symptoms, less intense symptoms, and less similarity to their actual panic attacks.

The effect of safety cues has also been investigated as a potential mediator in the response to biological challenge. Safety cues appear to reduce anxiety by providing information that the anticipated threat will not occur in the presence of that cue. Only one empirical study has been conducted to investigate the role of safety factors in response to biological challenge (Rapee, et al., 1991). This study found no evidence for the mediating effect of safety cues on the response to the challenge. However, the attempt at manipulating safety cues was found to be ineffective. Therefore, this study was unable to provide a definitive test of the hypothesis. At this stage, anecdotal evidence from subjects' own accounts during challenge procedures

does suggest that the influence of safety cues is a factor which is worthy of further consideration.

There are therefore a number of factors which need to be considered when evaluating the validity of symptoms obtained from individuals with panic disorder based on biological challenge procedures. Another commonly used procedure for obtaining information regarding panic symptomatology is the use of retrospective reports.

### ***Retrospective Reports***

Although most research studies involving subjects with a primary diagnosis of panic disorder use an assessment device which relies on retrospective recall (Barlow, Brown, & Craske, 1994) there is evidence that the frequency and severity of panic attacks is overreported in retrospective accounts (Margraf et al., 1987; Rapee et al., 1990). As a result, the homogeneity of the samples of people with panic disorder included in research may be questionable considering that the initial diagnosis is dependent upon a retrospective report.

Westling & Ost (1993) suggested that in order to ascertain the central symptoms of panic the sequence of events in panic attacks must be studied in more detail. They argued that symptoms obtained retrospectively via more or less structured interviews may represent an artefact of the assessment method. Patients trying to remember their panic attacks might be susceptible to bias caused by a)

recollection difficulties (e.g. only recalling the most severe attacks) b) influence of the emotional state under which the reporting occurs (e.g. when anxious recalling more severe attacks) c) influence of the assessor (e.g. age, sex, race, social class) and d) interviewer expectancy effects (e.g. voice, facial expressions, posture) (Westling & Ost, 1993). They also suggested that patients be asked to wear a portable tape recorder and directly describe the symptoms and cognitions experienced in a panic attack.

Similarly, Dijkman-Caes, Kraan, & DeVries (1993) argued that in order to gain true to life descriptions of panic disorder and agoraphobia, research has to be carried out in the natural environment thus allowing the individual to prospectively describe the actual behaviour as it occurs and thus avoiding the retrospective distortions mentioned above. The authors pointed out that in panic patients, selective information processing is thought to play an important role (Ehlers, et al., 1988). Therefore, they may be more likely than other individuals to selectively recall panic symptoms in retrospect.

Cioffi (1991) argued that symptom checklists are already biased toward a negative or pathological interpretation. She argued that an item such as 'pounding heart' is a symptom, not a sensation and some distress over the perception of an accelerated heart rate is already in the item. She adds that those most distressed with what they have felt are most likely to endorse it as something that they have experienced. She concludes that symptom checklists may not allow individuals to independently report what they feel and how they feel about it.

In a study by Margraf et al. (1987) the number of panic attacks reported retrospectively by each subject varied considerably with the number recorded using concurrent self-monitoring. For example, although each patient reported at least one panic attack, some patients noted one or two attacks and others reported up to eight or nine attacks in six days. Moreover, evidence was found for large intra-individual variations in the experience of panic symptoms with different symptoms being registered by the same subject during separate attacks (Rapee et al., 1990).

Barlow et al. (1994) has argued that data from concurrent self-monitoring may be more satisfactory than data from retrospective report if one is studying the nature of panic. However, there are also elements within the self-monitoring of panic attacks which require consideration when being used to clarify the nature of panic.

### ***Nature of Recording Instrument***

As well as issues regarding retrospective versus prospective recording procedures, there is also a lack of research directly examining properties of the most commonly used methods for prospectively recording panic attacks. One of the most frequently used methods due to its cost effectiveness and time effectiveness is a structured panic attack rating form. Despite its wide use studies have not examined the effect of such a recording procedure upon symptom reports. An important question is whether the range of symptoms reported by individuals with panic disorder is restricted to the major symptoms listed on these forms. The symptom lists

are typically those included in the DSM-IV criteria for a panic attack. It is possible that individuals note down only those symptoms listed on these forms thus distorting the accuracy of the record. Provision of a less structured method of recording naturally-occurring panic attacks may enable more accurate descriptions to be obtained.

### ***Summary***

In summary, there appear to be a number of factors influencing the symptom reports obtained from both laboratory induced panic attacks and naturally occurring panic attacks. These factors include possible psychological mediators (e.g. perceived threat) and distortions in symptom reports as a result of retrospective recall of symptoms. A further factor potentially effecting the validity of panic symptoms is the use of structured as opposed to unstructured recording methods. It has been suggested that structured methods may bias symptom reports. Rapee (1995) has also suggested that studies comparing panic symptoms obtained from voluntary hyperventilation and naturally-occurring panic attacks be compared using concurrent rather than retrospective recording procedures.

### ***Aim of Study***

The aim of this study is to compare a structured method of recording panic attack symptoms with an unstructured method. As discussed, structured recording methods may influence the type of symptoms reported by individuals with panic disorder. A second aim of this study is to compare the symptoms of panic attacks

occurring in the natural environment with those produced via voluntary hyperventilation using concurrent as opposed to retrospective recording of symptoms as suggested by Rapee (1995).

## **Method**

### ***Subjects***

Subjects consisted of 37 people with a primary diagnosis of panic disorder with mild or no agoraphobia, who presented for treatment at the Curtin Centre for Anxiety and Fear Research. The mean age of participants was 37 years, with 70.3 % being female and 29.7 % male. Secondary diagnoses were; social phobia (33%), depression (12.2%), generalised anxiety disorder (11.4%), post-traumatic stress disorder (7.5%) and dysthymia (4.1%) with 39.3% not having any secondary diagnosis. Eighty four percent of the participants had mild agoraphobia with the remaining 16% having no agoraphobia. Of the original subject pool of 45, eight people were excluded from the study as they did not experience any natural panic attacks in the baseline recording period.

All subjects meeting the DSM-IV criteria for panic disorder with mild or no agoraphobia were included in the study. Subjects were excluded if the severity of additional diagnoses according to the ADIS-III-R assessment were less than 2 points away from the primary diagnosis of panic disorder on a 9-point clinician rating scale. Prospective subjects were also excluded if they reported any serious medical conditions such as asthma, angina or emphysema.

### ***Measures***

A standard panic attack record form based on that included in Barlow & Craske's (1994) Mastery of Your Anxiety and Panic - II was used in this study. This form included a 9-point severity rating scale for each panic symptom experienced. As well as providing information as to the severity of the panic symptoms experienced, this form also includes the number of panic symptoms experienced during a panic attack. A copy of the form appears in Appendix G.

An unstructured, descriptive panic attack record form was also used in this study. This involved participants writing down all symptoms experienced during a panic attack using their own words and rating each on a 9-point severity scale to correspond with the structured method. A copy of the form appears in Appendix H.

### ***Procedure***

All prospective subjects were interviewed by the author and other graduate clinical psychology students trained in the administration of the ADIS-III-R according to the standards used at the Centre for Stress and Anxiety Disorders at the State University of New York at Albany, USA.

Subjects selected for the study were asked to attend a feedback session during which they would receive information regarding their diagnosis and treatment and to complete the necessary questionnaires used in the centre. Prior to the feedback

session, all subjects were randomly assigned to either Group A or Group B. At the feedback session the author explained to each subject the importance of monitoring the symptoms they typically experience during a panic attack before the beginning of the treatment intervention. It was explained that by monitoring panic symptoms over the two week period a baseline would be obtained of the current frequency of panic attacks.

Group A was asked to complete the standard panic attack record form during the first week of recording. Subjects were asked to rate alongside each symptom on the form the severity at which it was experienced on a 9- point scale. For the second week they were asked to use the descriptive method and write down in their own words all symptoms experienced during a panic attack again using a 9 point severity scale. Group B was asked to use the descriptive method for the first week and the standard form for the second week. It was explained that the use of two types of methods allow a more complete assessment of panic symptoms.

Approximately 15 minutes was spent in the feedback session ensuring that all subjects understood the procedure. The difference between anxiety symptoms experienced during a panic attack and those experienced as a result of generalised anxiety was emphasised. All subjects demonstrated that they understood the difference. The importance of completing forms as soon as possible immediately following an attack was also highlighted. For that reason subjects were asked to carry the recording materials with them at all times.



Following the two week recording period subjects attended a session where all forms were collected by the author. Subjects not experiencing at least one panic attack per week were excluded from the analysis. For each panic attack recorded the author asked the subject how soon after the attack the form was completed. This information was noted for each subject and later an estimate of compliance was calculated. Subjects were randomly assigned to new groups (either Group A or B) for the next stage of the study involving the recording of panic symptoms in the laboratory.

Participants were thanked for their cooperation and told that a further test of symptoms using the same forms was to be conducted as the final stage of assessment. Each subject was told that they were going to complete a breathing exercise which may elicit panic-like sensations. The type of instructions given to participants in biological challenge exercises has been shown to influence the degree to which they panic (Clark, Salkovskis, & Anastiastrades, 1990; Rapee, 1986). Therefore, the present study followed the procedure suggested in the therapist's handbook which accompanies Barlow & Craske's (1989) Mastery of Your Anxiety and Panic program. This ensured that the hyperventilation procedure used in this study was consistent with other procedures. The procedure was then demonstrated by the author. Subjects were told that they would need to breath forcefully and rapidly in and out as though they were blowing up a balloon for 90 seconds. It was stressed that for the exercise to produce valid results it must be attempted fully. All subjects successfully completed the 90 second hyperventilation exercise.

Those subjects assigned to Group A were given the structured panic attack form (Barlow & Craske, 1994) to complete immediately following the hyperventilation procedure. They were then given 10 minutes to relax in a quiet room. The author then returned and asked the subject to repeat the procedure but this time to record the symptoms in their own words using the descriptive form. Group B completed the same procedure recording the symptoms first with the descriptive method and second with the structured method.

All forms were then collected from the subjects and they were again thanked and asked to attend next week for the beginning of a cognitive-behavioural treatment program.

Four major groupings of physiological panic symptoms were used to categorise the symptoms reported during the panic attacks. The symptom categories used were; respiratory, cardiovascular, gastro-intestinal and neurological. These categories were considered to best cover the possible array of physiological panic symptoms likely to be reported by the subjects as indicated by the principal components analysis conducted in study 1. All of the symptoms reported by subjects are shown in Appendix I according to the category they corresponded to. A symptom category labelled 'other' was also designed for any symptoms reported using the unstructured method which were unable to be categorised using the major symptom groupings. Two independent raters were used to categorise the symptoms from the descriptive measure. Inter-rater agreement on categories was 100% with all symptoms reported falling into one of the four symptom categories.

## ***Dependent Variables***

### ***Severity of Symptoms***

All symptoms were measured using a severity rating scale consisting of 9 points (as shown in appendix H). Subjects were asked to rate each individual symptom experienced using this scale. The average severity rating for each symptom grouping (respiratory, cardiovascular, gastro-intestinal, neurological) was obtained for each subject, in each of the conditions.

### ***Number of Symptoms***

The number of symptoms recorded for each separate physiological symptom group was averaged across all panic attacks experienced over the recording time for each condition. Panic attacks consisting of less than 3 symptoms were not included in the analysis as it was considered that these represented limited-symptom panic attacks and would potentially confound results. Fyer and Rassnick (1990) reviewed the literature on this issue and concluded that individuals who experience less than four symptoms during their panic attacks constitute a very small percentage of the population experiencing panic and may in fact represent a sub-group of panickers.

### ***Compliance Rates***

Eighty eight percent reported their naturally occurring panic symptoms immediately after they occurred. The remaining 12% recorded their symptoms within an hour after the attack.

### ***Data Analysis***

A doubly multivariate split plot repeated measures analysis of variance (MANOVA) was used to analyse the data. The independent variables were setting (clinic versus invivo) and recording method (structured versus descriptive). The dependent variables were the severity and number of panic attack symptoms reported for each of the physiological symptom clusters (respiratory, cardiovascular, gastrointestinal and neurological).

## Results

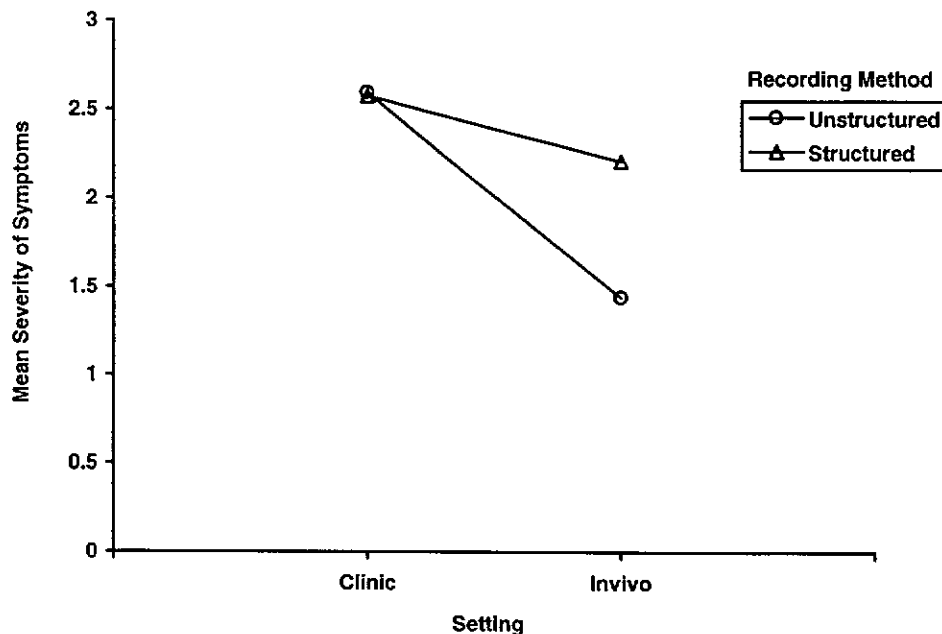
### *Recording Measure*

A main effect for recording measure was found for all of the symptom groups using MANOVA ( gastro-intestinal:  $F(1,36) = 10.05$ ,  $p = .000$ ; cardiovascular:  $F(1,36) = 17.00$ ,  $p = .000$ ; respiratory:  $F(1,36) = 5.04$ ,  $p = .012$ ; neurological:  $F(1,36) = 7.61$ ,  $p = .002$ ). Univariate tests indicated significant differences on both the severity and number of symptoms for each of the four symptom groups (gastro-intestinal, severity of symptoms:  $F(1,36) = 5.32$ ,  $p = .027$ ; number of symptoms:  $F(1,36) = 19.88$ ,  $p = .000$ ; cardiovascular, severity of symptoms:  $F(1,36) = 13.37$ ,  $p = .001$ ; number of symptoms:  $F(1,36) = 29.18$ ,  $p = .000$ ; respiratory, severity of symptoms:  $F(1,36) = 42.56$ ,  $p = .000$ ; number of symptoms:  $F(1,36) = 54.69$ ,  $p = .000$ ; neurological, severity of symptoms:  $F(1,36) = 6.09$ ,  $p = .018$ ; number of symptoms:  $F(1,36) = 9.16$ ,  $p = .005$ ). As shown in figure 6 (a) - (h) the structured recording method resulted in greater numbers and severity of symptoms being reported than the unstructured method for each of the symptom groups.

### *Setting*

The mean severity and number of symptoms for the four physiological symptom groupings across the two settings are shown in Figure 6 (b) - (h). A main effect for setting on symptom severity was found using MANOVA for the neurological symptom grouping ( $F(3,35) = 7.863$ ,  $p < .05$ ) but not for any of the

other symptom groups (gastro-intestinal,  $F(3,35) = .622$ ,  $p > .05$ ; cardiovascular,  $F(3,35) = .135$ ,  $p > .05$ ; respiratory,  $F(3,35) = 1.69$ ,  $p > .05$ ) Univariate tests indicated a significant difference in the severity of neurological symptoms reported between the two settings ( $F(1,36) = 14.64$ ,  $p < .05$ ) with clinical setting symptoms being more severe than invivo ones. A significant setting by recording method interaction was also observed for the severity of neurological symptoms ( $F(1,36) = 5.605$ ,  $p < .05$ ). Figure 6 (a) shows the interaction effect for the neurological symptoms with the unstructured recording method resulting in significantly lower severity ratings in the invivo setting than clinic setting.



