School of Population Health

Testing the mediating effects of psychological and behavioural processes on risk factors for mental ill-health in the Australian population

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Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

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Human Ethics (For projects involving human participants/tissue, etc) The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated March 2014. The proposed research study received human research ethics approval from the Curtin University Human Research Ethics Committee (EC00262), Approval Number #.HRE2017-0169.....

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DECLARATION

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Signature: .....

Date: 26 July 2022

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ABSTRACT

The biopsychosocial model of mental ill-health (Engel, 1977) is based on the belief of numerous causes of mental disorder, with biological, psychological, and social factors being integral in the development of mental disorders. Kinderman (2005) posited a psychological model of mental disorder that hypothesised the relationships between components of the biopsychosocial model. Kinderman et al.'s (2013) study in the United Kingdom found that psychological processes mediated the effects of biological, social and circumstantial factors on mental health problems and wellbeing, which provided empirical support for the hypothesised model. In addition to psychological processes, there is substantial evidence that behavioural processes (i.e., engaging in physical, cognitive, and social activities) can alleviate mental health problems and enhance wellbeing. Therefore, behavioural processes may also mediate the relationships between biological, social and circumstantial factors with mental health problems and wellbeing.

This study replicates Kinderman et al.'s (2013) empirical test of the revised biopsychosocial model of mental ill-health and extends that study by assessing whether behavioural processes (as represented by the Act-Belong-Commit constructs; Donovan et al., 2006) mediate the relationships between biological, social and circumstantial factors on mental health problems and wellbeing among a sample of Australian adults. An online survey of 635 Australian adults was conducted via Qualtrics. The survey instrument included established measures that assessed all the constructs in this study's hypothesised model. Using a structural equation modelling approach, the findings provided empirical validation of the hypothesised model which accounted for 83% of the variance in mental health problems and 72% of the variance in wellbeing.

This study supported Kinderman et al.'s (2013) findings that psychological processes mediate the relationships between biological, social and circumstantial factors with mental health problems and wellbeing. That is, psychological processes influence the causal effect of biological, social and circumstantial factors. In this study, both correlation analysis and analysis of the structural paths found that behavioural processes had a significant negative relationship with mental health problems and a significant positive relationship with wellbeing. That is, increasing acting, belonging and committing is associated with lower levels of mental health problems and higher levels of wellbeing. In addition, behavioural processes mediated the relationships between social factors with mental health problems and wellbeing.

The findings of this study have important and practical implications for policy, clinical practice, and the content of mental health promotion programs. For mental health services, higher priority should be given to psychological therapies in treating people with mental disorders. In clinical practice, there is a need to identify the underlying psychological mechanisms implicated in mental disorders and develop interventions that directly target these psychological mechanisms. An example of such a psychological mechanism is rumination, which has been found to predict the onset, severity and duration of depression. There is encouraging evidence of the effectiveness of a psychological therapy involving a variant of cognitive behavioural therapy that targets rumination in the treatment of people with depression.

Although developing and implementing more effective treatments of mental disorders is a major priority, prevention of mental disorders is clearly a more effective way to reduce the considerable burden of disease associated with such disorders. However, current mental health education programs mainly focus on building awareness and

knowledge of signs of mental illness and assisting or encouraging help-seeking. This study's findings provide a strong theoretical framework and empirical validation for the adoption of mental health promotion interventions such as the Act-Belong-Commit campaign that focus on increasing engagement in behaviours that can prevent mental illness and enhance wellbeing.

Overall, this study supported Kinderman et al.'s (2013) revised biopsychosocial model of mental ill-health and provided evidence that behavioural processes fit into this theoretical framework designed to explain mental health outcomes. Future studies could survey a representative sample of the Australian population and international samples to provide cross-cultural research to confirm (and extend) the current findings. In addition, a longitudinal study design is necessary to make assertions about cause-and-effect relationships and to validate these cross-sectional findings. The findings of this study provide initial validation of a model that appears useful in understanding influences on mental health problems and wellbeing.

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CHAPTER 1: INTRODUCTION

1.1 Mental Health

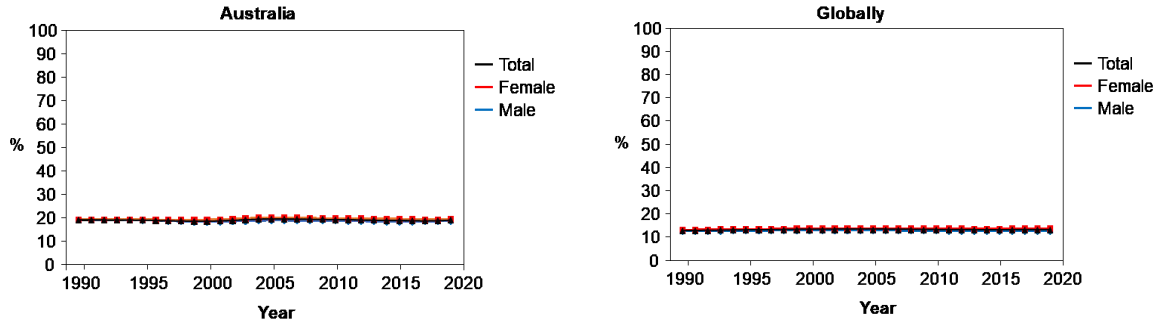
Mental health is a major public health issue worldwide due to the increasing burden of mental disorders. According to the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (American Psychiatric Association, 2013), a mental disorder "*is a syndrome characterized by clinically significant disturbance in an individual's cognition, emotion regulation, or behavior that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning*" (p. 20). Since 1990, the Global Burden of Disease study, coordinated by the Institute for Health Metrics and Evaluation, provides burden indicators on diseases, including data on mental disorders. The most recent peer-reviewed publication on burden indicators of mental disorders (Rehm & Shield, 2019) was based on the 2016 Global Burden of Disease data. However, the latest data available on the Global Burden of Disease online database are for 2019, and are based on data from 204 countries and territories around the world. The 2019 data on burden indicators of mental disorders (i.e., prevalence**,** mortality, and disability-adjusted life-years) have been extracted from the online Global Burden of Disease Results Tool (Global Burden of Disease, n.d.) and presented here.

1.1.1 Prevalence of mental disorders

The Global Burden of Disease study data show that the prevalence of mental disorders (as a percentage of the population in each year) have remained relatively constant from 1990 to 2019 in Australia (ranged between 18.5% to 19.4%) and globally (12.7% to

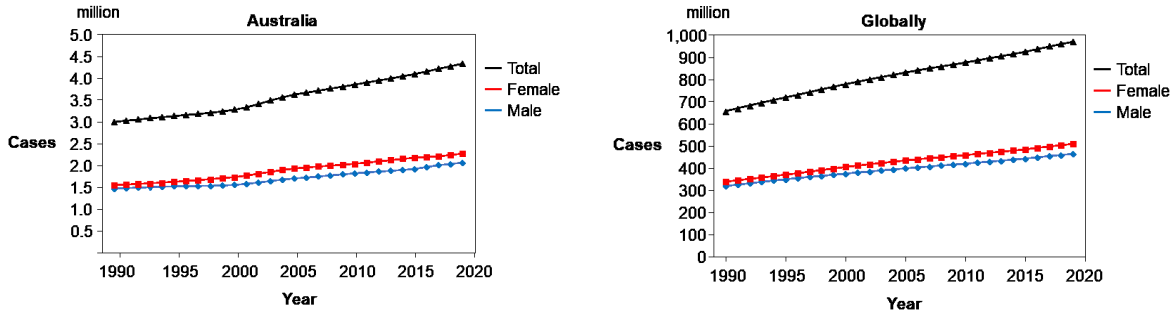
13.2%) (see Figure 1.1). In each year, the prevalence of mental disorders was higher in Australia than globally (e.g., 2019: 18.9% vs 13.0%).

Figure 1.1: Prevalence of mental disorders in Australia and globally by gender (1990 to 2019 data)



In both Australia and globally, the number of cases of mental disorders have steadily increased from 1990 to 2019: 3.0 million to 4.3 million (44.4% increase); and 655 million to 970 million (48.1% increase), respectively (see Figure 1.2). In each year, a greater number of females than males experienced a mental disorder (e.g., 2019: 2.27 million vs 2.06 million in Australia; 508 million vs 462 million globally).

Figure 1.2: Number of cases in Australia and globally by gender (1990 to 2019 data)



These trends in prevalence of mental disorders are consistent with the findings in Baxter et al.'s (2014) systematic review of community-based studies conducted between 1990 and 2010 that reported on anxiety disorders (N = 95 studies) and major depressive disorders (N = 144 studies). The review showed that while the number of cases increased by 36%, there was no change in the prevalence of anxiety disorders and major depressive disorders over the two decades of the study. The authors stated that this increase was due to population growth and changing age structures, which also explains the increase in cases in the Global Burden of Disease data.