**Figure 6(a):** The Interaction Effect for the Severity of Neurological Symptoms

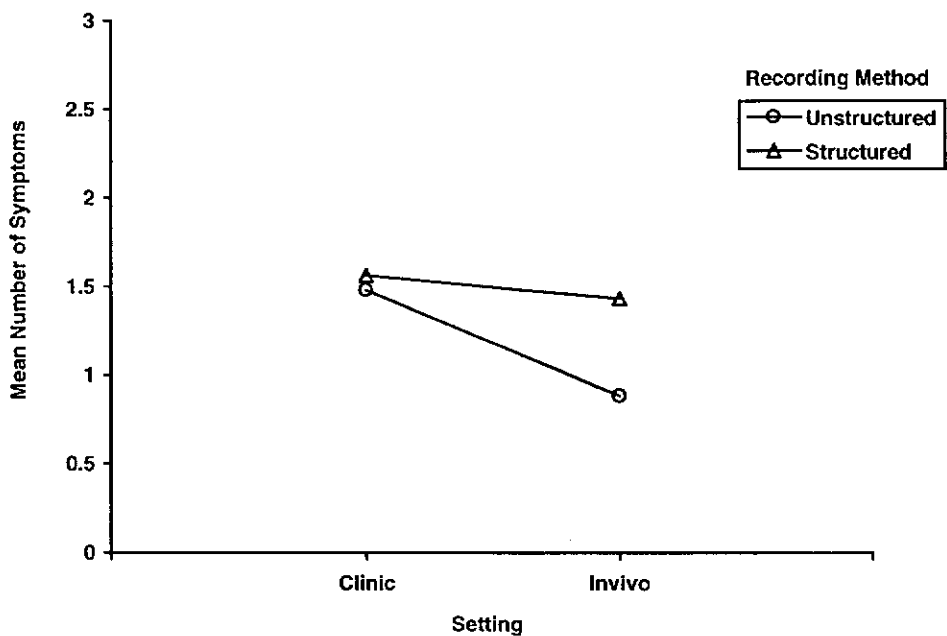


Figure 6(b): Average Number of Neurological Symptoms Across the Two Settings

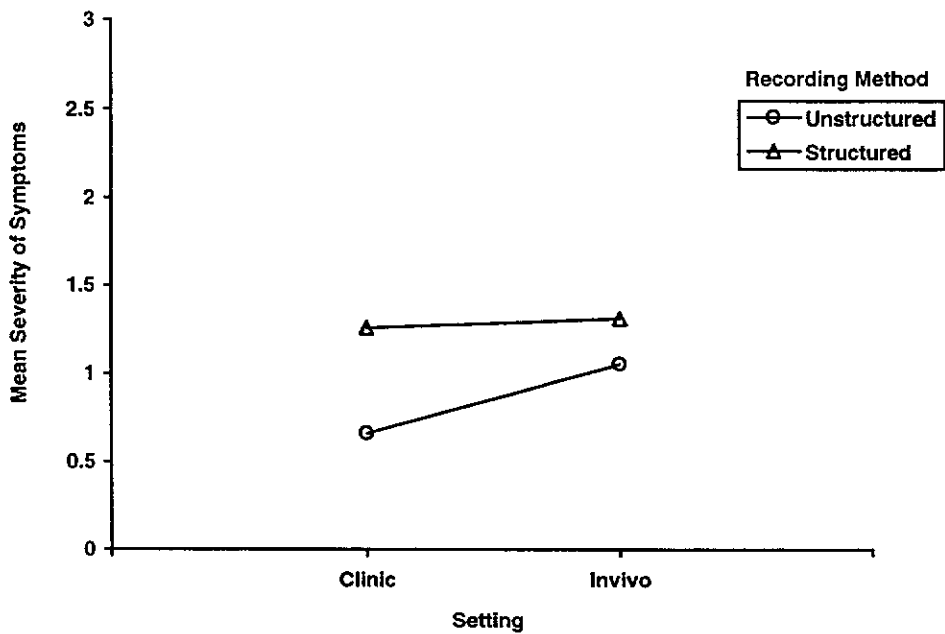


Figure 6(c): Average Severity of Respiratory Symptoms Across the Two Settings

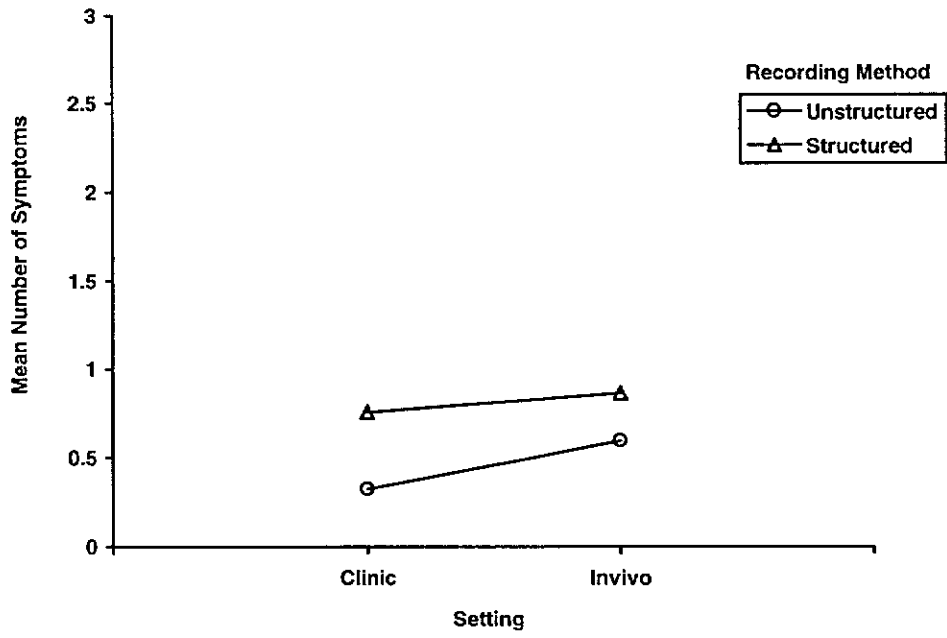


Figure 6(d): Average Number of Respiratory Symptoms Across the Two Settings

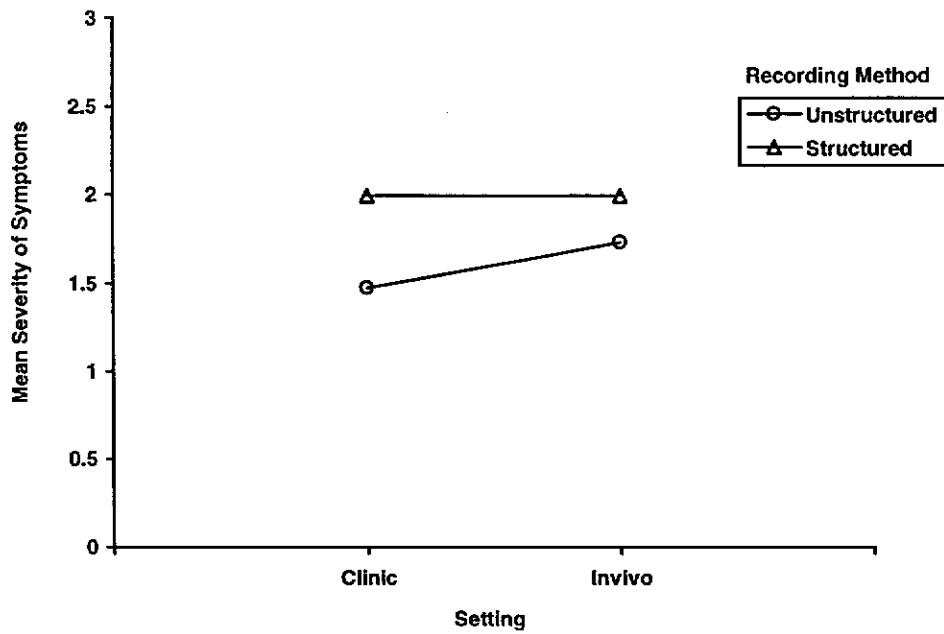


Figure 6(e): Average Severity of Gastro-intestinal Symptoms Across the Two Settings



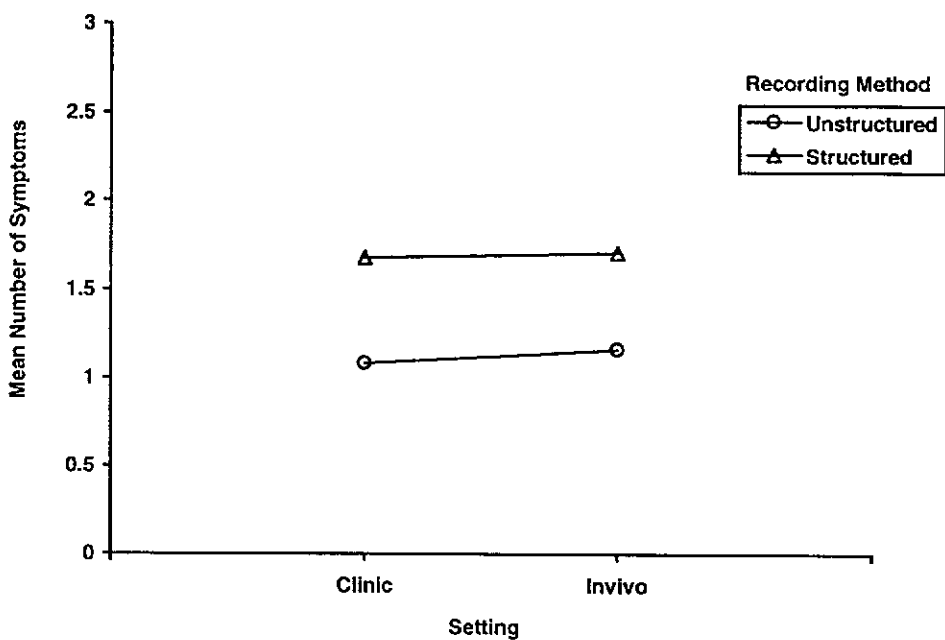


Figure 6(f): Average Number of Gastro-intestinal Symptoms Across the Two Settings

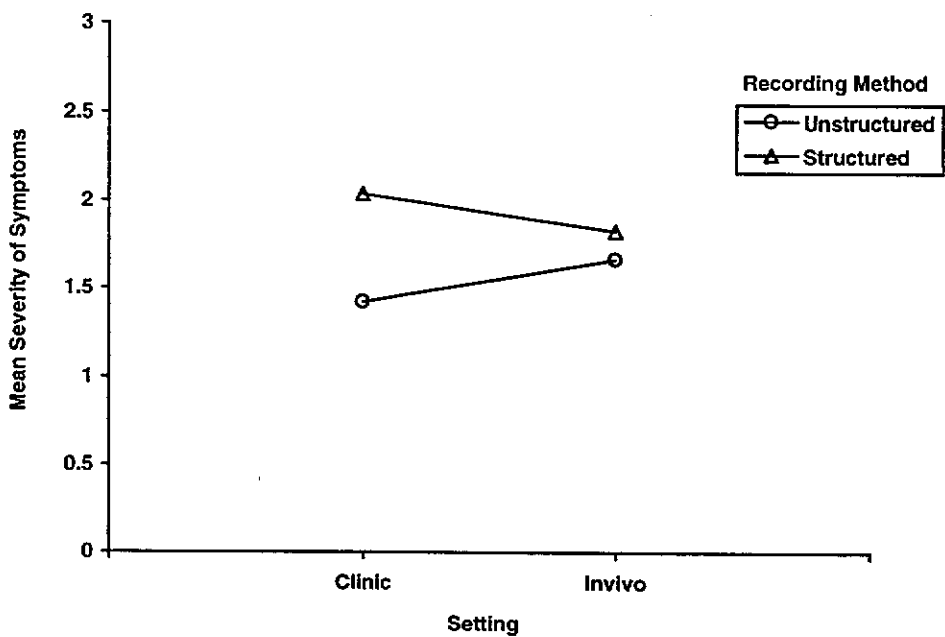
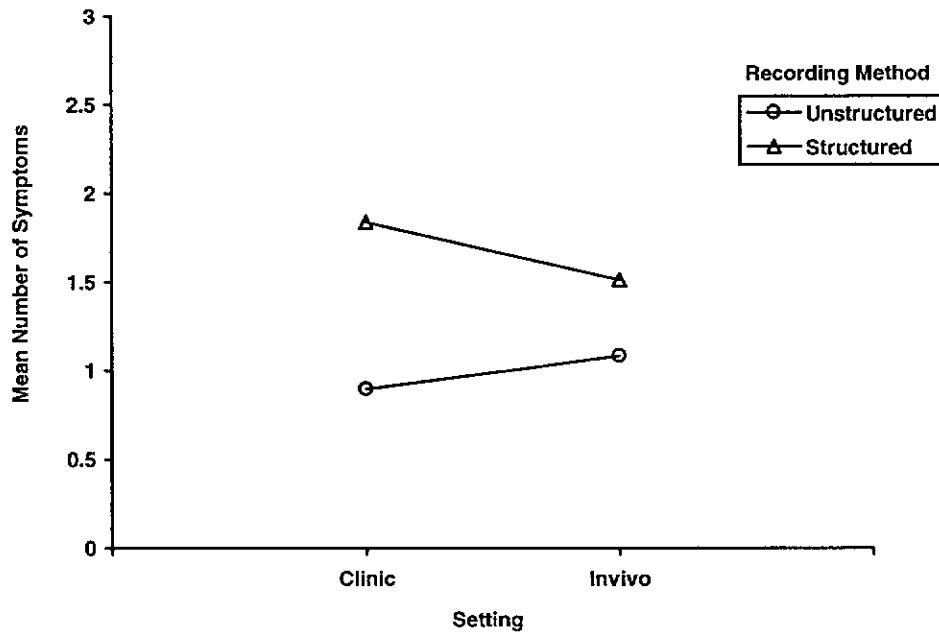


Figure 6(g): Average Severity of Cardiovascular Symptoms Across the Two Settings



**Figure 6(h):** Average Number of Cardiovascular Symptoms Across the Two Settings

## Discussion

The aim of this study was to compare the severity and number of physiological panic symptoms reported using two different types of recording methods. A secondary aim was to compare the symptoms of panic attacks experienced in the natural environment with those reported following voluntary hyperventilation in the laboratory. As the physiological symptoms of a panic attack were found to form into major clusters in study 1, the present study examined the severity and number of panic symptoms recorded based on these symptom groupings. That is, symptoms reported by individuals in the study were categorised according to

whether they represented respiratory, cardiovascular, gastro-intestinal or neurological symptoms.

A main effect was found for the type of recording measure used. All panic symptoms were reported as less severe and consisted of fewer symptoms when using the descriptive recording method. This suggests that the type of measure used to record panic attacks affects both symptom severity reporting and the number of panic symptoms reported.

Apart from the one interaction between the type of setting and type of recording measure observed in the results, the two methods of reporting panic attacks produced significantly different results across all of the panic symptoms. Regardless of the setting, the structured method produced higher severity ratings and more symptoms than the unstructured, descriptive method. As suggested by Cioffi, it is possible that the structured measure results in a greater number of symptoms being reported by virtue of the way items are worded. For example, a 'pounding heart' is very likely to be endorsed by a distressed individual. As such it may be the case that structured measures do not allow independent, non-biased reports of symptoms to be made. In addition, the presence of the comprehensive symptom list with items worded this way may elicit the individual's cognitive threat schema causing them to respond to their physiological sensations more catastrophically and thus giving high severity ratings for the symptoms included.

Alternatively, the unstructured descriptive measure may not be producing an accurate account of the extent of symptoms experienced by an individual. It is possible that some people may not have included all of the symptoms experienced but only those most noticeable. If this is the case it could be argued that these symptoms would be the most relevant as they represent the ones most distressing to the individual. A further possibility is that the descriptive measure produced less symptoms as people had too much to write.

The use of the descriptive measure produced lower severity ratings for neurological symptoms in the natural setting but not in the clinic setting. This finding may have occurred as a function of the suggestive nature of the recording measure. For example, items such as 'de-personalisation' and 'de-realisation' may be more likely to elicit a stronger severity rating than when the person describes their own symptoms such as 'fuzzy in the head'. The two types of recording measures differed in the natural setting but not in the clinic setting. This difference may be due to the influence of the therapist being present in the clinic setting. Individuals who reported the severity of their neurological symptoms in the natural environment may have taken more time to complete the descriptive measure than the structured measure. This may have resulted in a reduction of the severity of the symptoms by the time they were completed. The use of a portable tape-recorder would enable this potential influence to be investigated as the symptoms could be reported immediately without the need for any delay.

An alternative explanation is that the voluntary hyperventilation exercise elicited strong neurological effects in the participants which cancelled out any influence of recording measure. That is, the symptoms experienced by participants following the provocation procedure may have been specific neurological symptoms and were easy to describe using the unstructured method. If other symptoms produced by the challenge were not as salient they may have been harder to put into words. A similar trend was found with the number of neurological symptoms reported which were also greater in the clinic condition when using the unstructured method. This illustrates some of the difficulties involved in examining panic symptoms following panic provocation in the laboratory setting. The procedure used to elicit the panic sensations is likely to produce particular kinds of physiological responses in participants depending on the method used.

However, for all other symptom groups no significant differences were found in the number or severity of panic attack symptoms reported following naturally-occurring panic attacks compared to panic attacks induced by voluntary hyperventilation. Previous studies found significant differences in the severity and number of panic attacks reported in clinic and natural settings (Rapee, Mattick & Murrell, 1986; Rapee, 1995; Sanderson, Rapee & Barlow, 1989). Unlike these studies the present study involved the use of concurrent measurement of panic attack symptoms rather than the use of retrospective reports. The lack of support in the present study for the findings of these earlier studies may be due to this difference. In other words, the previous studies found that the symptom reports obtained through retrospective recall indicated that symptoms were generally more severe in the natural

environment as opposed to the clinic. Given the problems relating to the validity of retrospective recording measures, the current findings suggest that more studies utilising concurrent recording methods are necessary.

Unfortunately, the ability to generalise about this aspect of the study is limited as a possible order effect may have occurred as a result of participants completing the 'invivo' component of the study before the 'clinic' component. This was difficult to avoid as the study required individuals to hyperventilate in order to provide the data for the clinic condition. This presents researchers with a dilemma as participants cannot be expected to complete voluntary hyperventilation exercises before being allowed to build up rapport with the therapist. Attempting to do so may result in unacceptably high attrition rates as participants may feel too overwhelmed to continue with the study. Future studies investigating differences between panic attack symptoms occurring naturally compared to those provoked in the laboratory could improve on the present study by eliminating any possible order effects.

A second limitation was that only one data point was obtained for participants in the clinic condition compared to more than one data point for participants in the in vivo condition. Practical difficulties such as these are inherent in research of a clinical nature. Future studies would need to consider creative methods to overcome such difficulties.

It is surprising that so few respiratory symptoms were reported following the voluntary hyperventilation exercise. A possible explanation is that respiratory

symptoms were not reported with the same frequency as they were interpreted as less threatening symptoms. They may have been perceived as less threatening than the other symptoms following the hyperventilation exercise as the individual may have considered them to be a fairly natural response to overbreathing. That is, the participants may have had a more obvious explanation for feeling breathless following the breathing exercise than perhaps for feeling stomach distress or dizziness. This study was concerned with physiological panic symptoms and therefore did not ask participants to report associated cognitions. However, future studies could include a measure of the participant's cognitions as this would help to clarify the impact of the provocation exercise.

The difference between recording measures found in this study indicates that the reporting of panic symptoms should be interpreted with caution. It appears that the standard panic attack rating forms often used in the assessment of panic symptoms may be potentially over-inclusive and that alternative measures such as the descriptive measure used in this study may produce useful information as to the experience of panic.

The overall results suggest that the reporting of panic symptoms is affected by the type of recording measure used. For the majority of panic symptoms, the structured measure resulted in more symptoms of greater severity being reported. Further investigation is needed to establish whether the structured method is over-inclusive or whether the descriptive measure is not covering all the symptoms experienced by an individual.

One implication of this study is that in order to learn more about the nature of panic attack symptoms it may be necessary to eliminate the potentially confounding nature of recording instruments and artificially provoked panic attack symptoms. As Westling & Ost (1993) have suggested the use of portable tape recorders and monitoring panic symptoms over time may provide a more objective account of panic attack symptoms.



## **CHAPTER SEVEN**

### **STUDY 5 - THE EFFICACY OF INFORMATION-GIVING IN THE TREATMENT OF PANIC DISORDER**

#### **Introduction**

##### *Overview*

There are two dominant approaches to the treatment of panic disorder, pharmacological and cognitive-behavioural treatments (CBT). Despite the success of both in the reduction of panic attacks and general anxiety, the latter has been shown to produce changes which are more long-term (Margraf, Barlow, Clark, & Telch, 1993). For example, in a study by Klosko, Barlow, Tassinari, & Cerny (1990) CBT panic control treatment resulted in 87% panic-free patients compared to 50% for a trial of alprazolam treatment. In addition, the relapse rates after CBT are considerably lower than those obtained with the pharmacological alternatives studied thus far (Barlow, Craske, Cerny, & Klosko, 1989). Indeed, recent studies have found that CBT when combined with alprazolam in the treatment of panic disorder can reduce the occurrence of relapse normally found with the use of alprazolam alone (Spiegel, et al., 1984; Swinson, et al., 1993).

Although many studies investigating CBT have been conducted (Barlow, et al., 1984; Barlow, Craske, Cerny & Klosko, 1989; Clark, Salkovskis & Chalkley,

1985; Klosko, Barlow, Tassinari & Cerny, 1990; Michelson, et al., 1990; Ost, 1988; Waddell, Barlow & O'Brien, 1984) and provide evidence for its efficacy, the compound nature of the treatment has made it difficult to isolate which components most contribute to success.

Overall, the review of cognitive-behavioural treatments for panic disorder has revealed high success rates, with 80% or more of individuals who receive combined treatment components achieving panic-free status as well as clinically significant improvement on other dimensions of the disorder, such as general anxiety (Brown & Barlow, 1995; Cote et al., 1994) . Despite this success rate, conservative estimates of successful alleviation of panic suggest that 25% of individuals do not respond adequately to the treatment. This suggests that there is room for improvement on the components within the overall cognitive-behavioural program.

By isolating and examining the effectiveness of the various components, researchers are hoping to clarify the mechanisms of change as well as to attempt to further improve already quite sound success rates. There are a number of distinct components within CBT most of which have been compared.

### ***Comparison of Components of CBT***

The Albany Study (Barlow, Brown, Craske, Rapee & Antony, 1991; Barlow et al., 1989; Craske, Brown & Barlow, 1991) compared a wait-list condition to progressive muscle relaxation, panic control treatment consisting of interoceptive exposure and cognitive restructuring and a combination of progressive muscle relaxation and panic control treatment. All three treatments resulted in significantly more improvement than the wait-list condition on a variety of outcome measures. Craske et al. (1991) presented the results after follow-up at 6 and 24 months which also showed that a significantly greater percentage of the panic control and combined treatment participants were panic-free when compared to those who had the progressive muscle relaxation. In general, studies have shown that relaxation is probably not the optimal intervention for panic disorder (Margraf et al., 1993).

The Marburg Study, (Margraf & Shneider, 1991) investigated the contribution of reattribution of anxiety symptoms and habituation due to exposure, to treatment success. The authors compared 'pure' cognitive therapy (no exposure to external or internal anxiety cues) to 'pure' exposure treatment (no apparent reattribution of anxiety symptoms), combined cognitive/exposure treatment and a wait-list control condition. By the end of treatment no significant differences were found between the three treatment conditions. A careful examination of the process measures indicated that treatment success was related more to reattribution (panic-specific cognitive changes) than to habituation (self-exposure).

Many of the symptoms found in panic disorder have been attributed to overbreathing (Ley, 1985; Rapee, 1986). Logically, it follows that learning to control hyperventilation should result in a reduction of panic symptoms. All reports and empirical investigations of breathing retraining in the treatment of panic attacks have reported beneficial effects (Bonn, Readhead, & Timmons, 1984; Clark, Salkovskis & Chalkley, 1985; Lum, 1976; Rapee, 1985). In a controlled comparison of respiratory control training plus *in vivo* exposure to *in vivo* exposure alone, Bonn et al. (1984) found that by measuring respiratory rate at follow-up the respiratory control group had a significantly lower rate of respiration than the exposure alone group. At 6-month follow-up the respiratory control group was experiencing significantly fewer panic attacks than the exposure alone group.

A major difficulty with this and other studies examining the utility of breathing retraining as a treatment technique however is that it is not clear whether the success is due to the actual breathing retraining or another associated treatment factor. For example, in the above study both groups had exposure *in vivo* which could be argued as interacting with the breathing retraining. Similarly, studies typically involve an educational component where individuals are provided with information as to the nature of panic attacks and reattribution of the source of symptoms to hyperventilation as part of the treatment package. Thus, it is not clear whether results are due entirely or at all to breathing retraining.

### ***Information-Giving***

The overall consensus appears to be that the essential components of CBT are exposure and cognitive therapy. However, information-giving is one major component of treatment which has not been actively targeted by researchers. Information-giving makes up what is essentially the foundation of the treatment program. It is at this stage that the therapist builds rapport with the client and attempts to isolate the major problems or issues that s/he faces. Information is typically provided in the session by way of questions and answers, straight-forward verbal information-giving as well as between sessions via a manual covering anxiety and panic attacks. Typically, this component also involves concomitant self-monitoring of mood and panic attacks. This provides the clinician with relevant personal examples with which to focus the content of the information.

Given that this component of therapy provides the foundation for subsequent work it is surprising that it has not received the research attention of the other components. The provision of information as to the nature of panic disorder has been reported anecdotally by researchers to be of great value in the treatment of those suffering from panic disorder. A number of researchers have commented on the need to investigate empirically the value of information-giving. Roy-Byrne (1992) has suggested that the 'information phase' is an important component of recently validated CBTs for panic disorder. Similarly, Shear, Leon & Portera (1991) have suggested that the education component of cognitive therapy may be most crucial, implying that physicians armed only with a sufficient explanatory model can provide their patients

with a sense of understanding and control over their symptoms, which in many cases can result in substantial symptom relief.

Similarly, Gould, Clum & Shapiro (1993) reported that bibliotherapy in the treatment of panic disorder was effective in contributing to an increase in subjects' level of knowledge regarding the aetiology and presentation of panic attacks. In a more recent study by Gould & Clum (1995) a self-help manual administered with minimal therapist contact was superior to a wait-list condition on a number of anxiety measures taken at post-test and 2-month follow-up. In another study manipulating the amount of therapist contact in CBT, Cote, Gauthier, Laberge, Cormier & Plamondon (1994) found that reduced therapist contact was as effective as the same programme which was entirely therapist directed. The results of these studies indicate that the provision of information in CBT even with minimal therapist contact can produce effective results. Results of this kind lend support for the argument that panic disorder information packages should be made available to the general public who access health care facilities.

A further important reason for investigating the efficacy of this component is that it may enable access to treatment for individuals with panic disorder who might otherwise miss out due to financial or time constraints. In fact, it has been found that fewer than 25% of individuals suffering with panic disorder seek treatment (Weissman & Merikangas, 1986) and that accessibility and availability are major barriers. Lidren et al. (1994) argued that alternative dissemination approaches may be especially vital to the many panic sufferers presenting to primary care facilities and

emergency departments where traditional forms of psychological treatment are not immediately available.

### ***Cioffi's Model of Somatic Interpretation***

Cioffi (1991) has suggested some important reasons why information giving may be effective as a treatment for panic disorder. Specifically, Cioffi raises the issue of somatic attention in relation to helping people manage various physical problems (e.g. chronic pain). She argues that in some cases attention to somatic sensations could be more successful than distraction. Cioffi refers to this attention to somatic sensations as 'sensory monitoring' and she argues that its effectiveness would be due to several different factors. First, it would allow an accrual of information that would not otherwise be available to the distracting person. This provides information about actual physiological status which may then result in more appropriate self-regulatory behaviours. For example, a person who self-monitors their panic attacks may then realise that rapid and shallow breathing inevitably leads to other distressing symptoms such as dizziness and as a result may attempt to regulate this behaviour by actively slowing down his/her breathing rate.

A second important factor noted by Cioffi is perceived control. She describes the difference between willingly becoming aware of physical sensations as opposed to unwillingly being a 'victim' of the physical sensations. A purposeful search for sensory information could provide the person with a degree of self-control not otherwise likely to occur. A perception of control has been identified as an important influence

upon anxiety levels in people with panic disorder. For example, a study by Sanderson, Rapee & Barlow (1988) found that panic disordered patients who did not believe they could control CO<sub>2</sub> administration reported more anxiety than those patients who had an illusion of control. Cioffi therefore argues that for this to be an effective strategy, the person need only believe that self-monitoring is somehow beneficial.

Cioffi also notes that unpleasant sensations can become increasingly more difficult for the individual to ignore. Therefore, sensory monitoring may allow a person to adapt by becoming more prepared should they be faced with the full awareness of their symptoms. This once again enhances self-control and helps to eliminate a sense of helplessness. Although self-monitoring is only one component of information-giving, there appear to be a number of reasons why it may be a useful strategy when applied to panic disorder treatment.

### ***Summary***

As discussed, the provision of information if effective in CBT could potentially be modified for use in more general non-psychiatric settings. For example, given the high medical utilisation and costs associated with panic disorder, the modification of information sections from CBTs could help to reduce the confusion experienced by this population during the early stages of their condition. It may then be possible to further refine this information to be specifically targeted towards an individual's most troubling cluster of somatic symptoms. The modification of



information packages clearly has a number of potentially useful options. This kind of use could potentially reduce the costs usually associated with panic disorder.

Cioffi's model of somatic interpretation argues for the use of self-monitoring of somatic sensations in conditions where individual's typically opt to engage in distraction. CBT for panic disorder have long emphasised the importance of self-monitoring in order for individuals to overcome the temptation to engage in distraction and so gain a sense of control over the physical symptoms.

### ***Aim of Study***

The aim of this study is to examine the effectiveness of information-giving and self monitoring in CBT. As the information-giving component of CBT typically includes self-monitoring the effectiveness of information-giving will be compared against self-monitoring alone. It is hypothesised that the provision of information regarding the origin and development of anxiety and panic via individual sessions with a therapist as well as written material plus self-monitoring compared with self-monitoring only will result in significant differences between anxiety measures for two groups of individuals with panic disorder.

## **Method**

### ***Subjects***

Subjects consisted of 40 individuals (68.3% female and 31.7% male) recruited via the Curtin Centre for Anxiety and Fear Research at Curtin University. The mean age of participants was 37 years. All potential subjects attended a 2 hour assessment session where they were administered the ADIS-III-R.

All subjects meeting the DSM-IV criteria for panic disorder with mild or no agoraphobia were included in the study. Of the 40 participants, 33 had mild agoraphobia and 7 had no agoraphobia. Subjects were excluded if additional diagnoses were less than 2 points away from the primary diagnosis of panic disorder on a 9-point clinician rating scale. Secondary diagnoses included generalised anxiety disorder (28.7%), depression (11.1%), social phobia (11.0%), post-traumatic stress disorder (7.8%), and specific phobia (3.2%). Of the total subject pool, 38.2% did not have any secondary diagnosis. Prospective subjects were also excluded if they had any serious medical conditions such as asthma, angina or emphysema. All individuals underwent medical screening prior to participation in the study.

Half of the total subjects were randomly assigned to group A and half to group B. Group A received the intervention (provision of information including self-monitoring) and Group B received self-monitoring only and therefore represented a

comparison group against which to evaluate the effectiveness of the information-giving intervention.

### ***Measures***

The ADIS-III-R was used to assess all subjects. This measure has good reliability and validity (as described in earlier sections). Daily mood records based on those in Barlow and Craske (1994) Mastery of Your Anxiety and Panic - II were used to measure each persons average anxiety, average depression and average anticipatory anxiety over the intervention period. This daily mood record requires the individual to rate their anxiety, depression and fear of panicking on a daily basis using a 9-point severity rating scale. Ratings are made at the end of each day so that the person can give an overall rating based on the whole day. A copy of the daily mood record appears in Appendix J.

Standard panic attack rating forms as described previously were used to measure the number of panic attacks experienced during the intervention period.

### ***Procedure***

Following the ADIS-III-R assessment, all subjects were asked to complete daily mood records (see Appendix J) and panic attack forms (see Appendix G) for one week prior to a feedback session. At the feedback session they were given information about their diagnosis and asked to complete a standard battery of questionnaires (e.g. anxiety inventories). Subjects were then randomly assigned to

either Group A or Group B, with a total of 20 subjects in each group. During the feedback session those people in Group A were given a handout providing information regarding panic attacks and anxiety (Rapee, Craske, & Barlow, 1989) (See Appendix K). This information consisted of material outlining the major physiological changes which occur in the body in response to perceived danger as well as statistics and information regarding the prevalence of anxiety and panic and factors understood to contribute to the development of panic disorder.

During the feedback session subjects in group A and B were provided with the rationale for the concept of self-monitoring and an explanation of its usefulness as a therapeutic technique. They were asked to continue to complete the Daily Mood Record at the end of each day. They were also asked to continue to complete Panic Attack Forms immediately following any panic attacks experienced over the two-week monitoring period. Subjects in group A completed self-monitoring over the week as well as reading the information provided in the handout.

The next session with group A consisted of the therapist answering questions which emerged from the previous week's reading as well as carefully explaining the fight-flight response and the associated physical sensations of anxiety. The self-monitoring was examined in the light of the information-giving in an effort to draw the two together in a logical manner. Subjects in group A continued the self-monitoring over the following week and were asked to re-read the information provided in session 1.

Group B completed the same tasks as Group A in the initial session except that they did not receive the information handout on causes of anxiety or receive any information about anxiety or panic from the therapist. They were simply asked to complete the self-monitoring exercise which was described as the first stage of treatment. Subjects in Group B returned for their second session which consisted of the therapist looking over the forms completed and listening to the subject describe the events of their week. Any difficulties with self-monitoring were addressed and subjects were then asked to continue self-monitoring over a second week. Each treatment session consisted of approximately one hour each week. All treatment sessions were conducted by the same therapist for all subjects.

Following the two-week period, records were collected for all subjects prior to undertaking standard cognitive-behavioural treatment.

### ***Dependent Variables***

The dependent variables were average levels of anxiety, depression, anticipatory anxiety and number of panic attacks. To obtain these scores, the severity ratings for average anxiety, depression and anticipatory anxiety taken from each person's daily mood record were averaged across a baseline period of one week (prior to the intervention) and again over one week following the intervention. The average number of panic attacks was calculated using the panic attack record forms at both the baseline and the week following the intervention.