In Australia, similar levels of prevalence of mental disorders have been found in a series of nationally representative population health surveys conducted by the Australian Bureau of Statistics. In the last three surveys, the proportions who reported having a mental or behavioural (e.g., attention-deficit/hyperactivity disorder, autistic spectrum disorder) condition was 17.5% in 2014-15 and 20.1% in both 2017-18 and 2020-21 (Australian Bureau of Statistics, 2015, 2018, 2022). The number of cases of mental or behavioural condition increased from 4 million in 2014-15 to 5 million in 2020-21. Consistent with the Global Burden of Disease data, greater proportions of females than males reported having a mental or behavioural condition (e.g., 2020-21: 22.8% vs 17.3%).

In Australia, the 2007 National Survey of Mental Health and Wellbeing (Australian Bureau of Statistics, 2008) provides lifetime prevalence estimates of mental disorders. [A National Survey of Mental Health and Wellbeing was conducted in 2020-21, however, a report on the findings of the survey has not been released as yet]. In the 2007 survey, assessment of mental disorders was based on the diagnostic criteria of the World Health Organization's *International Classification of Diseases*, 10th revision,

2nd edition (World Health Organization, 2004a). The survey results showed that 20% of Australians aged 16 to 85 years reported having a mental disorder in the 12 months prior to the survey, and 45% reported that they had a mental disorder at some point in their life (Council of Australian Governments, 2013). This lifetime prevalence of mental disorder is comparable to the United States at 47% (Kessler et al., 2007). In Pedersen et al.'s (2014) study, data from the Danish Psychiatric Central Register (a population-based registry) revealed that the lifetime risks for treated mental disorders was 37.7% for females and 32.1% for males.

Tables 1.1 and 1.2 show the Global Burden of Disease study 2019 data on age-adjusted prevalence rate (per 100,000) of different mental disorders by gender in Australia and globally, respectively. In the Global Burden of Disease study, the mental disorder category includes 'attention-deficit/hyperactivity disorder', 'autistic spectrum disorder', and 'idiopathic development intellectual disability'. However, it is noteworthy that these conditions are categorised in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (American Psychiatric Association, 2013) as behavioural disorders and not mental disorders. In 2019, anxiety disorders were the most common type of mental disorder in Australia and globally (age-adjusted rates: 5,815 and 3,780 per 100,000, respectively), followed by depressive disorders (age-adjusted rates: 4,382 and 3,440 per 100,000, respectively). Similarly, in the 2020-21 National Health Survey (Australian Bureau of Statistics, 2022), anxiety-related conditions were the most common mental or behavioural condition (12.7%), followed by depression (10.1%).

Table 1.1: Age-adjusted prevalence of mental disorders per 100,000 in Australia (2019 data)

	Males	Females	Total
	Mean estimate (lower-upper bounds)	**Mean estimate (lower-upper bounds)**	**Mean estimate (lower-upper bounds)**
Anxiety disorders	4,530 (3,593-5,723)	7,076 (5,592-8,893)	5,815 (4,640-7,272)
Depressive disorders:			
Major depressive disorder	2,751 (2,317-3,272)	4,126 (3,440-4,935)	3,440 (2,912-4,065)
Dysthymia	855 (667-1,113)	1,230 (932-1,613)	1,044 (803-1,364)
Total depressive disorders	3,543 (3,070-4,099)	5,218 (4,511-6,072)	4,382 (3,818-5,062)
Bipolar disorder	1,101 (900-1,323)	1,145 (967-1,323)	1,125 (947-1,306)
Eating disorders:			
Bulimia nervosa	601 (412-799)	999 (816-1,196)	799 (637-970)
Anorexia nervosa	72 (50-104)	406 (292-545)	238 (174-323)
Total eating disorders	672 (479-876)	1,396 (1,180-1,628)	1,032 (850-1,225)
Schizophrenia	442 (407-479)	335 (307-366)	389 (360-420)
Attention-deficit/ hyperactivity disorder	4,798 (3,710-6,069)	1,912 (1,399-2,504)	3,377 (2,586-4,248)
Conduct disorder	770 (615-958)	447 (337-598)	612 (483-775)
Autistic spectrum disorder	693 (578-830	178 (145-218)	436 (363-524)
Idiopathic development intellectual disability	279 (50-518)	346 (135-561)	313 (98-540)
Other mental disorders	2,099 (1,745-2,488)	1,730 (1,397-2,071)	1,911 (1,584-2,257)
Total mental disorders	**17,222 (15,825-18,793)**	**17,839 (16,404-19,553)**	**17,563 (19,104-16,274)**

Note: Mean estimate lower and upper bounds represent the 95% uncertainty interval: lower bound is the 2.5% percentile estimate; upper bound is the 97.5% percentile estimate.

Table 1.2: Age-adjusted prevalence of mental disorders per 100,000 globally (2019 data)

	Males	Females	Total
	Mean estimate (lower-upper bounds)	**Mean estimate (lower-upper bounds)**	**Mean estimate (lower-upper bounds)**
Anxiety disorders	2,860 (2,397-3,380)	4,695 (3,946-5,577)	3,780 (3,181-4,473)
Depressive disorders:			
Major depressive disorder	1,741 (1,528-1,972)	2,822 (2,474-3,212)	2,286 (2,006-2,592)
Dysthymia	1,017 (846-1,229)	1,438 (1,202-1,738)	1,228 (1,026-1,483)
Total depressive disorders	2,713 (2,438-3,013)	4,158 (3,747-4,616)	3,440 (3,097-3,818)
Bipolar disorder	467 (389-553)	513 (426-609)	490 (408-581)
Eating disorders:			
Bulimia nervosa	94 (61-132)	156 (107-210)	124 (84-170)
Anorexia nervosa	25 (17-35)	77 (55-108)	50 (36-70)
Total eating disorders	118 (85-156)	231 (175-291)	174 (130-222)
Schizophrenia	303 (260-348)	272 (233-314)	287 (246-331)
Attention-deficit/ hyperactivity disorder	1,612 (1,185-2,134)	631 (456-847)	1,132 (832-1,495)
Conduct disorder	711 (530-904)	397 (264-546)	559 (405-722)
Autistic spectrum disorder	560 (465-667)	176 (143-214)	369 (306-441)
Idiopathic development intellectual disability	1,436 (860-2,028)	1,415 (891-1,954)	1,427 (874-1,992)
Other mental disorders	1,690 (1,311-2,139)	1,173 (906-1,485)	1,429 (1,108-1,816)
Total mental disorders	**11,727 (10,836-12,694)**	**12,760 (11,832-13,763)**	**12,262 (11,383-13,213)**

Note: Mean estimate lower and upper bounds represent the 95% uncertainty interval: lower bound is the 2.5% percentile estimate; upper bound is the 97.5% percentile estimate.

Since the World Health Organization declared the coronavirus disease (COVID-19) to be a pandemic in March 2020, there is evidence that the prevalence of mental disorders in the general population has increased globally. For example, in the Twenge and Joiner (2020) study, data from the United States Census Bureau (N = 336,525) showed that the prevalence of anxiety and depression among adults was three times higher during the pandemic in April/May 2020 than prior to the pandemic. In addition, Nochaiwong et al.'s (2021) systematic review and meta-analysis of data from 107 studies conducted between 1 January to 16 June 2020 in 32 countries among 398,771 participants found that the pooled prevalence of mental health problems during the COVID-19 pandemic was higher than previous reports before the pandemic. The higher levels of mental health problems during the pandemic have been attributed, in part, to national lockdowns and quarantine directives (Brooks et al., 2020; Pfefferbaum & North, 2020).

The Mental Health Commission of NSW conducted two community surveys to capture the mental health and wellbeing of NSW residents aged 18 years and older in the first and second year of the pandemic. In the 2020 survey (N = 2,000), 55% of respondents reported that their mental health was negatively impacted by COVID-19. This proportion increased to 61% in the 2021 survey (N = 2,014) (Mental Health Commission of NSW, 2021, 2022).

1.1.2 Burden of disease of mental disorders

The mortality rates of mental disorders per se are low (e.g., 2019: 0.004 per 100,000 globally; 0.02 per 100,000 in Australia) as mental disorders are not usually a direct cause of death. However, people with mental disorders have higher rates of unhealthy behaviours (e.g., smoking, alcohol and drug use, poor diet, physical inactivity) than the

general population (Almeida & Pfaff, 2005; Cassidy et al., 2004; Druss & Rosenheck, 1998; Druss & Walker, 2011; Moussavi et al., 2007; Parry et al., 2011; Prince et al., 2007; Simon et al., 2006). Therefore, they have higher rates of risk factors for mortality from chronic diseases (e.g., heart disease, diabetes) and suicides (Almeida et al., 2007; Hawton & van Heeringen, 2009; Maraldi et al., 2007; Newcomer & Hennekens, 2007; Prince et al., 2007; Whiteford et al., 2013; World Health Organization, 2011). Taking into account comorbid medical conditions and unnatural causes of death (e.g., suicide), Walker et al.'s (2015) meta-analysis of data from 203 studies in 29 countries estimated that 14.3% of deaths worldwide are attributable to mental disorders.

Mortality rates do not provide a complete picture of the burden of disease of mental disorders. A better indicator of the considerable impact of mental disorders is the disability-adjusted life years as it combines the years of healthy life lost due to living with ill-health (non-fatal burden) with the years of life lost due to dying prematurely (fatal burden) (Australian Institute of Health and Welfare, 2020). A disability-adjusted life year represents the loss of the equivalent of one year of full health. It allows comparison between diseases like mental disorders that cause considerable disability but small number of deaths with diseases that cause premature death but little disability (e.g., drowning).

In 2019, 125 million disability-adjusted life years were lost due to mental disorders globally, which is 4.9% of the total disability-adjusted life years lost in that year (Global Burden of Disease, n.d.). In Australia, mental disorders accounted for 607,669 disability-adjusted life years (9.6% of total disability-adjusted life years) in 2019. In comparison, cancer caused the most burden in 2019: 250 million disability-adjusted life years (9.9% of total disability-adjusted life years) globally; and 1,087,223 disability-

adjusted life years (17.4% of total disability-adjusted life years) in Australia (Global Burden of Disease, n.d.).

Tables 1.3 and 1.4 show the age-adjusted disability-adjusted life years (rates per 100,000) associated with different types of mental disorders by gender in Australia and globally, respectively. While anxiety is more prevalent than depressive disorders, it is the latter that causes the most disability-adjusted life years (age-adjusted rates per 100,000: 698 in Australia and 460 globally). Anxiety was associated with the next most disability-adjusted life years, with age-adjusted rates of 555 and 360 per 100,000 in Australia and globally, respectively. Given that depression and anxiety are the most prevalent types of mental disorders and cause the most burden of disease, the literature review in this thesis primarily includes studies related to these two mental disorders.

Besides the considerable disability that results from mental disorders, mental health impairments are also associated with reduced use of medical services (Druss & Rosenheck, 1998). According to Burgess et al. (2009), only one third of people who fulfil the diagnostic criteria for mental disorder seek help in any one year. Those that are diagnosed often have poor adherence to treatment (Katon, 2011), which raises the risk of further complications and increases the severity of any underlying illnesses when they are admitted to hospital (Prina et al., 2012). In addition, due to deficient immune and inflammatory responses via the effect of depression on the body, people with depression often have a poorer clinical outcome (Chrousos, 2000; Morris et al., 1992). This results in an increased risk of hospitalisation and hospital re-admission or the potential for further complications (Prina et al., 2012, 2014; Rowan et al., 2002).

Table 1.3: Age-adjusted rates per 100,000 of disability-adjusted life years caused by mental disorders in Australia (2019 data)

	Males Mean estimate (lower-upper bounds)	Females Mean estimate (lower-upper bounds)	Total Mean estimate (lower-upper bounds)
Anxiety disorders	436 (290-627)	672 (441-955)	555 (367-785)
Depressive disorders:			
Major depressive disorder	561 (375-798)	835 (562-1,206)	698 (475-998)
Dysthymia	83 (51-125)	118 (73-184)	100 (61-155)
Total depressive disorders	644 (439-903)	953 (656-1,346)	799 (549-1,129)
Bipolar disorder	239 (143-368)	244 (149-368)	242 (146-370)
Eating disorders:			
Bulimia nervosa	127 (73-196)	209 (134-294)	168 (107-240)
Anorexia nervosa	16 (9-26)	87 (54-135)	51 (31-80)
Total eating disorders	142 (84-216)	296 (192-414)	219 (144-309)
Schizophrenia	284 (213-347)	210 (159-257)	247 (188-300)
Attention-deficit/ hyperactivity disorder	58 (35-95)	23 (13-39)	41 (24-67)
Conduct disorder	94 (55-149)	54 (30-87)	74 (44-117)
Autistic spectrum disorder	105 (69-153)	27 (17-40)	66 (43-96)
Idiopathic development intellectual disability	13 (3-26)	17 (7-29)	15 (6-27)
Other mental disorders	155 (103-223)	126 (83-184)	141 (94-200)
Total mental disorders	**2,172 (1,579-2,842)**	**2,623 (1,911-3,477)**	**2,399 (1,751-3,159)**

Note: Mean estimate lower and upper bounds represent the 95% uncertainty interval: lower bound is the 2.5% percentile estimate; upper bound is the 97.5% percentile estimate.

Table 1.4: Age-adjusted rates per 100,000 of disability-adjusted life years caused by mental disorders globally (2019 data)

	Males Mean estimate (lower-upper bounds)	Females Mean estimate (lower-upper bounds)	Total Mean estimate (lower-upper bounds)
Anxiety disorders	275 (191-378)	445 (307-609)	360 (249-494)
Depressive disorders:			
Major depressive disorder	354 (243-489)	564 (387-779)	460 (315-635)
Dysthymia	99 (64-147)	138 (90-204)	118 (77-177)
Total depressive disorders	452 (317-618)	702 (492-964)	578 (406-789)
Bipolar disorder	101 (62--156)	109 (67-167)	105 (64-162)
Eating disorders:			
Anorexia nervosa	5 (3-8)	17 (10-26)	11 (17-17)
Bulimia nervosa	20 (12-32)	33 (19-51)	26 (15-41)
Total eating disorders	25 (15-39)	49 (31-73)	37 (23-56)
Schizophrenia	196 (143-250)	172 (126-219)	184 (134-235)
Attention-deficit/ hyperactivity disorder	20 (11-33)	8 (4-13)	14 (8-23)
Conduct disorder	87 (50-136)	48 (26-79)	68 (38-106)
Autistic spectrum disorder	85 (56-124)	27 (18-39)	56 (37-82
Idiopathic development intellectual disability	59 (30-98)	57 (31-94)	58 (30-96)
Other mental disorders	126 (81-189)	86 (55-130)	105 (68-160)
Total mental disorders	**1,426 (1,056-1,869)**	**1,703 (1,261-2,238)**	**1,566 (1,160-2,043)**

Note: Mean estimate lower and upper bounds represent the 95% uncertainty interval: lower bound is the 2.5% percentile estimate; upper bound is the 97.5% percentile estimate.

1.1.3 Economic costs of mental disorders

Besides impacts on health and wellbeing, mental disorders impose substantial economic costs on society. In Australia, an estimated $11.0 billion was spent on mental health-related services in 2019-20, with 60.0% funded by state and territory governments ($6.6 billion), 34.7% by the Australian Government ($3.8 billion), and 5.3% by private health insurance funds and other third-party insurers ($584 million). This represents an average annual inflation adjusted increase of 3.0% since 2015-16 (Australian Institute of Health and Welfare, 2022). As noted by Atkinson et al. (2020), this does not include: broader mental health-related costs (e.g., disability support pension, and carer payment and allowances); funding for services provided by non-government organisations, philanthropic investments or out of pocket costs paid by patients; funding for research provided by government and philanthropic investments; and hundreds of millions of dollars spent on mental health system reforms.

The economic costs of mental illness are mainly due to reduced productivity in workers (Bubonya et al., 2017; Greenberg et al., 2003). A project led by the World Health Organization has estimated that anxiety and depression cost the global economy one trillion in US dollars (approximately $1.34 trillion in Australian dollars) in lost productivity each year (The Lancet Global Health, 2020). According to an Australian Government Productivity Commission report (Productivity Commission, 2020), in 2018-19, the annual economic cost of mental ill-health and suicide in Australia was estimated at $70 billion. This is comprised of: direct expenditure on mental healthcare and support services ($16 billion); cost of lower economic participation and lost productivity ($39 billion); and cost of replacing the support provided by carers of those with mental illness ($15 billion). In addition, the cost of disability and premature death

due to mental illness, suicide and self-inflicted injury was estimated at $151 billion per year. Hence, the estimated total cost of mental ill-health on Australia's economy is approximately $220 billion a year.

Therefore, given the growing number of people with mental health problems in Australia and globally, and its rising economic cost and burden of disease, new insights for prevention and early intervention of mental health problems are needed.

1.2 The Biopsychosocial Model of Mental Ill-Health

Over four decades ago, Engel (1977) posited a biopsychosocial model for understanding the determinants of diseases, including mental disorders. He argued that the biomedical model, the dominant model of medicine at that time, was limited due to its tendency to view diseases as ultimately derived from a single primary cause (i.e., biological reductionism) such as genetics. The biomedical model "*assumes disease to be fully accounted for by deviations from the norm of measurable biological (somatic) variables*" (Engel, 1977, p. 379). Hence, diseases and behavioural aberrations are explained in terms of disordered somatic (biochemical or neurophysiological) processes. From a biomedical viewpoint, mental disorders are brain diseases that are predominantly caused by biological factors such as genetics and neurochemical imbalances. Hence, pharmacological treatments are sought to target presumed biological abnormalities (Deacon, 2013). Behavioural and psychosocial issues are not considered given that diseases are defined in terms of somatic parameters only.