### **Data Analysis**

A doubly multivariate analysis of variance was used to analyse the data from this study. The MANOVA program from SPSS for Windows - Version 6.0 was used for this purpose. The independent variables were intervention type (information versus self-monitoring) and time (pre and post-intervention) and the dependent variables were average anxiety, average depression and average anticipatory anxiety. A separate analysis using a paired-sample t-test was used to compare the groups on frequency of panic attacks. Separate analyses were considered appropriate due to the different measurement scales used on the daily mood and panic attack rating forms.

A multiple regression analysis was conducted post hoc in order to examine the relationship between the dependent variables and panic attack frequency at both pre and post intervention. This was considered necessary to assist in explaining why no difference in panic attack frequency was found following the intervention. A simultaneous regression analysis was used which is a sub-command of the LINEAR REGRESSION program in SPSS for Windows (Version 6.0). As the variable 'group membership' was categorical this was entered into the regression equation first as a 'dummy' variable. Regression analyses were carried out for both panic frequency pre-intervention and panic frequency post-intervention to examine any possible changes in the influence of the other variables on panic frequency following the intervention.

## Results

Figure 7 (a) - (c) show the mean scores for both groups on the three dependent variables at pre-intervention and post-intervention intervals. Comparison of the pre-intervention means on each of the dependent variables for the two groups using independent samples t-tests showed no significant differences (average anxiety,  $t(3,38) = -.38$ ,  $p = .704$ ; average depression,  $t(3,38) = -.72$ ,  $p = .476$ ; average anticipatory anxiety,  $t(3,38) = -.10$ ,  $p = .925$ ).

MANOVA revealed a main effect for intervention type using the Pillais test ( $F(3,36) = 4.08$ ,  $p = .014$ ). Univariate tests indicated significant differences in average anxiety ( $F(1,38) = 9.15$ ,  $p = .004$ ), average depression ( $F(1,38) = 4.49$ ,  $p = .040$ ) and average anticipatory anxiety ( $F(1,38) = 6.03$ ,  $p = .019$ ) between the two groups, with group A reporting lower scores following information-giving and self monitoring as opposed to group B who received self monitoring alone.

A main effect was also found for time ( $F(3,36) = 31.37$ ,  $p = .000$ ) with univariate tests indicating significant differences in average anxiety ( $F(1,36) = 46.89$ ,  $p = .000$ ), average depression ( $F(1,36) = 18.58$ ,  $p = .000$ ) and average anticipatory anxiety ( $F(1,36) = 32.12$ ,  $p = .000$ ) between pre and post-intervention measures.

A significant group by time interaction effect was found using MANOVA ( $F(3,38) = 29.26$ ,  $p = .000$ ). Univariate tests revealed significant interactions on each of the dependent variables (average anxiety,  $F(1,36) = 58.90$ ,  $p = .000$ ; average

depression,  $F(1,36) = 11.78, p = .001$ ; average anticipatory anxiety,  $F(1,36) = 20.37, p = .000$ ), meaning that for each measure the group receiving the information and self monitoring did better from pre to post intervention.



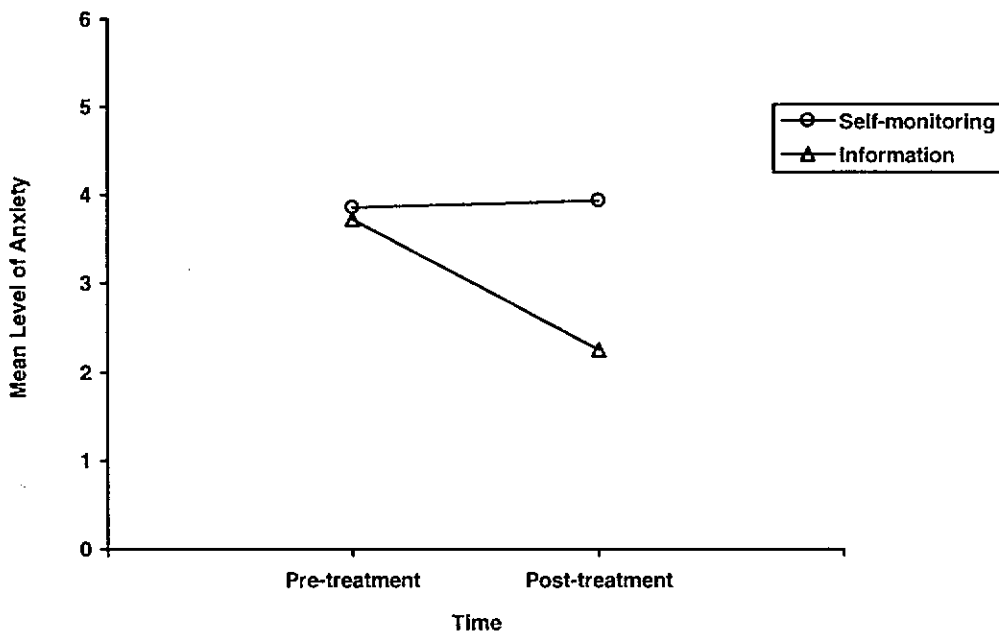


Figure 7(a): Average Anxiety Levels for the Two Groups at Pre and Post Treatment

Intervals

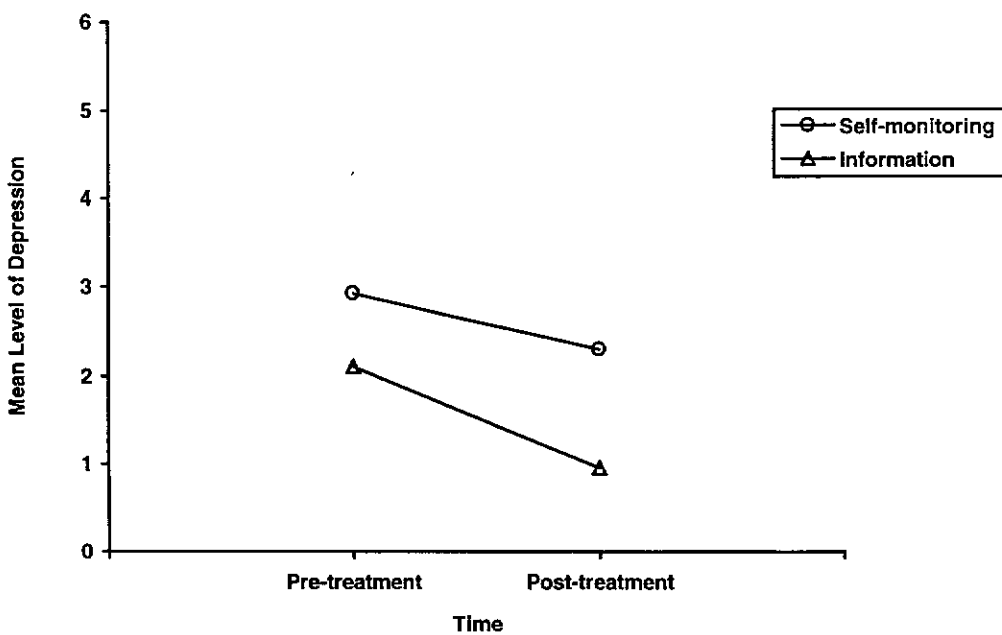
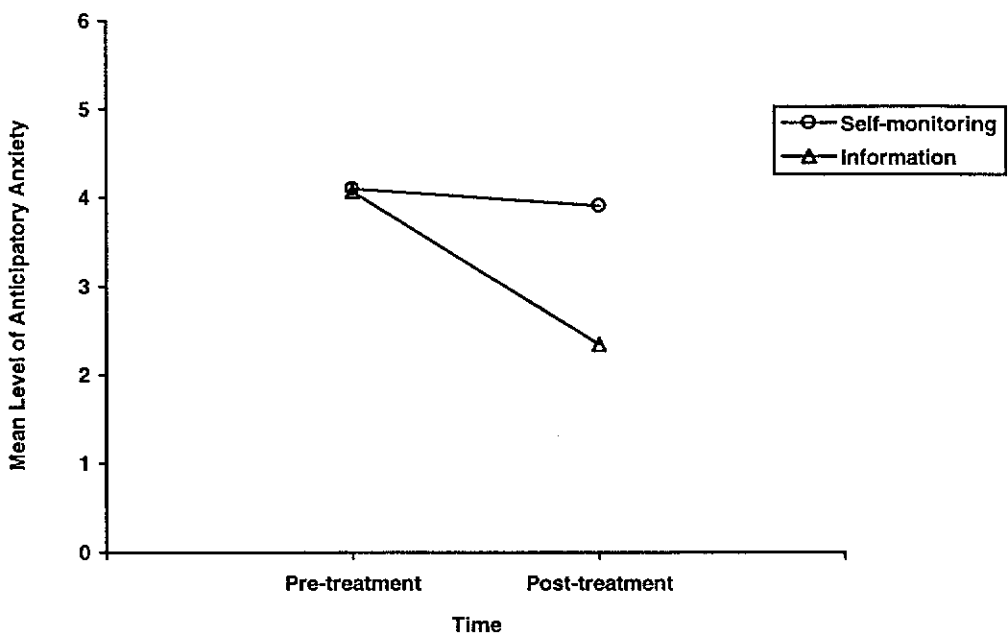


Figure 7(b): Average Depression Levels for the Two Groups at Pre and Post Treatment

Intervals



**Figure 7(c):** Average Anticipatory Anxiety Levels for the Two Groups at Pre and Post Treatment Intervals

Table 13 shows the average number of panic attacks reported by each group at pre and post-intervention intervals. The difference between the means of the two groups on average number of panic attacks at pre-intervention compared to post-intervention was not significant ( $t(1,38)=1.28, p>.05$ ).

**Table 13:** Average Number of Panic Attacks for Both Groups at Pre and Post Intervention

	Group A n=20		Group B n=20	
	Mean	Std dev	Mean	Std dev
Average number of panics pre-intervention	2.950	2.164	3.250	2.593
Average number of panics post-intervention	2.850	2.978	4.100	3.194

The regression analysis indicated that there was a significant relationship between panic frequency at pre-intervention and level of anticipatory anxiety and average anxiety ( $r^2 = .2548$ ,  $p < 0.05$ ). However, this relationship was not apparent for panic frequency at post-intervention. Level of general anxiety was still closely related to panic frequency at post-intervention but this relationship did not reach significance. This suggests that completion of the intervention somehow altered the relationship between these variables.

Post hoc analysis of the power of this study was conducted to further clarify why no difference in panic frequency was observed. With power set at 0.8 and an effect size of 0.5, Cohen's power curves for t-tests (Cohen, 1977) indicate using a sample size of between 50-60. Based on the sample size used in this study, the calculated power to find an effect of 0.5 is 0.65. Therefore, this study had slightly less than optimal power to detect an effect of the intervention.

## **Discussion**

The results of this intervention could potentially have been strengthened by the inclusion of a greater number of subjects to improve the chances of identifying an effect on the frequency of panic attacks. Post hoc power analysis indicated that the failure to find a reduction in panic attack frequency following the intervention may have been a function of low power. Unfortunately, the effect size for this study could not be calculated in advance as this study was exploratory and no comparable studies

could be found. Future studies would need to include a greater number of subjects to improve power.

Some authors have speculated about the importance of information-giving in CBT (Roy-Bryne, 1992; Shear, Leon & Portera, 1991). This study examined the effectiveness of this component of treatment for individuals with a major diagnosis of panic disorder. The results support the general consensus that this element of treatment is more effective than simply carrying out self-monitoring, at least for anxiety, depression and anticipatory fear of panic.

A comparison of the two groups revealed that when all other variables such as therapist contact, session length and number and self-monitoring homework were equivalent, those individuals who received information regarding panic and anxiety had significantly lower rates of general anxiety, depression and anticipatory anxiety than those who engaged in self-monitoring only. There were no significant differences between the two groups in the number of panic attacks experienced although the results were in the expected direction with the group receiving the intervention having a lower mean number of panic attacks than the group completing self-monitoring only.

A regression analysis was conducted to investigate other variables which could have explained the panic frequency results. Interestingly, this analysis indicated that at pre-intervention panic frequency was significantly related to levels of average anxiety, depression and anticipatory anxiety. However, no significant relationship was

found between these variables following the intervention suggesting that the intervention somehow altered the relationship between these variables. Level of anxiety was still closely related to panic frequency following the intervention but this was not significant. This result suggests that although levels of anxiety, anticipatory anxiety and depression all influenced panic frequency before the intervention they did not significantly influence panic frequency following the intervention. It may be that due to the intervention lowering anticipatory anxiety, individuals were less fearful of having a panic attack and this reduction in anticipatory fear resulted in a reduction in the level of depression. Therefore, despite no change in their frequency of panic attacks, individuals were experiencing lower levels of anticipatory anxiety. The finding that average anxiety levels were still strongly related to panic following the intervention suggests that level of anxiety is an important variable to consider in the reduction of panic attacks. This intervention could perhaps be improved by including a component which more directly aims to reduce general anxiety levels such as relaxation techniques or controlled breathing techniques.

In order to clarify this issue a study comprising of a greater number of participants is necessary in order to improve the power of the study to detect an effect on panic frequency. It would also be useful to include another group who receive additional relaxation therapy to more directly address levels of average anxiety. These steps would help to clarify which components are essential in altering the frequency of panic attacks in this type of intervention.

The results of this study are important for a number of reasons. First, significant reductions were not only found on the measures of anxiety but also for depression. A possible explanation for the reduction in depression is that it occurred as a secondary effect of reductions in levels of anxiety. Clearly the reverse could also be true and it is not possible to determine cause and effect in this study. The important point is that reductions on either of these measures would be likely to enhance an individual's progress throughout the remainder of treatment and possibly suggest a more favourable prognosis.

For the group which received self-monitoring only no significant changes occurred on any of the dependent variables. Cioffi (1991) has argued for the importance of self-monitoring in conditions where an individual experiences distressing somatic symptoms. She proposed that 'sensory monitoring' enables the individual to accrue information regarding the physiological processes involved in the experience of somatic sensations and to gain a sense of control over them. Although Cioffi argued that the process of self-monitoring results in the accrual of information, it appears to be less effective than information which is supplied in addition to 'sensory monitoring'. An extension of this study to include a group not completing self-monitoring would provide a measure of the effectiveness of self-monitoring alone and thus shed further light on Cioffi's argument for the importance of this process.

Cioffi has also suggested that an individual's attribution for a sensation is not fixed and although it is influenced by a number of different processes it can be changed. For example, Cioffi highlights that a hypothesis of illness can be changed to

one of wellness. The accrual of information via self-monitoring is recommended by Cioffi as a method of enabling an individual to modify their attribution. She argued that as a person learns to observe their physiological sensations they are more able to accurately explain their origin.

Therefore, according to this model, the most likely explanation for the current findings is that the provision of information in conjunction with self-monitoring makes sense of the previously confusing and frightening somatic symptoms experienced. Thus, the individual is not simply being asked to focus on the symptoms alone but is able to integrate the information given and find some meaning for the sensations experienced. This implies that a type of re-attribution process is operating. Change in attribution was not assessed in this study and therefore it is not possible to directly relate the results to a change in attribution as Cioffi's model proposes. A better test of the model would be to measure attributions both before and after the intervention.

This finding suggests that the provision of information in CBT is not only effective in isolation but may actually influence an individual's progress in therapy. By reducing levels of anxiety and depression and the anticipation of panic, the foundations are laid for the progression to the next stage of therapy. It therefore follows that the quality of this component of treatment is very important. For example, if good rapport is not established between therapist and client at this early stage the depth of understanding of the information provided to the client may be limited. The results of this study suggest that more attention to the therapeutic benefit

of this early stage of therapy is in order. The relative efficacy of what follows may depend upon the early foundations of information-giving.

In addition, this finding may enable more thorough examination of the efficacy of other components of CBT. An individual's success or failure with certain treatments may depend upon their initial progress with information-giving. For example, examination of an individual's anxiety, depression and anticipatory anxiety following the early sessions may indicate that their anxiety levels have not changed or perhaps have deteriorated. If this is the case, the therapist may want to inquire as to whether or not the individual understood the information they were given or if they believed it.

The ability of such a brief intervention to reduce anxiety and depression significantly suggests a number of implications outside of improving CBTs. As has been suggested, information made available to sufferers in the early stages of panic disorder could significantly reduce associated personal and economic costs in the community. Information packages based on those used in CBT could be modified and made available to the general public. In particular, this type of information could be made available in general medical practices. Early intervention for people suffering initial panic attacks could greatly reduce the numbers that go on to develop panic disorder. As well, individuals who are unable or unwilling to engage in lengthy therapy sessions could benefit substantially from a brief two-session intervention.



Clearly there are many possibilities which emerge from these results.

Intuitively clinicians have felt that the provision of information is at the cornerstone of successful intervention for people with anxiety disorders. This study has confirmed via empirical means that this may indeed be the case.

## CHAPTER EIGHT

### GENERAL DISCUSSION

#### Overview

The general aim of this project was to investigate the nature and structure of the physiological symptoms of panic attacks and to explore the relationship between these symptoms and the use of health care services. Cioffi's model of somatic interpretation was applied in order to examine its applicability to the area of panic disorder. Each of the individual aims will be discussed by examining the findings of the relevant studies. Potential improvements and suggestions for future research along with the implications for panic disorder in general will also be discussed.

#### *Summary of Project*

##### *Study 1*

The initial study investigated the proposal that panic symptoms form into major physiological clusters. As predicted by the literature, five physiological clusters emerged from a sample of 153 panic attack symptom checklists. The components identified were a respiratory component, a gastro-intestinal component, a neurological component and two cardiovascular components. That is, five separate symptom clusters emerged from the overall list of eleven physiological symptoms. In

order to examine whether the individuals in the study could be separated into groups on the basis of the type of symptoms reported a cluster analysis was also conducted. Once again, the analysis revealed that the five components found formed five separate clusters. The five clusters were based on the original responses of the participants. The contrasts of each cluster revealed an emphasis on a single component and thus they could be seen to reflect each of the major groupings of physiological symptoms.

The results of this study therefore supported the prediction that panic symptoms cluster into separate physiological groupings and that a person with panic disorder's panic attack symptomatology reflects a preponderance of one of these groups. This study also provided evidence that sub-groups of individuals with panic disorder may exist who can be distinguished on the basis of their most predominant physiological panic symptoms. This study therefore provided some evidence for the existence of sub-types of people with panic disorder as well as sub-types of panic symptoms.

The similarity between panic clusters identified in this study and the symptoms of commonly experienced medical conditions, suggested that this information would be relevant to the development of appropriate screening measures for panic disorder. The first part of study two was therefore aimed at establishing the current need for such screening measures in Australia by providing data on the health care costs of people with panic disorder.

**Study 2 (a)**

Although other studies had identified high medical costs for people with panic disorder, most had been based on American samples. In addition, no studies had directly compared the medical costs and utilisation of individuals with panic disorder to those of other anxiety disorders. A total of 99 participants were asked about their use of the medical system over the last 6-12 months in Western Australia. The total group consisted of 41 individuals with panic disorder, 43 normal controls and 15 people with social phobia. The hypothesis that people with panic disorder would have both higher rates of medical utilisation and associated medical costs than people with social phobia.

The high costs and rates of utilisation found in this study were unique to the panic disorder group. Those people in the social phobia group who also experienced panic and anxiety symptoms had rates of utilisation and costs that were similar to the normal control group. These results suggested that people with panic disorder over-use the medical system due to the ambiguous and frightening nature of their anxiety symptoms and the lack of explanation as to their cause.

This study demonstrated that individuals with panic disorder in Australia incur high costs and over-use the medical system, as is the case with sufferers of the disorder overseas. In addition, the results highlighted that not all anxiety conditions lead individuals to over-use the medical system (e.g. social phobia). The experience of

anxiety symptoms for people with panic disorder represents a unique phenomenon. Whereas, this study described the medical utilisation behaviour of people with panic disorder, the possible processes influencing this behaviour were the focus of the second part of the study.

### **Study 2 (b)**

The second part of the study aimed to investigate the relationship between an individual's most predominant panic symptoms and the type of specialist medical care sought. As study 1 had established predominant clusters of panic symptoms, the hypothesis of this study was that these symptoms would be the ones for which people would seek help. The literature indicated that many individuals with panic disorder present to specialists such as cardiologists with related symptoms which are later identified as the symptoms of panic. Katon (1992) proposed that people with panic disorder seek help for their most distressing symptoms. Also, Cioffi's model of somatic interpretation (1991) proposed that an individual's behaviour in response to the experience of somatic sensations would be dependent upon how they interpret those sensations. Thus, by knowing the symptoms most predominant for the individual it may be possible to explain their subsequent behaviour. The hypothesis was that there would be a relationship between an individual's predominant panic symptoms and the type of specialist medical care sought.

A sample of 53 individuals with a primary diagnosis of panic disorder were asked about their attendance to specialists over the previous 12 months. Each

individual's predominant panic symptoms (based on the components identified in study 1) were then compared with the type of specialists seen. The results only partially supported the hypothesis in that the only significant relationship found was for individuals whose predominant symptoms were respiratory. That is, by knowing that the person's typical panic symptoms were respiratory it was possible to predict attendance at this type of specialist. However, none of the other symptom components was able to predict attendance at the relevant specialists. The results indicate that individuals whose predominant panic symptom are respiratory can potentially be identified within the general medical system more efficiently by an appropriately designed screening device used by pulmonary specialists. Such a device would ideally be sensitive to the likelihood of people presenting with one distinct set of physiological symptoms (e.g. respiratory).

### **Study 3**

The third study was partly intended to explain the general failure to find a relationship between predominant panic symptoms and type of specialists seen in the previous study. The previous study made the assumption that an individual with panic disorders' most predominant symptoms would also be the ones which they interpret as most threatening. As a result, the individual would seek help for those particular symptoms. However, as this hypothesis was only partially supported the third study was designed to investigate the issue of interpretation more closely. The hypothesis was that there would be a relationship between an individual's most predominant

symptoms and those interpreted as most threatening. This study also provided a further test of the concepts in Cioffi's model.

To test this hypothesis, 38 people with a primary diagnosis of panic disorder were randomly selected from the sample pool of 153 people included in the initial study. Each person was asked to complete a questionnaire which described somatic sensations similar to those typically experienced during a panic attack. Each person was asked to imagine a hypothetical situation whereby they experienced the sensation and offer an explanation as to the cause of the sensation. The second part required them to rank three pre-set explanations for the sensation.

No relationship was found between a person's predominant symptoms and their subsequent interpretation of threat. In fact, when interpretations of threat were made they tended to be in response to a range of physiological symptoms. Significantly more threat interpretations were made for cardiovascular symptoms than for any other group of symptoms. Also, a difference was found in the interpretation of threat when the individual's fear schema was activated. In other words when individuals were prompted with an interpretation of threat (multiple-choice section) they were more likely to endorse that item as true.

Therefore, the results of this study suggest that the most frequent and severe physiological symptoms experienced by people with panic disorder are not necessarily those that are more likely to be interpreted as threatening. This may in fact explain

why little relationship was found in study 2(b) between a person's predominant symptoms and the type of medical care sought.

#### **Study 4**

The above results may reflect the 'true' state of affairs regarding panic symptomatology or may be an artefact of the ADIS method of assessing panic symptomatology. For this reason the fourth study was designed to further investigate the nature of panic symptomatology by taking into consideration the effect of both recording measure and setting on the reporting of panic symptoms. The aim of the fourth study was to compare the nature and the strength of the symptoms of panic attacks reported using structured and unstructured recording methods. A second aim was to compare these symptoms following artificially provoked panic attacks and naturally-occurring panic attacks.

Individuals were asked to record their naturally-occurring panic attacks using a descriptive method for one portion of the time and a standard structured method for the other. The same individuals were also asked to hyperventilate in the clinic setting and record the subsequent panic sensations again using the two different measures. Panic symptoms given on the unstructured measure were ranked by an independent rater according to major physiological groups (cardiovascular, neurological, gastrointestinal and respiratory).



A main effect was found for the type of recording method used with the unstructured method producing symptom reports of a lesser severity and number than the structured method. A significant interaction was also found between recording method and setting on the severity of neurological symptoms reported. The unstructured recording method resulted in significantly lower severity ratings of neurological symptoms in the natural environment than those reported using the structured method in this setting.

These results suggest that the type of method used to record panic symptoms is an important factor to consider when studying the nature of panic symptoms. It is possible that people with panic disorder may be influenced by cues inherent to the particular recording method used. For example, in this study the structured method which produced a greater number and severity of symptoms overall may have done so due to the wording of the items which could have activated the individual's threat schema. This interpretation is supported by study 3 which found evidence to suggest that individuals were more likely to endorse more symptoms as threatening when completing the structured or 'forced-choice' section of the questionnaire compared to the unstructured or 'open-ended' section. These studies taken together suggest that individuals with panic disorder may be particularly vulnerable to suggestive items in questionnaires and panic symptom rating forms and that their responses may in fact be exaggerated by the use of such measures.

### **Study 5**

The final study was aimed at examining the efficacy of the information-giving component of cognitive behavioural treatment. The earlier studies had revealed that panic disorder sufferers experience predominant sets of physiological panic symptoms which are difficult to distinguish from common medical conditions. Consequently, they incur high medical care costs as a result of frequent misdiagnoses and lack of understanding as to the origin of their symptoms. The previous studies indicated that panic disorder could be identified earlier in general medical settings with an appropriately designed screening device. Once identified, these individuals could be offered the most appropriate treatment. The high health care costs associated with the confusing nature of panic symptoms as found in study 2 (a), highlighted the importance of screening measures for panic disorder in general medical settings. In addition, the finding that panic symptoms form into distinct physiological clusters suggested the need for information packages describing the likely presentation of these physiological clusters. Although the results of study 1 indicated that individuals are likely to acknowledge one particular cluster of physiological symptoms at a given point in time, no relationship was found between these clusters and subsequent attendance at health care specialists. Therefore, the provision of general information packages covering all potential symptoms would seem the most appropriate option. A major aim of this study was to test the efficacy of information-giving as an individual treatment for panic disorder.

A study of this nature was also considered an important addition to recent dismantling studies which have attempted to isolate the critical components of cognitive behavioural treatments. The individual contribution of the provision of information to the overall effectiveness of cognitive behavioural treatments had not been directly investigated. Recently emphasis has been placed on providing cost-efficient and time-efficient treatments for panic disorder in an attempt to make existing treatments more accessible. The provision of information if effective could therefore be a useful brief intervention for this purpose.

Forty individuals with panic disorder received either information and self-monitoring sessions or self-monitoring only. Results indicated that the combination of information and self-monitoring was superior to self-monitoring alone. Average levels of anxiety and depression as well as average anticipatory anxiety for panic were significantly lower for the combined group. This study revealed that information-giving is an effective individual component of treatment which could be useful if made available to panic disorder sufferers in general medical settings. The results also suggested that this component of treatment represents an important foundation for the subsequent treatment components included in cognitive behavioural interventions. The results provide some support for Cioffi's suggestion that attention to somatic sensations is important for individuals typically distressed by the sensations as it enables the accrual of information as to the source of these sensations. However, the results indicated that individual's with panic disorder benefit the most from the provision of information as well as monitoring the sensations of panic.

## ***Fundamental Issues in Panic Disorder***

The experience of frightening and ambiguous panic symptoms is at the core of panic disorder. Although research in the area has expanded dramatically since the recognition of panic disorder as a separate anxiety condition in 1980 by DSM, clarification as to the nature of panic symptoms was still required. A major aim of this project was to explore the fundamental nature of panic symptomatology including the methods used to record symptoms and the relationship between those symptoms and medical utilisation.

### ***Panic Symptomatology***

Research on panic disorder has investigated the possibility of panic symptoms forming into separate physiological clusters (Briggs, et al., 1993; Whittal, et al., 1994). Study 1 supported these previous studies and also found that people with panic disorder could be identified on the basis of their predominant set of physiological symptoms. The clusters identified closely mirror common medical conditions. The high rates of attendance to medical professionals found in study two highlighted the confusion between panic symptoms and medical conditions (e.g. asthma).

People with panic disorder whose predominant symptoms were respiratory were found to be a particularly distinct group. This cluster of symptoms accounted for the greatest proportion of the variance in the principal components analysis and

was the only group which predicted attendance at specialists. As discussed earlier, these findings could be due to the localised nature of respiratory symptoms and the current focus on asthma conditions within the general community. Other authors argue that a distinct sub-group of people with predominantly respiratory panic symptoms exist. This study lends further support to the probable existence of a respiratory sub-group of people with panic disorder as found by others (Briggs et al., 1993; Rapee, 1991).

However, cardiovascular symptoms were interpreted by individuals as more threatening than any of the other symptom clusters identified. Cardiologists were also the most frequently visited specialists by people with panic disorder (63% of sample) but attendance at these specialists was not related to a person reporting predominantly cardiovascular symptoms on the ADIS-III-R. Therefore, it seems that people with panic disorder interpret cardiovascular symptoms as most threatening regardless of whether they are typically the strongest of the symptoms experienced in the panic attack.

### ***Measurement of Panic Attacks***

The results of the fourth study call into question the methods used to record panic attack symptoms. A difference in the severity and number of panic symptoms was found using two different types of measures. The use of the structured panic attack rating form resulted in more symptoms of a greater severity being reported.

It is likely that most structured checklists involve some element of suggestion. That is, an individual who has just experienced a frightening anxiety attack or is attempting to recall such an experience is likely to have difficulty remaining objective about the experience. In this state it is possible that the wording of an item may play an important part in whether or not it is endorsed by the person. As discussed in an earlier section, Cioffi (1991) has noted that certain items such as 'pounding heart' are already negatively loaded. Therefore, the nature of structured checklists may result in a biased recollection of panic attack symptoms. The alternative to this proposal is that the unstructured, descriptive option does not provide the individual with enough prompting of their panic experience thus resulting in an underestimation of the symptoms.

Regardless of the mechanisms resulting in the discrepancies found between the two recording methods the point of concern is that differences exist. It has already been established in the literature that retrospective and prospective recording of panic attacks produce a different account of symptoms. This study indicates that in addition to the differences caused by these procedures further differences emerge when using either structured or unstructured measures. Comparison of studies of panic symptoms where alternative recording methods have been used should therefore be made with caution. Ideally, comparisons should only be made between studies which have used the same method to obtain their results. Some authors have suggested that in order to get an objective account of the panic experience individuals need to be given a portable tape recorder to describe their symptoms as they are experienced (Westling & Ost, 1993).

### **Setting**

The setting in which panic symptoms are experienced was not found to produce significant differences in the symptom reports of individuals with panic disorder. However, this study was different to previous investigations as the panic symptom ratings were made concurrently rather than retrospectively. Also, the validity of this study was limited by practical difficulties such as controlling for order effects. Therefore, it is difficult to make firm conclusions on the basis of this study. Further studies investigating panic symptoms in the clinic and natural environment using concurrent measurement of panic attack symptoms are needed.

### **Interpretations of Threat**

Study three found that symptoms were interpreted as threatening significantly more often in the forced-choice section than in the open-ended section of the interpretation questionnaire. The results applied to Cioffi's model (1991) would suggest that a 'forced' hypothesis was given to these subjects thereby activating their threat response. When no such prompt was given less threatening interpretations were made. This study suggests that the hypotheses of individuals with panic disorder may be particularly open to negative bias or activation by relevant cues. Cioffi (1991) states that manipulating a cognitive set or biasing causal attributions towards a particular somatic hypothesis increases selective attention to information that is hypothesis relevant and often biases the interpretation of that information toward a confirmation of the hypothesis (Snyder & Gangestad, 1981).

## ***Limitations and Potential Improvements***

### ***Subject Numbers***

Study 2(b), 3 and 5 could have been improved by including a larger sample of subjects. Power calculations were conducted for the non-significant groups in study 2 (b) and were found to be too low to detect the potential significance of a small effect. The sample sizes included in these studies would have been appropriate for moderate effect sizes. However, it was difficult to calculate effect sizes for these studies in advance as no comparable studies could be found. Any future replication of these studies should therefore include a greater number of participants in order to reduce the chance of a type II error.

### ***Retrospective Recall of Panic Symptoms***

The physiological symptom clusters identified in the first study formed the basis for later comparisons in study 2(b) and study 3. As a result the validity of the symptom clusters must be considered when interpreting the results of the above studies. The symptom clusters were identified on the basis of retrospective recall of panic symptoms using the ADIS-III-R. As a result, the ratings given were based on the person's recollection of the experience. This type of procedure is subject to a person's memory bias and as such is not a definitive measure of symptoms on its own.

Despite these limitations, they remain the most practical means by which to establish a person's symptomatology at assessment. It has been argued that



investigations using such measures are necessary to enhance knowledge about the underlying mechanisms of the measure (Barlow, Brown, & Craske, 1994). Although it is useful to investigate the mechanisms operating in these measures the fact that they are subject to bias is a serious obstacle to the clarification of panic symptomatology. For this reason study 4 was conducted to compare the effect of different recording measures on panic symptomatology.

### ***Single Episode of Measurement***

A second limitation relating to the validity of the symptom clusters is that they were reported on the basis of only one point in time. It is likely that the symptoms reported as most predominant at that point in time may not be the most predominant at another point in time. Consequently, this study does not provide information as to the stability of the experience of panic symptoms over time.

To enable firmer conclusions about panic symptoms to be made, a longitudinal research design utilising several different points of measurement over time and with different recording measures would be beneficial. Such an investigation was outside the scope of this project due to the anticipated length of time required and associated costs.

### ***Cioffi's Model of Somatic Interpretation***

Three of the studies in this project provided a test of the ability of Cioffi's model (1991) to account for the response to physiological sensations in panic disorder. Overall, the model was found to provide a useful framework with which to consider interpretative processes in the disorder. As previously outlined, the model emphasises the interaction between social and biological factors in the interpretation of somatic sensations. Two major aspects of the model can be discussed in relation to the findings.

#### ***Factors Influencing Somatic Interpretation***

The model attempts to explain the interpretative processes which influence the behaviour of a person in response to the experience of a somatic sensation. The processes emphasised by the model are attributions, prior hypotheses and mediators. The studies conducted in this project provide only an indirect test of the mechanisms described by Cioffi's model. However, it is possible to draw some conclusions as to the applicability of this model to the interpretation of somatic sensations in panic disorder.