The biomedical model of mental disorders was prevalent in the 1990s. Indeed in 1989, the United States Congress declared the 1990s as the "Decade of the Brain"

(Kinderman, 2005; MacDuffie & Strauman, 2017). Consequently, the National Institute of Mental Health and other major funding bodies incentivised research to determine indicators and predictors of mental disorders in the brain (Pilecki et al., 2011). In addition, pharmaceutical companies' promotion of their anti-depressants as the solution for the supposed chemical imbalance with messages such as "Depression is a chemical imbalance", influenced the public's perception of biological causes of mental disorders (Lacasse & Leo, 2005; MacDuffie & Strauman, 2017; Moynihan et al., 2002; Pescosolido, 2013; Pescosolido et al., 2010; Pittenger & Duman, 2008; Rosenthal et al., 2002; Schnittker, 2008). However, the chemical imbalance explanation for mental disorders is overly simplistic. In most clinical trials, only approximately half of people diagnosed with depression achieve complete symptom remission when treated with anti-depressants. This figure is similar to the efficacy rates for most psychotherapies designed to treat depression (Amick et al., 2015).

The effectiveness of antipsychotic drugs in the treatment of psychotic disorders (e.g., schizophrenia) have also come into question. Lepping et al.'s (2011) systematic review of 120 studies investigating the effectiveness of antipsychotic drugs found that on average the clinical significance of the reported findings was limited, and there was little difference between first- and second-generation antipsychotic drugs. The authors concluded that caution should be exercised when drawing conclusions from this literature about the clinical usefulness of these drugs. Similarly, according to Ivanov and Schwartz (2021), pharmacological treatments for mental disorders influence certain brain chemicals and alter gene expression and protein synthesis. However, these biological effects do not have lasting positive psychological effects as symptoms tend to return when pharmacological treatments are stopped. Hence, these studies reinforce the

notion that mental disorders are not caused solely by biological factors (e.g., chemical imbalances) as posited by the biomedical model.

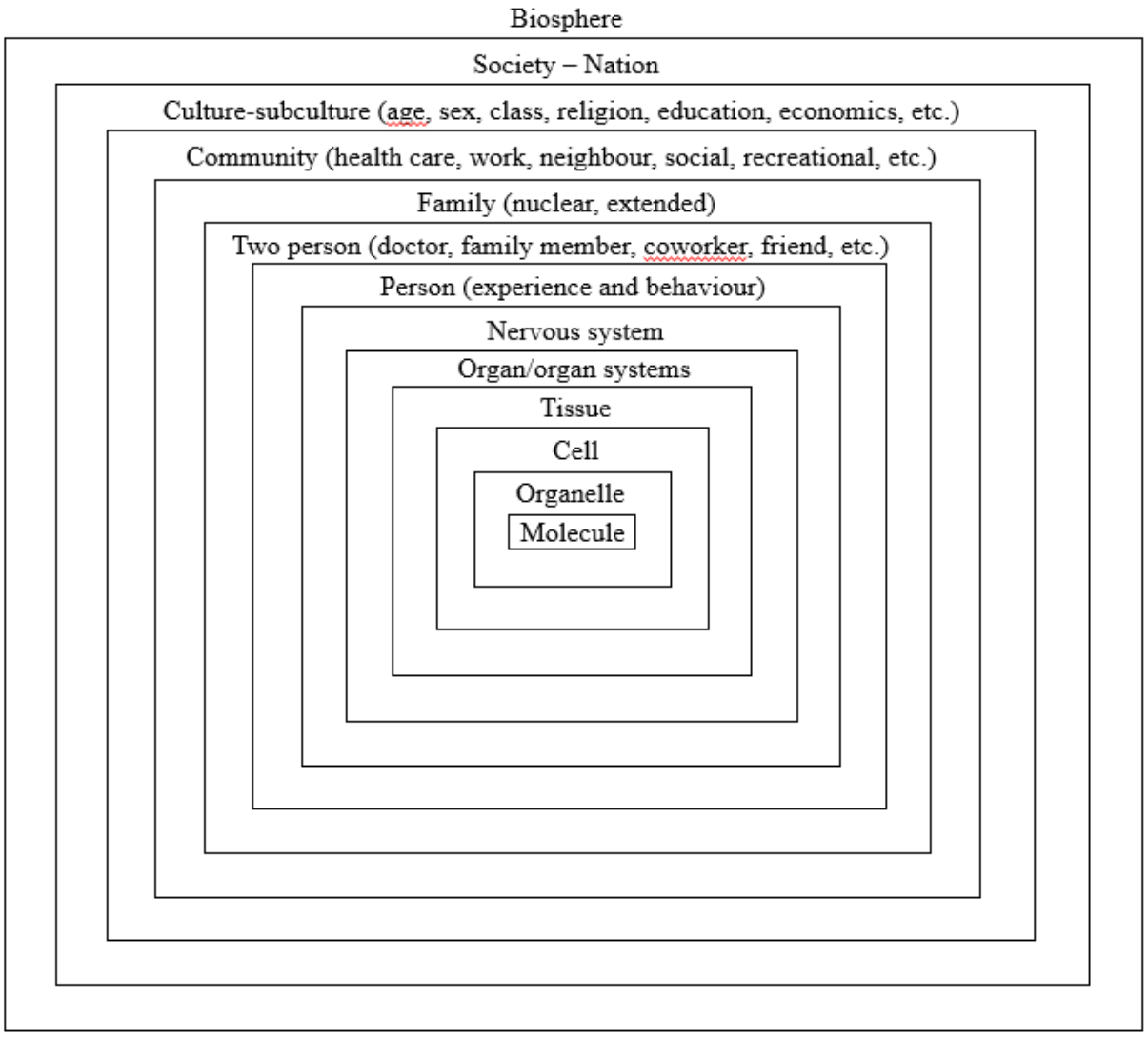
Furthermore, Engel (1977) noted that the biomedical model does not explain why some people feel well despite having positive laboratory findings and are advised to have treatment, while others have physiological symptoms without underlying pathology. In addition, Haslam et al. (2019) noted that the relevance of the biomedical model is limited as the prevailing causes of ill-health are chronic conditions (e.g., diabetes, depression, cardiovascular disease) for which there is no straightforward medical solution. In contrast to the biomedical model, the biopsychosocial model (Engel, 1977) provides a better explanation of these conditions as it encompasses sociocultural, psychological, and behavioural dimensions of illness in the diagnosis, treatment and care of a patient.

The theoretical foundation of the biopsychosocial model is general systems theory (von Bertalanffy, 1968, 2015). Systems theory has its origins in biology and it makes the observation that nature is a hierarchically arranged continuum, whereby more complex larger units are superordinate to the less complex smaller units (see Figure 1.3). It guides a physician to approach a health problem starting from the system level of ‘person’ (i.e., a patient), and takes into consideration all systems when addressing the health problem.

A systems approach to the biopsychosocial model of mental ill-health (Engel, 1977) posits that there are multiple simultaneous causes of mental disorder. These causes can be grouped into three components: biological factors incorporating the systems from ‘molecules’ to ‘nervous system’ (e.g., genetics, neural transmission); psychological

factors operating at the 'person' level (e.g., beliefs, attitudes, emotions); and social factors incorporating the systems from 'two persons' to 'society' (e.g., relationships, community, discrimination). That is, mental disorder develops from the whole human system which has physical and biological elements, and psychosocial systems including personal relationships, community, cultural and societal elements (Kinderman, 2009).

Figure 1.3: Representation of the general systems theory. From "The clinical application of the biopsychosocial model", by G. L. Engel, 1980, *American Journal of Psychiatry*, 137, p. 105.



A drawback of the biopsychosocial model is that it does not clearly describe how the social and psychological factors interact with biological factors to influence health outcomes (Havelka et al., 2009; Lehman et al., 2017; Suls & Rothman, 2004). Kinderman (2005) had similar concerns which led him to revise the biopsychosocial model to explain the relationships between each factor in the model, particularly how psychological processes are implicated.

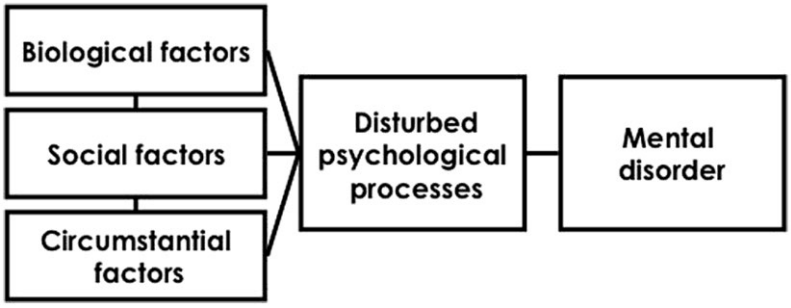
1.3 Kinderman's Psychological Model of Mental Disorder

Kinderman (2005) posited a psychological model of mental disorder that hypothesised the relationships between the elements of Engel's (1977) biopsychosocial model of mental ill-health (see Figure 1.4). Kinderman's (2005) model includes two significant modifications of the biopsychosocial model:

1. The distinction between psychological processes and personally significant life events. The latter is referred to as 'circumstances'. This distinction is important as interpretation of a life event (influenced by psychological processes) is distinctly different from the actual event (circumstantial factor). Kinderman (2005) felt that the biopsychosocial model does not clearly differentiate the difference between life events and the personal meaning that these events have for an individual.
2. The specific status given to the disruption of psychological processes as a final common pathway to mental disorder. The model hypothesises that it is only through the disruption of psychological processes that any precursors (e.g., biological, social, or circumstantial factors) come to be expressed and experienced as a mental disorder.