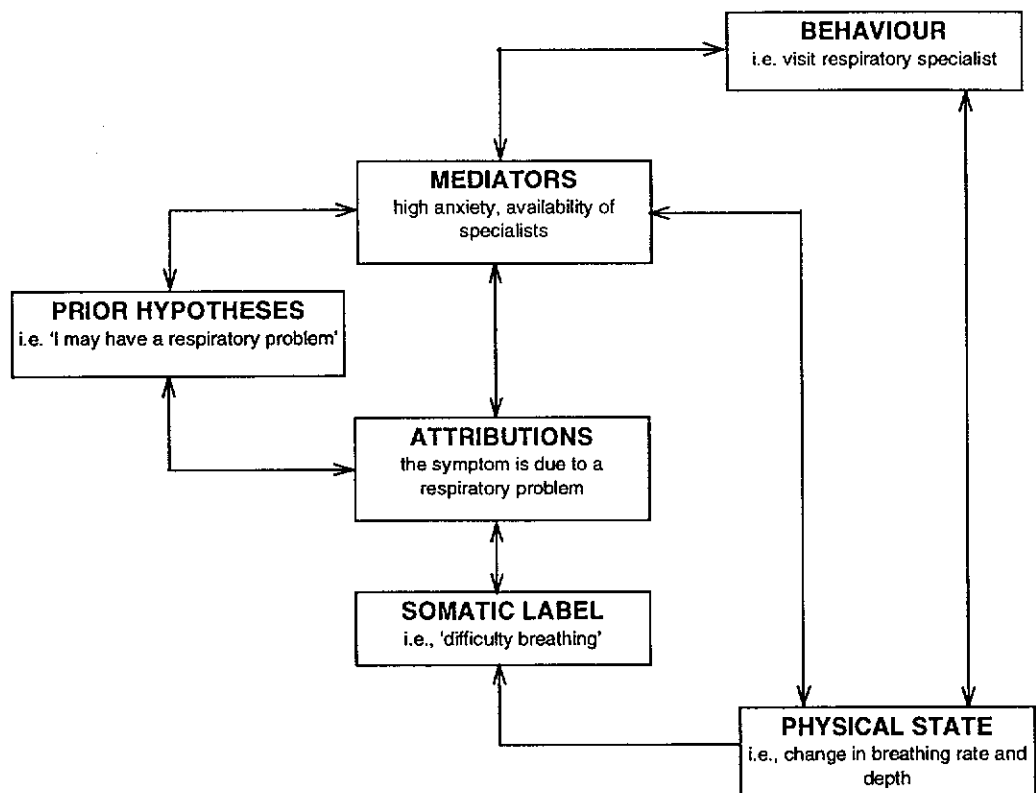
The initial hypothesis of study 2 (b) was that there would be a relationship between an individual's predominant panic sensations and the type of specialist care sought. This hypothesis was based on clinical observation and also the processes outlined in Cioffi's model.

Cioffi proposed that people are active self-diagnosticians and the kind of mental representation they hold for their sensations or perceived illness determines what they do in response to a perceived health threat. Once people have a particular illness hypothesis in mind they are likely to selectively search for sensations associated with that illness and to interpret incoming sensory information relative to it. Therefore, Cioffi's model suggested that the person's pre-existing illness hypothesis would affect the way that they interpret physical sensations and act on those sensations. That is, if they believe that they have some underlying pathology relating to their sensations (e.g. heart condition) this hypothesis is likely to bias their interpretation of subsequent somatic sensations. Having an illness hypothesis in mind causes people to selectively search for sensations associated with that illness and interpret incoming sensory information relative to it.

People with panic disorder have been found in previous studies to attribute their physiological sensations catastrophically to underlying medical conditions (Ottaviani & Beck, 1987; Westling & Ost, 1993). Therefore, if the processes in Cioffi's model were accurate the behaviour (type of specialists seen) of individuals in response to their predominant symptoms should be predictable.

The results of the study supported the hypothesis for one set of physiological symptoms only. The respiratory component was able to predict individuals' attendance at respiratory specialists. For this particular component the processes outlined in Cioffi's model were able to account for the type of behaviour observed.

Figure 8 shows Cioffi's model outlining the proposed interpretative processes using respiratory symptoms as an example.



**Figure 8:** Cioffi's Model of Somatic Interpretation Applied to the Interpretation of Respiratory Systems

In this example, an individual initially notices a change in their breathing rate (*physical state*). This change in breathing rate is then given a *somatic label* in this case it may be shortness of breath. The individual may then have a *prior hypothesis* regarding the particular sensation such as, 'I may have a respiratory problem' which influences the *attribution* made for the cause of the sensation. If no such prior hypothesis exists an attributional search is launched in order to explain the symptom. The attribution made will be affected by *mediators* such as the person's general

anxiety level, hypervigilance, family history of respiratory illness, gender etc. In this example, the person's most likely attribution would be that a respiratory problem is causing the symptom. The final *behaviour* in response to the experience of the sensation depends upon the attribution made and the mediators influencing the person.

Although Cioffi's model appears to explain the behaviour of individuals with predominant respiratory symptoms it was less useful in determining the behaviour of the other physiological components. No relationship was found between the other components and the type of specialists seen. In fact, individuals were attending specialists not directly related to their most predominant physical symptoms.

Study three attempted to explain the failure to find a relationship between the other components and specialist attendance. It was possible that the symptoms reported as most predominant were not the ones considered as most threatening by the individual. Based on the assumptions of Cioffi's model an individual would seek help for the symptoms they regard as most threatening.

The third study provided a test of this possibility by examining the interpretation of ambiguous panic symptoms. Specifically, the hypothesis was that the person's predominant panic symptoms would be more likely to be interpreted as threatening than other panic symptoms. However, this hypothesis was not supported. A variety of symptoms were interpreted as threatening which were not necessarily related to the person's predominant symptoms. This result may explain the failure of

study 2(b) to find a relationship between predominant symptoms and attendance at specialists.

No relationship was found between people whose predominant symptoms were respiratory and the interpretation of threat. This suggests that interpreting a symptom as threatening does not necessarily make it the symptom for which specialist care is sought. The relationship found in study 2 (b) for people whose symptoms were respiratory is therefore more likely to be due to other mediating factors discussed than interpretation of respiratory symptoms as threatening.

Cioffi's model refers to 'mediators' which are considered to influence an individual's interpretation of symptoms and how they eventually act on those symptoms. The results of these studies indicate that mediators may be more important in determining the behavioural response to somatic sensations than interpretations of threat. For example, the relationship observed for the respiratory group may have been related to the current emphasis in the community on asthma and respiratory problems. Mediating factors therefore require more investigation.

The study found that people with panic disorder were significantly more likely to interpret sensations in a threatening manner when their cognitive fear schema was activated. In real-life situations this would translate to hearing about, seeing or being directly involved in a threatening situation. In this sense the sensations of panic are interpreted as indicative of threat when the relevant schema is activated in everyday life. For example, if the next door neighbour unexpectedly dies of a heart attack, the

individual with panic disorders' threat schema are activated for that particular threat cue and hence cardiological panic symptoms would be more likely to be interpreted as a potential catastrophe. A study by Richards, Edgar and Gibbon (1996) also found that when schema activated, people with panic disorder are more likely to closely attend to interceptive cues. In this example, cardiological panic symptoms would be highly salient.

The results of this study lend partial support to Cioffi's model which posits that a person's prior hypothesis regarding the experience of ambiguous somatic sensations will influence the type of interpretation they make regarding these sensations. It was hypothesised that people with panic disorder would interpret their most predominant symptoms as most threatening as these would be the ones for which they would most likely hold an illness hypothesis. However, the results suggest that once the person's fear schema is activated they interpret the majority of sensations with threat.

As noted earlier, this model does not enable a direct test of its efficacy to be carried out, however it does appear to account for this finding. Cioffi's model would suggest that for the other components which were unable to predict behaviour different mediators would be involved. For example, a possible mediator may have been availability of appropriate specialists. In this case, general practitioners may have been more likely to refer individuals with predominant respiratory symptoms to respiratory specialists. Therefore, initial examinations and general practitioner referrals would represent an important mediator. Clearly, it is a difficult task to isolate

potential mediators within the overall interpretation of somatic sensations. However, future studies may be able to select some potentially salient variables such as availability of specialists, ability to pay for services, self-esteem and prior medical experiences to investigate the issue further.

### ***Attention to Somatic Sensations***

A second major proposal put forward by Cioffi was that individuals would benefit more from monitoring distressing somatic sensations than distracting from them. Cioffi argued that distraction is a commonly used technique for coping with many unpleasant sensations such as chronic back pain but that for the experience of sensations in some other contexts it may not be the best option. This has been the approach used for panic disorder where treatment has generally aimed at having the person monitor their symptoms closely and avoid distraction where possible.

Study 5 tested the efficacy of focusing on somatic sensations when provided with accurate information as to the origin of the sensations. The results indicated that this process significantly reduced anxiety levels in individuals with panic disorder in comparison to simply monitoring panic sensations. Large differences were found following only a brief intervention of two sessions highlighting the importance of this aspect of cognitive-behavioural treatment for panic disorder. As proposed by Cioffi's model, focusing on the previously distressing sensations may enable the individual to engage in a process of re-attribution whereby a more accurate perception of the source of sensations is learned. Cioffi proposed that an individual would naturally



accrue information as to the source of the physiological sensation as a result of self-monitoring. The results of this study indicated that providing specific information as to the source of panic sensations along with self-monitoring was more effective than self-monitoring alone. As the individual efficacy of self-monitoring was not specifically investigated in this study it does not directly test Cioffi's hypothesis. However, the results do support Cioffi's general contention that information as to the source of physiological sensations can reduce an individual's distress.

Unfortunately, Cioffi's model is difficult to test as it is able to explain both positive and negative effects. The studies conducted in this project cannot falsify the model due to the nature of the model itself. The value of the model when applied to panic disorder is that it generates further research questions which may serve to clarify aspects of the interpretative processes involved in panic disorder. Cioffi (1991) in fact argues that the model is intended to highlight the complex nature of somatic interpretation.

### ***Implications of Findings***

#### ***Prevention***

##### ***Early identification***

The findings on health care costs for people with panic disorder in this project clearly demonstrate the need for improved identification procedures at the primary care level for panic disorder in Australia. An additional finding which also indicates

the need for improved identification is that over 50% of the people with panic disorder studied were initially given a non-anxiety explanation for their symptoms from general practitioners.

Therefore, the need for appropriate screening measures is well supported by the current findings. Although the existence of predominant physiological panic clusters was confirmed in this project, no definite relationship was found between a person with panic disorders' predominant cluster of symptoms and their interpretation of ambiguous interoceptive cues or attendance at related specialists. Given these results, the development of screening measures would ideally cover all potential symptom clusters likely to be experienced by the individual.

### ***Information***

Information about typical panic clusters could be made available to general and specialist medical professionals. The finding that individuals with panic can be identified on the basis of a particular sub-type of panic symptom may narrow the likely medical settings in which these individuals would be likely to present. In addition to enhancing screening measures, this type of information could be made available to patients. For example, specialist clinics could provide pamphlets outlining the similarity between cardiovascular panic symptoms and the symptoms of cardiac disease. As no relationship was found between the person's predominant physiological panic cluster and the type of specialist services sought the provision of a general information package covering all symptom clusters would possibly be the most

effective. Indeed, information-giving was found to significantly reduce anxiety and depression in panic disordered individuals in the final study of this project.

Information could therefore be designed for individuals presenting at medical settings for assistance. It could represent another preventative measure ultimately reducing costs to the individual and society. By providing relevant information to individuals at this early stage many may not require further treatment although this requires further investigation.

### ***Treatment***

The existence of panic clusters also provides some opportunities for improving existing treatment programs for panic disorder. The emphasis in cognitive-behavioural treatments for panic disorder has been on improving the already high success rates. The essential components of treatment have been investigated and found to include cognitive therapy and exposure (Margraf, et al., 1993). Both of these components involve the individual going through a process of re-attribution where the sensations of anxiety are eventually interpreted as non-threatening. Standard cognitive-behavioural programs teach the individual to understand and accept all of the potential physiological manifestations of anxiety.

The significance of information-giving as a treatment for panic disorder was demonstrated in this project. This finding has implications for research attempting to isolate the critical components of cognitive-behavioural therapy and thus improve on its success rates. The final study revealed that the provision of information results in

reductions in anxiety levels after only a brief period of time. Studies attempting to improve cognitive-behavioural treatments could examine the effect of successful information-giving on the effectiveness of the subsequent components of treatment. For example, measuring anxiety levels following information-giving may enable some prediction about the likely effectiveness of the cognitive therapy and exposure interventions to follow. If a person has not benefited from the early information component it may suggest that they have not accepted the information or do not understand it. If so, the success of the components to follow could be dependent upon this first stage of therapy.

### ***Reduction in Costs***

The findings of this research have a number of implications for reducing the costs associated with panic disorder. As discussed, high medical costs are incurred for this group as a result of difficulties in recognising the symptoms of panic disorder. The development of specific screening devices which can discriminate the symptoms of panic disorder from other 'physical' conditions is needed. Information regarding the nature of panic symptoms and in particular that they can present as particular physiological clusters could be provided to medical professionals. In addition, information packages could be made available in general medical settings and specialist settings for patients. This type of information would improve the general awareness of panic disorder in the settings where it is most likely to present.

Studies investigating the impact of cognitive-behavioural treatments on medical utilisation and costs would be useful. Investigations of this type would provide evidence as to the effectiveness of the most appropriate treatment for panic disorder on the medical utilisation behaviour of these individuals. This would more clearly highlight the importance of appropriate referrals to mental health professionals in order to reduce the direct costs associated with the disorder.

### ***Conceptualising Panic Disorder***

Research in the area of panic disorder is guided by various theories and models regarding the development and maintenance of the disorder. A predominant theory in this area is Barlow's diathesis-stress model. Empirical studies have been conducted which provide support for aspects of this model. This project investigated the efficacy of a supplementary model applied to panic disorder. The cognitive-perceptual model of somatic interpretation proposed by Cioffi (1991) describes a set of inter related processes which together attempt to explain how an individual interprets a somatic sensation. As panic disorder is characterised by the experience of ambiguous somatic sensations the concepts proposed in this model appear relevant to this disorder.

This project has found that some of the principles of Cioffi's model may be useful when applied to the processes involved in panic disorder. Specifically, it stresses the importance of several factors when attempting to explain an individual's response to the somatic sensations of anxiety. A number of variables have been

identified in the literature as particularly relevant to the area of panic disorder. These 'mediators' may represent useful areas for further research aimed at clarifying the behaviour of people with panic disorder.

### ***Life events***

Life events would be a useful factor to consider in relation to the interpretation of panic symptoms. Barlow refers to the impact of stressful life events in his diathesis-stress model. Specifically, significant life events are viewed as a 'trigger' which significantly effects an individual's response to high anxiety symptoms. The nature of life events is an important variable to consider as it may influence the interpretation of anxiety symptoms. For example, the loss of a friend or loved one to a sudden heart attack may represent an influential mediator in the persons later interpretation of somatic sensations. Future studies examining this variable would be useful.

### ***History of family illness***

A history of family illness could potentially be a very influential factor to consider in the mediation of a person's interpretation of symptoms. For example, if a person with panic disorder has a family history of stroke, neurological symptoms may be most likely to be interpreted as threatening for this individual.

### ***Self-efficacy***

The concept of self-efficacy was proposed by Bandura (1977) and refers to the conviction that one is capable of successfully performing whatever responses are necessary to accomplish a designated goal. Bandura argues that efficacy expectations can be affected by a variety of factors, including performance accomplishments, vicarious experience, and verbal persuasion. Self-efficacy has been identified as an important variable in determining an individual's success in cognitive-behavioural therapy for panic disorder (Cote et al., 1994; Oltman, Neale, & Davidson, 1991; Telch et al., 1989). In a study by Cote et al. (1994) individuals' self-efficacy to control their panic attacks significantly increased as a result of cognitive-behavioural therapy. Self-efficacy may also be an important mediator to consider in the overall interpretation of somatic symptoms. In this case self-efficacy relates to a person's perceived ability to control the symptoms of a panic attack. For example, a person with low self-efficacy may be inclined to accept inconclusive diagnostic test results and continue to experience their symptoms. In contrast, a person with high self-efficacy may be more likely to accept that there is no organic cause for their symptoms and take steps to work with a therapist on controlling the anxiety. Therefore, the behavioural response to somatic symptoms may depend upon this important mediator.

## ***Important Considerations for Future Research***

### ***Physical Conditions***

Although it is clear that individuals with panic disorder return for diagnostic tests and visit specialists several times for an explanation of their symptoms it is essential that a comprehensive medical screening is undertaken to rule out the possibility of an organic cause for symptoms. The emphasis in this project on screening for panic disorder in medical settings is based on the cases identified where no organic basis for symptoms can be found after several medical tests.

### ***Secondary Diagnoses***

All participants in this project were included only if secondary diagnoses were at least two points away from their primary diagnosis of panic disorder using the clinician's 9-point rating scale on the ADIS-III-R. This minimised the likelihood that other problems such as depression or generalised anxiety disorder were confounding the symptoms being investigated. Other studies examining the symptoms of panic disorder have not always included reference to secondary diagnoses. As such, comparisons with these studies are complicated by the influence of secondary diagnoses. Comparison of findings across studies could be improved by authors stating the secondary diagnoses of their participants.



### ***Future Research***

This project opens up a realm of possibilities for future research. Some major areas are summarised below.

#### ***Cioffi's Model of Somatic Interpretation***

These studies did not directly test Cioffi's model and could have been improved by including a question as to individuals' beliefs about their symptoms of panic, for example, asking them if they feared any underlying illness. This would more directly provide information as to the person's particular illness hypothesis. For example, in study 2 (b) a person with predominant gastro-intestinal symptoms may have held an illness hypothesis regarding neurological symptoms at that time. Illness hypotheses are also likely to change depending upon changes in mediating circumstances. In this example, the person may have watched a disturbing documentary on television regarding the incidence of brain tumours and the related symptoms. As such, the individual may interpret the experience of ambiguous somatic sensations according to this new hypothesis.

A study directly investigating change in attribution following the provision of information would clarify the mechanisms responsible for the success of this treatment component.

### ***Stability of Panic Symptoms***

As highlighted earlier, future research into the symptomatology of panic disorder could be improved by examining symptoms on more than one occasion. This would enable the stability of symptom clusters to be observed across time. A study of this type could also provide useful information about the average length of time an individual focuses on one particular set of symptoms before attending to another.

### ***Sequencing of Panic Symptoms***

An issue also worthy of further research is the sequencing of panic symptoms. It has been suggested that panic symptoms are experienced in a sequence with certain autonomic physiological changes occurring first and followed by other types of symptoms (Briggs et al., 1993). For example, early physiological changes might include an increase in breathing rate and body temperature followed subsequently by feelings of dizziness and light-headedness. The clusters of symptoms found in this project may be due to individuals having attacks of different lengths and hence experiencing different physical sensations as a result. Future studies could investigate panic symptoms in relation to the length of the attack and the pattern of symptoms.

### ***Length of Time Suffering***

A useful research topic would be to compare panic symptoms with the length of time an individual has been experiencing panic disorder. It is possible that people experiencing panic attacks for the first time may focus on the most frightening panic symptoms. In this project many individuals interpreted cardiovascular symptoms as most threatening. As chest pain and a pounding heart are usually experienced as severe and localised symptoms, the most likely explanation would be that of a heart problem. In contrast, other symptoms such as nausea are less likely to be attributed to a threatening medical condition. Therefore, people who are experiencing these symptoms for the first time may be likely to focus upon these symptoms over others. As time passes these symptoms may be replaced by other symptoms of anxiety. By examining the length of time a person has been suffering it would help to clarify the relationship between panic clusters and familiarity with symptoms.

Another issue related to the length of time suffering is that as a person becomes familiar with the experience of panic they may develop various coping skills which are employed to reduce the length or severity of panic attacks. For example, a person may learn to distract themselves by listening to a radio when they notice the first signs of an anxiety attack. As a result, people who have learnt to cope in various ways with their attacks may be experiencing shorter attacks. As discussed above, the length of the attack could determine the type of symptoms experienced if symptoms

depend upon the length of the attack. For example, neurological symptoms have been proposed to occur late in the duration of an attack (Briggs et al., 1993).

Studies could investigate this issue by having people record the order of their symptoms and the length of their attacks. It would then be possible to compare attacks of different lengths with the type of symptoms being rated as most severe.

### ***Recording of Panic Symptoms***

More studies investigating the effect of different methods of recording panic symptoms are required. As the present project has revealed, panic symptom reports are influenced by the nature of the recording device. Studies utilising descriptive, concurrent recording of attacks may improve the validity of panic symptom reports. The validity of descriptive measures could be verified by monitoring individuals using ambulatory monitoring devices such as heart rate monitors and comparing the results with symptoms reported using descriptive measures.

### ***Development of Panic Screening Devices***

As highlighted earlier, the results of this project suggest some useful considerations for the development of screening measures for panic disorder. General panic disorder screens could initially be piloted in general medical settings and later developed more specifically for application in specialist medical settings.

### ***Summary and Conclusions***

The overall finding of this project is that at a given point in time an individual with panic disorder is likely to acknowledge a predominant cluster of physiological panic symptoms as most salient. However, despite the existence of these clusters, individuals appear to remain hypervigilant to other physiological panic symptoms also and are likely to interpret any one of these other symptoms in a threatening manner. Consequently, individuals are also likely to seek specialist medical advice for any one of these symptoms and not necessarily those that are the most predominant or experienced as the most severe. This in part helps to explain the high rates of use of the health care system and high associated costs found for this group.

The results also suggest that the reporting and interpretation of physiological panic attack symptoms by these individuals is influenced by the nature of the measure used to obtain the reports. Specifically, people with panic disorder in this project were more likely to give higher severity ratings and indicate a greater number of symptoms as well as making more interpretations of threat when the measures contained some element of suggestion. This finding implies that in order to clarify issues relating to panic symptomatology, close attention to the likely activation of a person with panic disorder's threat schema via the nature of the recording measure is essential.

The provision of information regarding the nature and development of anxiety and panic along with monitoring of the symptoms was found to be an effective

intervention for people with panic disorder. This finding when considered in relation to the earlier studies, suggests that individuals with panic disorder would possibly benefit most from a general information package covering all potential panic symptoms made available in medical settings. Also, the findings indicate that despite individuals reporting predominant panic symptoms, the development of screening devices for the disorder should cover all symptoms as people with panic disorder are likely to respond to and seek help for symptoms which are not necessarily the most severe.

Cioffi's model of somatic interpretation may provide further insight as to the processes influencing an individual's interpretation of panic symptoms. In particular, the model highlights the need to consider the influence of mediators such as family history of illness when considering a persons interpretation of symptoms. A variety of other mediators could be investigated which may improve the ability of the model to predict the behaviour of individuals with panic disorder.

In summary, this project highlights the need for more studies to investigate the fundamentals of panic symptomatology, in particular its measurement. It also provides justification and considerations for the development of screening devices for panic disorder as well as other preventative measures aimed at reducing the costs associated with the disorder.

Panic disorder is a common anxiety condition which results in significant personal and financial costs to an individual as well as economic costs to a

community. The emphasis of this project has been on clarification of fundamental issues in panic disorder with the aim of enhancing preventative strategies which are favourable and less costly alternatives for the community. Clarification of fundamental processes such as the interpretation of symptoms and the effectiveness of appropriate information will ultimately enable the implementation of effective preventative strategies in the community.

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## APPENDIX A

### CLINICIAN'S RATINGS AND DIAGNOSIS

ABSENT	MILD	MODERATE	SEVERE	VERY SEVERE
0-----	1-----	2-----	3-----	4-----
5-----	6-----	7-----	8	
None	Slightly disturbing/ not really disabling	Definitely disturbing/ disabling	Markedly disturbing/ disabling	Very severely disturbing/ disabling

### CURRENT DSM-IV DIAGNOSIS

	PRINCIPAL DIAGNOSIS	SEVERITY RATING	ADDITIONAL DIAGNOSIS	SEVERITY RATING
Axis I:	_____	_____	_____	_____
	_____	_____	_____	_____
			_____	_____
			_____	_____
			_____	_____
			_____	_____
AXIS II:	_____	_____	_____	_____
AXIS III:	_____			
AXIS IV:	Acute: _____	Enduring: _____	_____	
	Stressors: _____			
AXIS V:	Present: _____	Last Year _____	_____	

### PAST DSM-IV DIAGNOSIS

DIAGNOSIS	SEVERITY RATING	DATE OF ONSET	DATE OF REMISSION
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Hamilton Anxiety: \_\_\_\_\_ Hamilton Depression: \_\_\_\_\_

Time: Start \_\_\_\_\_ Stop \_\_\_\_\_

Diagnostic confidence rating (0-100): \_\_\_\_\_ If rating is ≤ 70, please  
comment:

## APPENDIX B

- C. MOST RECENT PERIOD - rate the severity of typical symptoms for this period on the following scale.

0	1	2	3	4
None/ No Distress	Mild/ Mild Distress/ Easily Tolerated	Moderate/ Moderate Distress/ Tolerated With Difficulty	Severe/ Severe Distress/ Barely Tolerated	Very Severe/ Grossly Disabling/ Not Tolerable At All

**NOTE:** Symptoms which are occasionally experienced but are not typical should be rated parenthetically.

7. Did you usually experience \_\_\_\_\_ during your MOST RECENT period of panic attacks?

		MOST RECENT PERIOD				
a.	Shortness of breath (dyspnea) or smothering sensations	0	1	2	3	4
b.	Choking	0	1	2	3	4
c.	Palpitations or accelerated heart rate (tachycardia)	0	1	2	3	4
d.	Chest pain or discomfort	0	1	2	3	4
e.	Sweating	0	1	2	3	4
f.	Dizziness, unsteady feelings or faintness	0	1	2	3	4
g.	Nausea or abdominal distress	0	1	2	3	4
h.	Depersonalization or derealization	0	1	2	3	4
i.	Numbness or tingling	0	1	2	3	4
j.	Flushes (hot flashes) chills	0	1	2	3	4
k.	Trembling or shaking	0	1	2	3	4
l.	Fear of dying	0	1	2	3	4
m.	Fear of going crazy	0	1	2	3	4
n.	Fear of doing something uncontrolled	0	1	2	3	4

8. Maximum number of symptoms experienced during a panic attack that occurred during the most recent period. (Do not include parenthetical ratings.)

--	--

## APPENDIX C

NAME \_\_\_\_\_ DATE \_\_\_\_\_

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by each symptom during the PAST WEEK, INCLUDING TODAY, by placing an X in the corresponding space in the column next to each symptom.

	NOT AT ALL	MILDLY	MODERATELY	SEVERELY
1. Numbness or tingling				
2. Feeling hot				
3. Wobbliness in legs				
4. Unable to relax				
5. Fear of the worst happening				
6. Dizzy or lightheaded				
7. Heart pounding or racing				
8. Unsteady				
9. Terrified				
10. Nervous				
11. Feelings of choking				
12. Hands trembling				
13. Shaky				
14. Fear of losing control				
15. Difficulty breathing.				
16. Fear of dying				
17. Scared				
18. Indigestion or discomfort in abdomen				
19. Faint				
20. Face flushed				
21. Sweating (not due to heat)				



## APPENDIX D

### HEALTH CARE UTILISATION QUESTIONNAIRE

The information gathered from this questionnaire will be used for comparative purposes in a research study investigating the use of the health care system by people with anxiety disorders and individuals from the general population without anxiety disorders.

**The information you provide here is strictly confidential and for that reason your name is not required.**

---

#### GENERAL PRACTITIONERS

1. When was your most recent visit to a G.P? \_\_\_\_\_
2. What was the purpose of this visit?  
\_\_\_\_\_
3. Approximately how many visits have you had to a G.P. in the last 6 months?  
\_\_\_\_\_
4. How many visits have you had to a G.P. in the last month? \_\_\_\_\_

#### **(Question 5 and 6 for anxiety subjects only)**

5. What was the first explanation given to you by a G.P. for your anxiety symptoms?  
\_\_\_\_\_
6. Please list any current medications prescribed by your G.P. for your anxiety symptoms.  
\_\_\_\_\_
7. Have you visited a specialist in the last 12 months? If yes, please list all specialists seen (e.g. cardiologist, psychologist, physiotherapist).  
\_\_\_\_\_
8. When was your most recent visit to a specialist?  
\_\_\_\_\_

9. Have you had any diagnostic tests in the last 12 months? (e.g. EEG, blood tests, cat scan). Please list all of the test taken.

---

10. Have you attended an emergency room in a hospital in the last 12 months? If yes, please indicate the number of times and the reason.

---

11. Have you been transported to hospital in an ambulance in the last 12 months? If yes, please indicate the number of times and the reason.

---

12. Do you suffer from any severe medical conditions which require ongoing treatment? (e.g. diabetes, epilepsy). If yes, please list below.

---

**Thank you for your assistance with this questionnaire**

## APPENDIX E

### GP Consent Form

I \_\_\_\_\_, give permission to Clare Rees to contact my General Practitioner in order to establish the number of consultations I have had over the last 6 months. I understand that no other confidential medical information will be obtained or discussed.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

Witness Name: \_\_\_\_\_

Date: \_\_\_\_\_

Signature: \_\_\_\_\_

## APPENDIX F

### Interpretation Questionnaire - Revised

Here are some outline descriptions in which it is not quite clear what is happening. Read each one and then answer the question below it very briefly. Write down the first thing that comes to your mind without thinking too long about it. Please write down what you think is happening before you turn over the page.

When you have done that turn over the page and you will see three possible explanations for the situation. Arrange these in the order in which they would be most likely to come to your mind in a similar situation. So the one most like what you might think should come first and the one least like what you might think should come third. Do not think too long before deciding. We want your first impressions, and do not worry if none of them actually fits with what you actually did think.

1. You feel discomfort in your chest area.

Why?

- a) Something is wrong with your heart.
- b) You have a sore muscle.
- c) You have indigestion.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

2. You feel "light headed".

Why?

- a) You didn't get enough sleep last night.
- b) You need to get something to eat.
- c) You have a neurological problem.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_



3. You notice your heartbeats.

Why?

- a) You have a heart problem.
- b) You have been physically active.
- c) You have been watching an exciting TV show.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

4. Your legs are weak and rubbery.

Why?

- a) You forgot to eat lunch.
- b) You over exercised.
- c) Something is wrong with your circulation.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

5. You are feeling “spaced out”

Why?

- a) You stayed up late last night and you are tired.
- b) Something might be wrong with your brain.
- c) You're coming down with a mild virus.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

6. You feel unsteady on your feet.

Why?

- a) You had a bit too much to drink.
- b) You tripped on something.
- c) You are developing a brain tumour.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_



7. You are having difficulty breathing.

Why?

- a) You have an unrecognised cardiovascular disease.
- b) You have a cold.
- c) You are physically “out of shape”

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

8. You are experiencing tingling and/or numbness sensations

Why?

- a) You have been sitting in one position for too long.
- b) You are over tired.
- c) There is something wrong with your circulatory system.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

9. You are having chills and/or hot flashes.

Why?

- a) You have over exercised.
- b) Something is wrong with your intestinal system.
- c) You have a mild cold.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

10. You feel nauseous.

Why?

- a) You ate something that didn't agree with you.
- b) You exercised after eating.
- c) You have a gastro-intestinal problem.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_



11. You feel as though you are choking.

Why?

- a) You ate too quickly.
- b) Food or water went down your wind pipe.
- c) There is something wrong with your digestive system.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

12. You feel trembly and shaky.

Why?

- a) You didn't get enough sleep the night before.
- b) You are feeling cold.
- c) Something is wrong with your circulatory system.

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

13. You are sweating.

Why?

- a) You have a digestion problem
- b) It is hot and humid out
- c) You've been physically exerting yourself

1st \_\_\_\_\_ 2nd \_\_\_\_\_ 3rd \_\_\_\_\_

## APPENDIX G

### Form 2:1(a)

## PANIC ATTACK RECORD

Date: \_\_\_\_\_ Time Began: \_\_\_\_\_ Duration (mins.) \_\_\_\_\_

With: Alone  Friend  Stranger  Family

Stressful Situation? YES No

Expected? YES NO

Maximum Fear (circle)

0----- 1----- 2----- 3----- 4----- 5----- 6----- 7----- 8  
 None Mild Moderate Strong Extreme

Symptoms (underline the first symptom and check all symptoms present):

- |   |  |
|---|--|
| <input type="checkbox"/> Difficulty Breathing               | <input type="checkbox"/> Chest Pain/Discomfort           |
| <input type="checkbox"/> <u>Racing/Pounding Heart</u>       | <input type="checkbox"/> Hot/Cold Flashes                |
| <input type="checkbox"/> Choking Sensations                 | <input type="checkbox"/> Numbness/Tingling               |
| <input type="checkbox"/> Sweating                           | <input type="checkbox"/> Feelings of Unreality           |
| <input type="checkbox"/> Trembling/shacking                 | <input type="checkbox"/> Unsteadiness/Dizziness/Fainting |
| <input type="checkbox"/> Nausea/Abdominal Upset             | <input type="checkbox"/> Fear of Dying                   |
| <input type="checkbox"/> Fear of Losing Control/Going crazy |  |

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## APPENDIX I

### Panic Symptom Categories

#### **Respiratory**

Difficulty breathing  
 Choking sensations  
 Smothering  
 Restricted throat  
 Feel like coughing  
 Restriction in lungs  
 Heavy lungs  
 Tight throat

#### **Gastro-intestinal**

Nausea  
 Diarrhoea  
 Stomach pain  
 Stomach cramps  
 Heavy stomach  
 Churned-up stomach  
 Heavy bowel  
 Gas in stomach  
 Sweating

#### **Cardiovascular**

Heart palpitations  
 Racing heart  
 Trembling  
 Numbness  
 Tingling  
 Heart missing beat  
 Heavy heart  
 Tickling heart  
 Chest pain

#### **Neurological**

Dizziness  
 Lightheadedness  
 Depersonalization  
 Unreality  
 Out of it  
 Fuzzy head  
 Feeling faint  
 Visual disturbance

#### **Other**

## APPENDIX J

### DAILY MOOD RECORD

0----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8  
 None                      Mild                      Moderate                      Strong                      Extreme

Date	Average Anxiety	Average Depression	Average Anticipation/Worry About Panic



## APPENDIX K

### PHYSIOLOGY OF ANXIETY

Anxiety is probably the most basic of all emotions. Not only is it experienced by all humans, but anxiety responses have been found in all species of animals right down to the sea slug. Anxiety experiences vary tremendously in their severity from mild uneasiness to extreme terror and panic. They can also vary tremendously in their length from a brief, almost fleeting flash, to a constant, all day affair. While anxiety, by its nature and definition, is an unpleasant sensation, it is not in the least dangerous. It is this last point which forms the basis of this article. The aim of the next few pages is to teach you about the components (physical and mental) of anxiety in order that; (1) you realise that many of the feelings which you now experience are the result of anxiety and (2) you learn that these feelings are not harmful or dangerous.