Chapter 2 provides a review of the literature supporting the components of Kinderman's psychological model of mental disorder.

Figure 1.4: Kinderman's (2005) psychological model of mental disorder. From "A psychological model of mental disorder", by P. Kinderman, 2005, *Harvard Review of Psychiatry*, 13(4), p. 208.



Kinderman et al. (2013) conducted an empirical test of his theoretical model on a self-selected sample of United Kingdom adults (N = 27,397). The results from structural equation modelling provided support for the model. That is, psychological processes (i.e., lack of adaptive coping, rumination and self-blame) mediated the impact of biological, social and circumstantial factors on mental health problems and wellbeing. Kinderman's findings have substantial implications for policy and practice as psychological processes are amenable to intervention, but are underutilised in mental health promotion and mental illness prevention. Hence, it is important to assess the extent to which Kinderman et al.'s (2013) findings are robust and applicable to the Australian population.

1.4 Behavioural Processes as a Potential Mediator in the Biopsychosocial Model of Mental Ill-Health

Besides psychological processes, there is substantial evidence to support the notion that behaviour (i.e., engaging in physical, cognitive, and social activities) can alleviate mental health problems such as anxiety disorder and depression (Brunet et al., 2013;

Creaven et al., 2018; de Moor et al., 2006; Dore et al., 2018; Dunn et al., 2005; Handley et al., 2019; Have et al., 2011; Kim et al., 2012; Lindwall et al., 2012; McAuley et al., 2000; Rohrer et al., 2005; Rosenbaum et al., 2016; Saxena et al., 2005; Schuch et al., 2016a, 2016b; Sciamanna et al., 2017; Stubbs et al., 2016; Wipfli et al., 2011; Yu et al., 2015). Several explanations have been proposed to describe how behaviour influences mental health and wellbeing. From a biochemical perspective, engaging in behaviours (e.g., physical activity, meditation, art and craft) have been found to: decrease levels of blood serotonin, which is similar to the effects of taking anti-depressant medication (Wipfli et al., 2011); impede and negate the brain physiological causes of depression by reducing activity in the amygdala while enhancing other brain regions that are involved in the regulation of emotions (i.e., hippocampus and prefrontal cortex activity; Annells et al., 2016); and reduce stress and fear via invoking feelings of relaxation (Malchiodi, 2003). Alternatively, from a psychosocial perspective, engaging in behaviours has been found to: increase self-esteem (Schmitz et al., 2004); increase self-efficacy and reduce emotional strain (Paluska & Schwenk, 2000); and enhance ability to regulate emotions (Shapiro et al., 2006). Regardless of the exact mechanism underlying this mind-brain-body association, these studies have found that engaging in behaviours reduces depressive and anxiety symptoms and is negatively correlated to stress and the onset of mental disorder. Therefore, behavioural processes may also mediate the relationships between biological, social and circumstantial factors with mental health problems and wellbeing.

1.5 Research Objectives of this Study

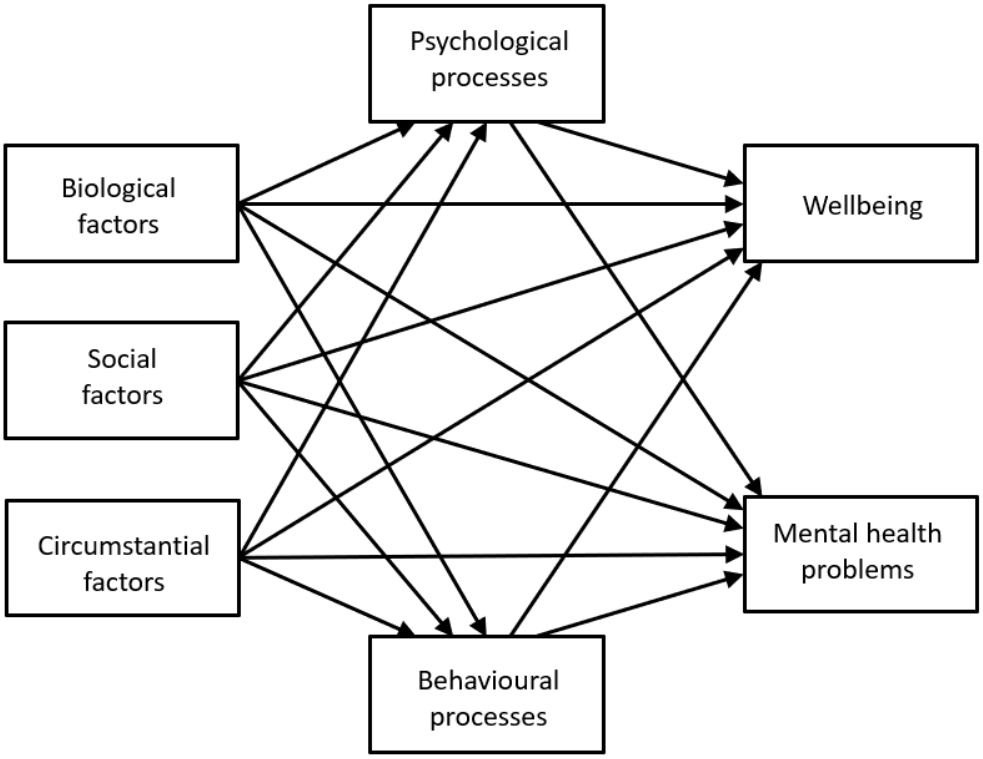
The aims of this study are to replicate Kinderman et al.'s (2013) study to assess the extent to which the findings are applicable in the Australian population and to extend

the biopsychosocial model of mental ill-health by including behavioural processes as a mediator in the model. The research objectives are:

1. To assess the relationships between biological, social and circumstantial factors with mental health problems and wellbeing; and
2. To assess whether psychological and behavioural processes mediate the relationships between biological, social and circumstantial factors with mental health problems and wellbeing.

Figure 1.5 shows the hypothesised research model for testing in which the effects of biological, social and circumstantial factors on mental health problems and wellbeing are mediated by psychological and behavioural processes.

Figure 1.5: The hypothesised research model



This study tests the following hypotheses:

Hypothesis 1a: There is a negative relationship between adverse biological factors and wellbeing.

Hypothesis 1b: Behavioural processes mediate the relationship between biological factors and wellbeing.

Hypothesis 1c: Psychological processes mediate the relationship between biological factors and wellbeing.

Hypothesis 2a: There is a positive relationship between adverse biological factors and mental health problems.

Hypothesis 2b: Behavioural processes mediate the relationship between biological factors and mental health problems.

Hypothesis 2c: Psychological processes mediate the relationship between biological factors and mental health problems.

Hypothesis 3a: There is a negative relationship between adverse social factors and wellbeing.

Hypothesis 3b: Behavioural processes mediate the relationship between social factors and wellbeing.

Hypothesis 3c: Psychological processes mediate the relationship between social factors and wellbeing.

Hypothesis 4a: There is a positive relationship between adverse social factors and mental health problems.

Hypothesis 4b: Behavioural processes mediate the relationship between social factors and mental health problems.

Hypothesis 4c: Psychological processes mediate the relationship between social factors and mental health problems.

Hypothesis 5a: There is a negative relationship between adverse circumstantial factors and wellbeing.

Hypothesis 5b: Behavioural processes mediate the relationship between circumstantial factors and wellbeing.

Hypothesis 5c: Psychological processes mediate the relationship between circumstantial factors and wellbeing.

Hypothesis 6a: There is a positive relationship between adverse circumstantial factors and mental health problems.

Hypothesis 6b: Behavioural processes mediate the relationship between circumstantial factors and mental health problems.

Hypothesis 6c: Psychological processes mediate the relationship between circumstantial factors and mental health problems.

Hypothesis 7: There is a positive relationship between behavioural processes and wellbeing.

Hypothesis 8: There is a negative relationship between behavioural processes and mental health problems.

This study is the first test of Kinderman et al.'s (2013) revised biopsychosocial model of mental ill-health outside the United Kingdom.

1.6 Overview of this Thesis

This thesis consists of seven chapters. Chapter 1 presented the latest available data on the prevalence of mental disorders and discussed the burden of disease and economic costs attributable to mental disorders. This chapter also provided an overview of Engell's (1977) biopsychosocial model of mental ill-health, Kinderman's (2005)

revision of the model, and the rationale for extending the model to include behavioural processes as a mediator in the model. Chapter 2 provides a literature review of the concepts in Kinderman's (2005) psychological model of mental disorder and the concepts representing the behavioural processes in the hypothesised research model. Chapter 3 provides the methodological details of this research study. Chapter 4 presents the descriptive results including the sample characteristics. Chapter 5 describes the model development of each of the constructs for use in testing the hypothesised research model. Chapter 6 presents the results of the structural equation modelling analyses in testing the model. Chapter 7 provides a discussion of the results in relation to the literature and the implications of the findings for policy, clinical practice and mental health promotion interventions. The limitations of this study and recommendations for future research are also discussed. The chapter concludes with a summary of the major findings of this study.

CHAPTER 2: LITERATURE REVIEW

This chapter consists of two major sections. The first section provides a review of the literature supporting the components of Kinderman's (2005) psychological model of mental disorder and the mediating role of psychological processes in the development of mental disorder. This study extends the model by including behavioural processes as a mediator of the relationships between biological, social and circumstantial factors on mental health problems and wellbeing. [Section 1.4 provided the evidence supporting behavioural processes as a potential mediator in the model]. The second section provides an overview of the Act-Belong-Commit campaign and the literature supporting the Act-Belong-Commit mental health promotion constructs (Donovan et al., 2006) in representing behavioural processes in the model. This literature review primarily includes studies related to depression and anxiety as they are the most prevalent types of mental disorders and cause the most burden of disease as evident in Sections 1.1.1 and 1.1.2.

2.1 Kinderman's (2005) Psychological Model of Mental Disorder

Kinderman's (2005) psychological model of mental disorder posits that mental disorder is influenced by biological, social and circumstantial factors, and it is only through the disruption of psychological processes that these three factors have their effects on mental disorder. The literature supporting the components of this model are described below.

2.1.1 Biological factors

Biological factors play a role in mental disorders, with almost all of the common severe mental disorders associated with a significant genetic component of risk (Uher, 2014). There are variations in the likelihood of specific mental disorders passing from one generation to another through genes (i.e., hereditary). In Hilker et al.'s (2018) study of 31,524 pairs of twins in Denmark, estimates of the heritability of schizophrenia were as high as 79%.

Compared to schizophrenia, the heritability of major depression and anxiety disorders is moderate. Sullivan et al.'s (2000) meta-analysis of twin studies found that the heritability of major depression ranged between 31% to 42%. Similarly, in Kendler et al.'s (2005) study of 13,864 twin pairs from the Swedish National Twin Registry, the concordance (i.e., probability of two people with shared genes developing the same disease) for major depression was 39.3% in monozygotic (i.e., identical) twins and 24.5% in dizygotic (i.e., fraternal) twins. Twin studies have shown that the heritability of anxiety disorders ranges between 30% and 50% (Scaini et al., 2012, 2014; Smoller et al., 2009; Tambs et al., 2009). Consistent with twin studies, family studies have observed the familial aggregation of depression, anxiety disorders and schizophrenia (Byrne et al., 2002; Coelho et al., 2007; Klein et al., 2003; Newman & Bland, 2006; Stein et al., 2004).

Genomic studies have revealed the highly polygenic (i.e., influenced by many genetic variants) nature of mental disorders (O'Donovan & Owen, 2016). For example, Howard et al.'s (2019) meta-analysis of the data from the three largest genome-wide association studies of depression (N = 807,553 individuals) identified 102 independent variants, 269

genes and 15 gene sets associated with depression. The findings from Wu et al.'s (2021) study prioritised 12 of these 269 genes for future depression research.

Genomic studies are important in understanding the complex role of genetics in mental disorders. However, mental disorders are not based on genetic factors only. Social and circumstantial factors (e.g., stress, abuse, traumatic event) may influence or trigger a mental disorder among those who have a genetic susceptibility to a mental disorder.

2.1.2 Social factors

There is considerable evidence that social factors (e.g., community integration, social engagement, social connectedness, social isolation, loneliness) are associated with mental health and wellbeing.

Community integration:

Community integration and a sense of belonging have significant impacts on mental health (McColl et al., 2001). Kitchen et al.'s (2012) analysis of data from the 2007-08 Canadian Community Health Survey (N = 120,838) showed that having a sense of community belonging significantly and consistently correlated positively with mental health. In Rugel et al.'s (2019) analysis of data from the 2012 Canadian Community Health Survey – Mental Health (N = 25,113), higher levels of a sense of community belonging were associated with improvements in three mental health outcomes: major depressive disorder; negative mental health; and psychological distress. For example, the odds of a major depressive disorder were substantially lower among individuals reporting a 'very strong' sense of community belonging than the reference category of

'very weak' (86% lower; 'somewhat strong': 78% lower). The concept of a sense of community belonging is reflective of social engagement and social connectedness.

Social engagement and social connectedness:

Glass et al.'s (2006) analysis of three waves of data from a representative cohort study of community-dwelling adults aged 65 years and over (N = 1,970) in the New Haven Established Populations for the Epidemiologic Study of the Elderly, found that social engagement was associated with lower depression scores. At all three time points, the most socially engaged group had the lowest depression scores, while the least engaged group had the highest depression scores. Among those who had non-elevated depression scores at baseline, greater social engagement was associated with a slower rate of increase in depressive symptoms with time. Similarly, Yen et al.'s (in press) study of 9,403 participants aged over 65 years in 30 countries found that social engagement negatively predicted depression.

Saeri et al.'s (2018) analysis of longitudinal data from a nationally representative sample of adults (N = 21,227) in New Zealand found that social connectedness and mental health were positively associated across time. Social connection has also been found to foster resilience in younger age groups (Barber & Schluterman, 2008; Fergus & Zimmerman, 2005). For example, in Barber and Schluterman's (2008) study, social connection (i.e., having a sense of attachment and being actively involved and engaging with others and their neighbourhood) played a pivotal role in the psychological adjustment of children and adolescents with cancer. In addition, studies have shown that interventions and activities fostering social interaction and inclusion significantly affect a person's mental health (Brunet et al., 2013; Creaven et al., 2018; Doré et al., 2018;

Sciamanna et al., 2017). Greater social engagement and social connectedness increases psychosocial resources such as social support (Glass et al., 2006).

Social support:

Longitudinal studies have shown that lower social support predicts depression. Schroevers et al.'s (2003) longitudinal study examined the role of social support on depressive symptoms among 475 recently diagnosed cancer patients and 255 individuals without cancer from the general population in the Netherlands. Their cross-sectional analysis showed that lower levels of social support were strongly associated with higher levels of depressive symptoms, and a longitudinal analysis showed that social support also predicted future levels of depressive symptoms. The associations of social support with depressive symptoms were generally consistent between cancer patients and those without cancer. Similarly, Heponiemi et al.'s (2006) longitudinal study of 3,596 participants aged 3 to 18 years in Finland showed that higher levels of perceived social support were associated with a decrease in depressive tendencies after five years. In Handley et al.'s (2019) 5-year longitudinal study of community residents aged 18 years and over (N = 2,639) in rural Australia, those who had high perceived interpersonal support were 62% less likely to report depression at baseline. In addition, interpersonal support was a protective factor in reducing the odds of depression in the next survey wave by 64%.

Social isolation and loneliness:

The absence of social support in relation to social isolation and loneliness has been shown to be detrimental to mental health and wellbeing (Smith & Victor, 2019; Wade & Kendler, 2000; Ward et al., 2019). Cross-sectional studies have found an association between social isolation and mental disorder. In Hawthorne's (2008) study of 3,015

South Australians aged 15 years and older, perceived social isolation was strongly associated with major depression. Chou et al.'s (2011) analysis of cross-sectional data of a nationally representative sample of 33,368 United States adults aged 18 years and over found that social isolation was associated with an increased risk of mental health problems, including major depressive disorder and generalised anxiety disorder. Ge et al.'s (2017) study of 1,919 adults aged 21 years and over in Singapore found that higher social isolation (i.e., weak social connectedness with relatives and friends) was associated with higher depressive symptom scores.

In addition, Ge et al.'s (2017) study found that higher loneliness scores were associated with higher depressive symptom scores. Similarly, studies among older population samples have also found that loneliness is associated with depressive symptoms. In Heikkinen and Kauppinen's (2004) 10-year longitudinal study of 337 Finnish adults aged 75 years at baseline, loneliness was found to be a predictor of depressive symptoms. Cacioppo et al. (2006) also investigated the extent to which loneliness is a risk factor for depressive symptoms via both a cross-sectional and a longitudinal study. In their cross-sectional study of a population-based sample of 1,945 adults aged 54 years and older in the United States from participants in the Health and Retirement Study, higher levels of loneliness were associated with more depressive symptoms. In their 3-year longitudinal study of a population-based sample of 229 adults aged 50 to 67 years at study onset from participants in the Chicago Health, Aging, and Social Relations Study, loneliness was found to predict changes in depressive symptoms. This finding was replicated in Cacioppo et al.'s (2010) analysis of a further two years of data collected from participants in their longitudinal study.