#### Definition of Anxiety

While an actual definition of anxiety which covers all aspects is very difficult to provide (indeed whole books have been written on the subject), everyone knows the feeling which we call anxiety. There is not a person who has not experienced some degree of anxiety whether it is the feeling upon entering a school room just before an exam, or the feeling when one wakes in the middle of the night, certain that they heard a strange sound outside. What is less known, however, is that sensations such as extreme dizziness, spots and blurring of the eyes, numbness and tingling, stiff almost paralysed muscles, and feelings of breathlessness extending to choking or smothering can also be a part of anxiety. When these sensations occur and people do not understand why, then anxiety can increase to levels of panic since people imagine that they must have some disease

#### Fight/Flight Response

Anxiety is a response to danger or threat. Scientifically, immediate or short term anxiety, termed the fight/flight response. It is so named because all of its effects are aimed toward either fighting or fleeing the danger. Thus, the number one purpose for anxiety is to protect the organism. Back in the days when we were cave people, it was vital that when faced with some danger, an automatic response would take over causing us to take immediate action (attack or run). Even in today's hectic world this is a necessary mechanism. Just imagine if you were crossing a street when suddenly a car sped toward you blasting its horn. If you experienced absolutely no anxiety, you would be killed. However, more probably, your fight/flight response would take over and you would run out of the way to be safe. The moral of this story is a simple one -

the purpose of anxiety is to protect the organism, not to harm it. It would be totally ridiculous for nature to develop a mechanism whose purpose is to protect an organism and yet, in doing so, harms it.

Anxiety manifests itself through three separate systems and it is important to identify these systems since each one can be primary in any individual person. The three systems are: the mental system (which includes the actual feelings of nervousness, anxiety and panic and also includes thoughts such as “there is something wrong”); the physical system (which includes all the actual activities such as pacing, foot tapping and avoidance). In panic attacks the physical system becomes the most important since it is these systems which are most easily mistaken as indicating some serious disease.

### **Systems of Anxiety**

The best way to think of all of the systems of the fight/flight response (anxiety) is to remember that all are aimed at getting the organism prepared for immediate action and that their purpose is to protect the organism.

### **Physical System**

#### **Nervous and Chemical Effects**

When some sort of danger is perceived or anticipated, the brain sends messages to a section of your nerves called the autonomic nervous system. The autonomic nervous system has two subsections or branches called the sympathetic nervous system and the parasympathetic nervous system. It is these two branches of the nervous system which are directly involved in controlling the body’s energy levels and preparation for action. Very simply put, the sympathetic nervous system is the fight/flight system which releases energy and gets the body “primed” for action while the parasympathetic nervous system is the restoring system which returns the body to a normal state.

One important point is that the sympathetic nervous system tends to be largely an all or none system. That is, when it is activated, all of its parts respond. In other words, either all symptoms are experienced or no symptoms are experienced; it is rare for changes to occur in one part of the body alone. This may explain why most panic attacks involve many symptoms and not just one or two.

One of the major effects of the sympathetic nervous system is that it releases two chemicals called adrenaline and noradrenaline from the adrenal glands on the kidneys. These chemicals, in turn, are used as messengers by the sympathetic nervous system to continue activity so that once activity in the sympathetic nervous system begins, it often continues and increases for some time. However, it is very important to note that sympathetic nervous system activity is stopped in two ways. First, the chemical messengers adrenaline and noradrenaline are eventually destroyed by other chemicals

in the body. Second, the parasympathetic nervous system (which generally) has opposing effects to the sympathetic nervous system) becomes activated and restores a relaxed feeling. It is very important to realise that eventually the body will “have enough” of the fight/flight response and will activate the parasympathetic nervous system to restore a relaxed feeling. In other words, anxiety cannot continue forever, nor spiral to ever increasing and possibly damaging levels. The parasympathetic nervous system is an inbuilt protector which stops the sympathetic nervous system getting carried away. Another important point is that the chemical messengers, adrenaline and noradrenaline take some time to be destroyed. Thus, even after the danger has passed and your sympathetic nervous system has stopped responding, you are likely to feel keyed up or apprehensive for some time because the chemicals are still floating around in your system. You must remind yourself that this is perfectly natural and harmless. In fact, this is an adaptive function because, in the wilds, danger often has a habit of returning and it is useful for the organism to be prepared to activate the fight/flight response.

### **Cardiovascular Effects**

Activity in the sympathetic nervous system produces an increase in heart rate and the strength of the heartbeat. This is vital to preparation for the activity since it helps speed up the blood flow, thus improving delivery of oxygen to the tissues and removal of waste products from the tissues. In addition to increased activity in the heart, there is also a change in the blood flow. Basically, blood is redirected away from the places where it is not needed (by tightening of the blood vessels) and toward the places where it is needed more (by an expansion of the blood vessels). For example, blood is taken away from the skin, fingers, and toes. This is useful because if the organism is attacked and cut in some way, it is less likely to bleed to death. Hence, during anxiety the skin looks pale and feels cold and fingers and toes become cold and sometimes experience numbness and tingling. In addition, the blood is moved to the large muscles such as the thighs and biceps which helps the body prepare for action.

### **Respiratory Effects**

The fight/flight response is associated with an increase in the speed and depth of breathing. This has obvious importance for the defence of the organism since the tissues need to get more oxygen in order to prepare for action. The feelings produced by this increase in breathing, however, can include breathlessness, choking or smothering feelings, and even pains or tightness in the chest. Importantly, a side effect of increased breathing, especially if no actual activity occurs, is that blood supply to the head is actually decreased. While this is only a small amount and is not at all dangerous, it produces a collection of unpleasant (but harmless) symptoms including dizziness, blurred vision, confusion, unreality, and hot flushes.

## **Sweat Gland Effects**

Activation of the fight/flight response produces an increase in sweating. This has important adaptive functions such as making the skin more slippery so that it is harder for a predator to grab, and cooling the body to stop it from overheating.

## **Other Physical Effects**

A number of other effects are produced by activation of the sympathetic nervous system, none of which are in any way harmful. For example, the pupils widen to let in more light which may result in blurred vision, spots in front of the eyes, etc. There is a decrease in salivation, resulting in a dry mouth. There is decreased activity in the digestive system which often produces nausea, a heavy feeling in the stomach and even constipation.

Finally, many of the muscle groups tense up in preparation for fight or flight and this results in subjective feelings of tension, sometimes extending to actual aches and pains as well as trembling and shaking.

Overall, the fight/flight response results in a general activation of the whole body metabolism. Thus, one often feels hot and flushed and, because this process takes a lot of energy, afterwards the person generally feels tired, drained, and washed out.

## **Behavioural System**

As mentioned before, the fight/flight response prepares the body for action - either to attack or to run. Thus, it is no surprise that the overwhelming urges associated with this response are those of aggression and a desire to escape wherever you are. When this is not possible (due to social constraints), the urges will often be shown through such behaviours as foot tapping, pacing or snapping at people. Overall, the feelings produced are those of being trapped and needing to escape.

## **Mental System**

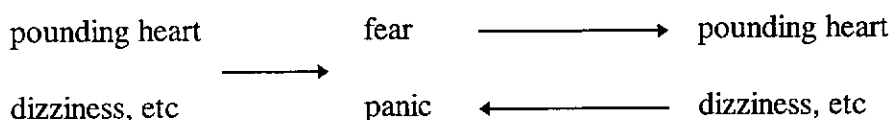
The number one effect of the fight/flight response is to alert the organism to the possible existence of danger. Thus, one of the major effects is an immediate and automatic shift in attention to search the surroundings for potential threat. In other words it is very difficult to concentrate on daily tasks when one is anxious. Therefore, people who are anxious often complain that they are easily distracted from daily chores, that they cannot concentrate, and that they have trouble with their memory. This is a normal and important part of the fight/flight response since its purpose is to stop you from attending to your ongoing chores and to permit you to scan your surroundings for possible danger. Sometimes, an obvious threat cannot be found.

Unfortunately, most humans cannot accept having no explanation for something. Therefore, in many cases, when people cannot find an explanation for their sensations, they turn their search upon themselves. In other words “if nothing out there is making me feel anxious, there must be something wrong with me”. In this case, the brain invents an explanation such as “I must be dying, losing control, or going crazy”. As we have now seen, nothing could be further from the truth since the purpose of the fight/flight response is to protect the organism not harm it. Nevertheless, these are understandable thoughts.

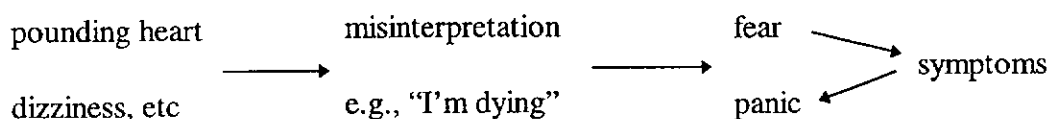
### Panic Attacks

Up until now, we have looked at the features and components of general anxiety or the fight/flight response. However, you may be wondering how does all this apply to panic attacks? After all, why should the fight/flight response be activated during panic attacks since there is apparently nothing to be frightened of?

Following extensive research, it appears that what people with panic attacks are frightened of (i.e., what causes the panic) are the actual physical sensations of the fight/flight response and then a response of panic or fear of the symptoms such as illustrated below:



The second part of this model is easy to understand. As discussed earlier, the fight/flight response (of which the physical symptoms are a part) causes the brain to search for danger. When the brain cannot find any obvious danger, it turns its search inward and invents a danger such as “I am dying, losing control, etc.”. This is illustrated below:

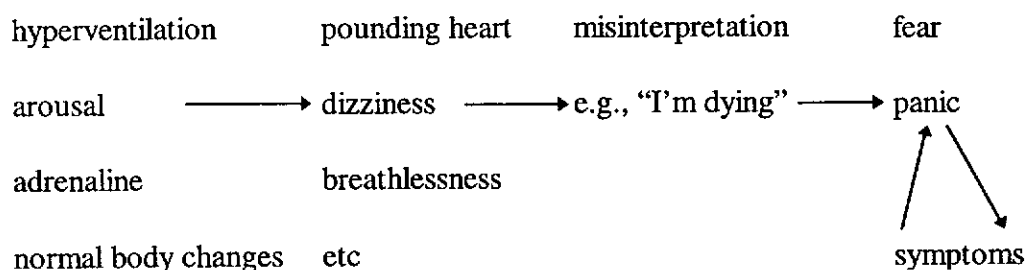


The first part of the model is harder to understand. Why do you experience the physical symptoms of the fight/flight response, if you are not frightened to begin with? There are many ways these symptoms can be produced, not just through fear. For example, it may be that you have become generally stressed for some reason in your life and this stress results in an increase in production of adrenaline and other chemicals which from time to time produce symptoms. This increased adrenaline could presumably be maintained chemically in the body even after the stressor has long gone. Another possibility is that you tend to breathe a little too fast (subtle hyperventilation) due to a learned habit and this also can produce symptoms. Because the over breathing is very slight, you easily become used to this level of breathing and do not notice that you are hyperventilating. A third possibility is that you are

experiencing normal changes in your body (which everyone experiences but most don't notice) and, because you are constantly monitoring and keeping a check on your body, you notice these sensations far more strongly than most people.

Even if we are not exactly certain why you experience the initial symptoms, we can assure you that they are a part of the fight/flight response and therefore are harmless.

Thus, our final model for panic attacks (simplified) looks like this:



Obviously, then, once you truly believe (100%) that the physical sensations are not dangerous, then the fear and panic will no longer occur and you will eventually no longer experience panic attacks. Of course, once you have had a number of panic attacks and you have misinterpreted the symptoms many times, this misinterpretations becomes quite automatic and it becomes very difficult to consciously convince yourself during a panic attack that the symptoms are harmless.

### In Summary

Anxiety is scientifically known as the fight/flight response since its primary purpose is to activate the organism and protect it from harm.

Associated with this response are a number of physical, behavioural, and mental changes. Importantly, once the danger has gone, many of these changes (especially the physical ones) can continue, almost with a mind of their own, due to learning and other longer term bodily changes. When the physical symptoms occur in the absence of an obvious explanation, people often misinterpret to normal fight/flight symptoms as indicating a serious physical or mental problem. In this case, the sensations themselves can often become threatening and can begin the whole fight/flight response over.

## MYTHS AND MISINTERPRETATIONS

### Going Crazy

Many people, when they experience the physical symptoms of the fight/flight response, believe they are "going crazy". Within this belief, they are most likely

referring to a severe mental disorder known as schizophrenia. Let us look at schizophrenia to see how likely this is.

Schizophrenia is a major disorder characterised by such severe symptoms as disjointed thoughts and speech, sometimes extending to babbling, delusions or strange beliefs (for example, that they are receiving messages from outer space), and hallucinations (for example, that there are voices in their head). Furthermore, schizophrenia appears to be a largely genetically based disorder, running strongly in families.

Schizophrenia generally begins very gradually and not suddenly (such as during a panic attack). Additionally, because it runs in families, only a certain proportion of people can become schizophrenic and, in other people, no amount of stress will cause the disorder. A third important point is that people who become schizophrenic will usually show some mild symptoms for most of their lives (such as unusual thoughts, flowery speech, etc.). Thus, if this has not been noticed in you yet, then the chances are you will not become schizophrenic. This is especially true if you are over 25 since schizophrenia generally first appears in the late teens to early 20's. Finally, if you have been through interviews with a psychologist or psychiatrist, then you can be fairly certain that they would have known you were likely to become schizophrenic.

### **Losing Control**

Some people during a panic attack believe they are going to “lose control”. Presumably, they mean that they will either become totally paralysed and not be able to move, or that they will not know what they are doing and will run around wildly killing people or yelling out obscenities and embarrassing themselves. Alternatively, they may not know what to expect by may just experience an overwhelming feeling of “impending doom”.

From our earlier discussion, we know where this feeling comes from. During anxiety the entire body is prepared for action and there is an overwhelming desire to escape. However, the fight/flight response is not aimed at hurting other people (who are not a threat) and it will not produce paralysis. Rather, the entire response is simply aimed at getting the organism away. In addition, there has never been a recorded case of someone “going wild” during a panic attack. Even though the fight/flight response makes you feel somewhat confused, unreal, and distracted, you are still able to think and function normally. Simply think of how often other people even notice that you are having a panic attack.

### **Nervous Collapse**

Many people are frightened about what might happen to them as a result of their symptoms, perhaps because of some belief that their nerves might become exhausted and they may collapse. As discussed earlier, the fight/flight response is produced chiefly through activity in the sympathetic nervous system which is counteracted by

the parasympathetic nervous system. The parasympathetic nervous system is, in a sense, a safeguard to protect against the possibility that the sympathetic nervous system may become "worn out". Nerves are not like electrical wires and anxiety cannot wear out, damage or use up nerves. The absolute worst that could happen during a panic attack is that an individual could pass out at which point the sympathetic nervous system would stop its activity and the person would regain consciousness within a few seconds. However, actually passing out as a result of the fight/flight response is extremely rare, and if it does occur, it is adaptive since it is a way of stopping the sympathetic nervous system from going "out of control".

### **Heart Attacks**

Many people misinterpret the symptoms of the fight/flight response and believe they must be dying of a heart attack. This is probably because many people do not have enough knowledge about heart attacks. Let us look at the facts of heart disease and see how this differs from panic attacks.

The major symptoms of heart disease are breathlessness and chest pain as well as occasional palpitations and fainting. The symptoms in heart disease are generally related to effort, That is, the harder you exercise, the worse the symptoms and the less you exercise the better. The symptoms will usually go away fairly quickly with rest. This is very different to the symptoms associated with panic attacks which often occur at rest and seem to have a mind of their own. Certainly, panic symptoms can occur during exercise or can be made worse during exercise, but they are different to the symptoms of a heart attack since they can occur equally often at rest. Of most importance, heart disease will almost always produce major electrical changes in the heart which are picked up very obviously by the ECG. In panic attacks the only change which shows up on the ECG is a slight increase in heart rate. Thus, if you have had an ECG and the doctor has given you the all clear, you can safely assume you do not have heart disease. Also, if your symptoms occur any time and not only upon exertion, this is additional evidence against a heart attack.