Erzen and Çikrikci's (2018) meta-analysis of 88 studies involving 40,068 participants found that loneliness had a moderately significant effect on depression not just in the elderly, but also in other age and sampling groups (e.g., students, patients, carers). Similarly, Leigh-Hunt et al.'s (2017) overview of 40 systematic reviews on the consequences of social isolation and loneliness found strong evidence that social isolation was associated with depression. In addition, the authors concluded that there was consistent evidence linking social isolation and loneliness to worse mental health outcomes.

Direction of the relationship between social factors and mental health:

Together, these studies demonstrate the importance of social factors in promoting and maintaining mental health. In addition, there is evidence from longitudinal studies that the relationship between social factors and mental health is not bidirectional. In Saeri et al.'s (2018) study, social connectedness predicted mental health more strongly than mental health predicted social connectedness. In Cacioppo et al.'s (2010) study, loneliness was found to predict changes in depressive symptoms, but not vice versa. Yu et al.'s (2015) analysis of data from the British Household Panel Survey from 1991 to 2008 (N = 10,000+ aged 16 and over surveyed annually since 1991) found that loneliness had a significant negative impact on perceived mental health, but this relationship was not reciprocal. Hence, these studies provide evidence that the pathway is primarily from social factors to mental health and not vice versa.

2.1.3 Circumstantial factors

Kinderman's (2005) circumstantial factors component encompasses personally significant life events. These events can have far-reaching consequences as they are

significant occurrences that often initiate changes to behaviour and may result in long-term consequences (Brugha & Cragg, 1990). Life events can be divided into normative life events (i.e., marriage, parenthood, retirement) or non-normative life events (i.e., divorce, unemployment) (Wrzus et al., 2013). Unlike normative life events, non-normative life events are typically unexpected and especially stressful. They are usually referred to as stressful life events or negative life events.

There is a well-established link between stressful life events and depression (Chapman et al., 2004; Gilman et al., 2003; Hammen, 2015; Hsu, 2011; Kendler et al., 1998; Kessler et al., 1997, 2003; Kraaij et al., 2002; Mazure, 1998; Paykel, 2003; Repetti et al., 2002; Siegrist, 2008; Spinhoven et al., 2010; Stroud et al., 2008; Tibubos et al., 2020; Vardaxi et al., 2018; Widom et al., 2007). For example, Kraaij et al.'s (2002) meta-analysis of 25 studies found that the total number of negative life events was associated with depression in people aged 65 years and older. Tibubos et al.'s (2020) study analysed data of 12,947 participants aged 35 to 74 in the Gutenberg Health Study in Germany and found that aggregated stressful life events (i.e., sum scores on 36 stressful life events) significantly predicted depression and anxiety. In addition, studies have shown a dose-response relationship (Glass et al., 1997; Kessler, 1997), that is, higher numbers of stressful life events are related to higher levels of depressive symptoms.

Recent exposure to stressful life events has also been associated with mental health problems. For example, Assari and Lankarani's (2016) cross-sectional study of 5,899 adults in the National Survey of American Life found that experiencing stressful life events in the past year was associated with increased odds of 12-month major depressive episode. In Handley et al.'s (2019) 5-year longitudinal study of community

residents in rural Australia aged 18 years and over (N = 2,639), the odds of depression were increased for those who had a greater number of recent adverse life events (e.g., interpersonal conflict, issues at work/financial problems). Similarly, Hammen's (2011) analysis of data from participants in the National Epidemiologic Study of Alcohol and Related Conditions aged 18 years or older in the United States (N = 34,653), found that past-year prevalence of major depression, anxiety disorders and post-traumatic stress disorder were higher among people with past-year major stressful life events. Furthermore, the increase in prevalence was greatest among those with greater exposure to childhood adverse events.

The latter finding is consistent with numerous studies showing that early negative life events or historical life events have profound effects on mental health and wellbeing across the lifespan (Banyard et al., 2008; Shonkoff & Garner, 2012). Examples of these childhood adverse events include abuse, maltreatment and victimisation (i.e., bullying) during childhood and youth (Finkelhor et al., 2009, 2013). There is a wealth of evidence highlighting the link between early negative life events, specifically abuse or neglect, and depression (Alloy et al., 2006a; Bernet & Stein, 1999; Klein et al., 2009; Liu et al., 2009; MacMillan et al., 2001; Nolen-Hoeksema et al., 1992). Compared to those who were not abused in their childhood, those who had been abused as a child are three to four times more likely to develop depression in their lifetime (MacMillan et al., 2001), and nine times more likely to experience psychosis ('mild abuse': 2 times; 'severe abuse': 48 times; Janssen et al., 2004). Similarly, Liu et al.'s (2019) meta-analysis (N = 15 studies) found that experiencing abuse as a child (i.e., physical abuse, emotional abuse, sexual abuse, neglect) positively predicted depressive symptoms in college students.

In addition to depression, there is strong evidence showing the association between adversities in childhood and psychosis. Varese et al.'s (2012) meta-analysis of 18 case-control studies (N = 2,048 psychotic patients and 1,856 nonpsychiatric controls), 10 prospective and quasi-prospective studies (N = 41,803), and 8 population-based cross-sectional studies (N = 35,546) found that childhood adversity was strongly associated with increased risk of psychosis across all research designs. The estimated population attributable risk using the odds ratios and the prevalence of childhood trauma from all the studies (excluding case-control studies for calculating prevalence) was 33% (95% confidence interval: 16% to 47%). This finding is consistent with Morgan and Gayer-Anderson's (2016) review that provided substantial evidence of associations between various forms of childhood adversity and psychosis.

Besides increasing the risk of mental disorder, there is also evidence that stressful life events can worsen symptoms and increase the risk of relapse in those who already have a mental disorder. Roca et al.'s (2013) cross-sectional study of 10,257 primary care depressive patients found a significant positive association between stressful life events with the number of depressive episodes (i.e., more stressful events reported, higher number of previous episodes) and depression severity (i.e., more stressful events reported, higher level of depression severity). Francis et al.'s (2012) longitudinal study of adults with a current or past history of anxiety disorders (N = 112) found that a higher total number of stressful life events was associated with a higher cumulative probability of relapse of anxiety disorders.

Direction of the relationship between stressful life events and mental disorder:

Kendler et al.'s (1999) study investigated the extent to which stressful life events cause major depression. Data were collected over a 1-year period in female twins from a

population-based twin registry in the United States. The sample contained 24,648 person-months and 316 onsets of major depression. Stressful life events were rated on contextual threat and dependence, that is, the degree to which the stressful life event could have resulted from the respondent's behaviour. The study found that stressful life events have a substantial causal relationship with the onset of major depression.

2.1.4 Psychological processes

Psychological processes are the intrinsic meaning and personal interpretation attributed to life events and circumstances. These processes occur internally and are personal to each individual. Psychological processes such as response style (e.g., rumination and adaptive response styles) and attributional style are associated with mental disorders.

Response style:

According to response styles theory of depression (Nolen-Hoeksema, 1991, 2004), people tend to respond and behave in a consistent manner when depressed. Some ruminate, that is, they think incessantly about their depressed feelings and problems (Nolen-Hoeksema et al., 2008). They think about their shortcomings and failings, feelings of anger and lack of motivation. While repeatedly thinking about the reasons for their depressed mood, they may also isolate themselves. The tendency to ruminate is relatively stable over time (Nolen-Hoeksema et al., 1993; Watkins & Moulds, 2005).

The associations between rumination with depression and anxiety have been well-established (Aldao et al., 2010; Just & Alloy, 1997; Kovács et al., 2020; Liu et al., 2019; Michl et al., 2013; Olatunji et al., 2013). Both Aldao et al. (2010) and Olatunji et al.'s (2013) meta-analyses found moderate associations between rumination with depression

and anxiety. In addition, Liu et al.'s (2019) meta-analysis of studies involving college students found that rumination was a predictor of depressive symptoms. Similarly, Kovács et al.'s (2020) meta-analysis of 12 studies involving 2,071 clinical patients found that rumination was a significant emotional regulation strategy for those with depression and bipolar disorder. The study also found that while patients with depression tend to ruminate exclusively on negative affect (depressive rumination), those with bipolar disorder also ruminate on positive affect as they experience acute dysfunctional mood states of mania or hypomania (American Psychiatric Association, 2013). Consistent with these findings, Silveira and Kauer-Sant'Anna's (2015) systematic review found that rumination exacerbates the affective lability and the emotional dysregulation in the depressive as well as the manic phases of bipolar disorder. This effect that rumination has on a person's affective lability and emotional dysregulation is significant as both characteristics are the core features of bipolar disorder in both the depressed and manic phases (Townsend & Altshuler, 2012).

A number of mechanisms have been suggested to explain how rumination worsens or prolongs a depressive episode. Firstly, according to the response styles theory (Nolen-Hoeksema, 1991), rumination intensifies the effects of negative emotions on a person's cognition. As a result, the person experiences more negative thoughts and memories. These negative emotions, thoughts and memories, in turn, trigger depressive symptoms. In addition, rumination worsens and lengthens negative affect possibly through increased negative thoughts and behaviours (Lyubomirsky et al., 1998; Morrow & Nolen-Hoeksema, 1990; Nolen-Hoeksema & Harrell, 2002). This increasing negative affect or negative mood leads to more rumination or mood-congruent cognitions, which further exacerbates depression (Moberly & Watkins, 2008). Secondly, adaptive problem-solving is impeded when a person ruminates. A number of studies have shown

that rumination hinders engaging in instrumental or problem-solving behaviour (Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Lyubomirsky et al., 1999; Nolen-Hoeksema & Davis, 1999; Nolen-Hoeksema et al., 2008). This occurs because when a person ruminates, the person becomes more pessimistic or fatalistic regarding their circumstances and situation, thereby increasing feelings of helplessness (Lyubomirsky & Nolen-Hoeksema, 1993; Lyubomirsky et al., 1999; Nolen-Hoeksema, 1991). Rumination also decreases the desire to partake in activities that promote positive affect (Lyubomirsky & Nolen-Hoeksema, 1993, 1995). Lastly, people who ruminate tend to isolate themselves and socially withdraw. This not only reduces their available social support, but also frustrates their loved ones, which can further worsen depression and prolong their depressive episodes. Conversely, people who ruminate may repetitively share their negative emotions and distress with others, which may lead to greater interpersonal problems (Lyubomirsky & Nolen-Hoeksema, 1993, 1995; Lyubomirsky et al., 1999; Nolen-Hoeksema & Davis, 1999; Spasojevic & Alloy, 2001).

There is also a possible link between rumination and stressful life events. In Michl et al.'s (2013) prospective longitudinal studies of adolescents (N = 1,065) and adults (N = 1,132), exposure to stressful life events increased engagement in rumination. In addition, rumination mediated the relationship between stressful life events and symptoms of anxiety in both the adult and adolescent samples. It also mediated the relationship between stressful life events and symptoms of depression in the adult sample.

Most people who engage in rumination erroneously believe that it is an effective problem-solving strategy (Papageorgiou & Wells, 2003). However, rumination is negatively related to problem-solving (Hong, 2007). Rumination is also commonly

associated with maladaptive cognitive styles, such as hopelessness, pessimism, self-criticism, dependency, neediness, negative inferential or attributional style, dysfunctional attitudes, and neuroticism (Ciesla & Roberts, 2002; Flett et al., 2002; Lam et al., 2003; Nolen-Hoeksema & Jackson, 2001; Nolen-Hoeksema et al., 1994; Robinson & Alloy, 2003).

In contrast to rumination, adaptive problem-solving such as coming up with a plan to overcome a problem changes people's focus from their depressed mood and symptoms to a more proactive stance. Similarly, distractive responses, which include doing something that has made them feel better in the past, also help divert attention away from their depressed mood and symptoms. By changing the focus of attention away from depressed mood and its consequences to a pleasant activity that is engaging and absorbing, distractive responses can not only serve as a positive reinforcement, but also improve mood and reduce depressive symptoms (Nolen-Hoeksema, 1991). As a result, distractive responses may not only shorten depressive episodes, but may also diminish them (Morrow & Nolen-Hoeksema, 1990). However, for distractive responses to be effective, they should not be dangerous or self-destructive as such responses will be harmful in the long run (Nolen-Hoeksema et al., 2008). Examples of maladaptive distractive responses to cope or distract oneself include the use of substances (i.e., alcohol, drugs) and engaging in reckless, dangerous behaviours. These dangerous behaviours are not only maladaptive, but are associated with poor psychological outcomes (Nolen-Hoeksema et al., 2008).

Attributional style:

Attributional style refers to a person's way of appraising the cause of a problem or event (Brewin, 1985; Kinderman & Bentall, 1997). It affects how people perceive themselves

and the world around them. It is an important component of social cognition, which is a cognitive process underlying how people view themselves and others and their social interactions and situations (Penn et al., 1997). People with a negative attributional style view the causes of negative life events as being internal, stable and global. That is, they blame themselves for a negative event (i.e., "it is due to me"), believe that the negative event is stable (i.e., "it will keep happening"), and feel that the effects or consequences of the negative event will be all-encompassing or global (i.e., "it will affect everything"). As a result, a person experiences feelings of hopelessness about the situation and future (Abramson et al., 1989).

The reformulated learned helplessness model of depression (Abramson et al., 1978) is an attribution theory of depression that explains how the interpretation and perception of people's experiences (i.e., negative/stressful life events) affects their emotional state and their risk of developing depression and recurrence of depressive symptoms. According to the model, individuals with a tendency towards negative attributional style (i.e., internal, stable, and global) when responding to uncontrollable negative or stressful events tend to develop depression. Abramson et al.'s (1989) hopelessness theory of depression also reinforces the importance of a person's attributional style in determining whether a person becomes depressed when experiencing negative/stressful life events. Overall, both the reformulated learned helplessness model of depression theory (Abramson et al., 1978) and the hopelessness theory of depression (Abramson et al., 1989) predict that people with depressogenic inferential style (i.e., attributional style that causes them to perceive the causes of negative life events as being internal, stable and global) are likely to become depressed. Consistent with the prediction of these attributional models of depression, Hu et al.'s (2015) meta-analysis of 86 studies conducted between 1996 and 2014 involving 51,407 participants found that attributional

style involving internal, stable, global, and composite causes for negative outcomes was positively associated with depression. Similarly, this attributional style has been found to be a predictor of depression in meta-analyses of studies involving children and adolescents (Gladstone & Kaslow, 1995; Joiner & Wagner, 1995).

A number of studies have shown that people with depression tend to view negative life events using a negative attributional style (i.e., internal, stable, and global causes) (Alloy et al., 1999, 2006b; Haeffel et al., 2005; Hu et al., 2015; Joiner, 2001; Moore & Fresco, 2007; Peterson et al., 1983; Rubenstein et al., 2016; Sanjuán et al., 2008). Alloy et al.'s (2006b) study found that young adults with a negative attributional style were at significantly greater risk of developing depressive episodes than those without a negative attributional style. A negative attributional style not only increases susceptibility to the development of depression, but also its recurrence (Haeffel et al., 2005; Hankin et al., 2004; Iacoviello et al., 2006).

Rather than inwardly blaming themselves for negative events, mentally healthy individuals tend to externally blame negative events on their circumstances. In addition, they also tend to internally attribute positive events to themselves (Kinderman et al., 1992). Hodapoor et al.'s (2015) experimental study of 30 adolescent females who were blind found that changing attributional style from internal, stable and global to external, unstable and specific, significantly reduced depression rates. This finding suggests that changing attributional style may well be effective in reducing depression in other population groups.

Besides depression, negative attributional style has been found to be associated with other mental disorders and mental health problems. Specifically, studies have

demonstrated an association between negative attributional style with anxiety symptoms (Luten et al., 1997; Ralph & Mineka, 1998), post-traumatic stress disorder (Reiland, 2017), and suicidal ideation (Hirsch et al., 2009; Kleiman et al., 2012). In addition, Jannati et al.'s (2020) systematic review of 15 studies found that most of these studies reported a significant relationship between self-blame (internal attribution) with psychological distress, anxiety and depression in patients.

2.1.5 Psychological processes as the final pathway to the development of mental disorder

Kinderman (2005) posits that the disruption of psychological processes is the final pathway in the development of mental disorder. That is, it is through the disturbance of psychological processes that any precursors, regardless of whether biological, social, or circumstantial, are manifested and experienced as mental disorder. To illustrate, there are many biological (e.g., genetic vulnerability, biochemical abnormalities), social (e.g., social isolation) and circumstantial factors (e.g., maltreatment during childhood) that may contribute to the onset of depression as discussed in Sections 2.1.1 to 2.1.3. According to Kinderman (2005), these factors are not considered to be the direct cause of the depression. Instead, biological factors associated with depression are viewed as influencing psychological processes such as beliefs regarding self-efficacy, self-esteem, and motivation. Social isolation (social factor) may lead to disruptions of psychological processes related to hopelessness and helplessness. Maltreatment during childhood (circumstantial factor) may lead to disruption or malformation of psychological processes in relation to their view of themselves and people in their lives, and social interactions. Therefore, depression is the direct consequence of these disruptions of psychological processes.

For personality disorder, biological traits (e.g., increased levels of the trait of neuroticism) and life circumstances (e.g., experiencing childhood abuse) are not considered to be the cause of the disorder. Rather, these factors affect how people perceive themselves, their world, and their relationships with others. Hence, it is this disruption of psychological processes that leads to the personality disorder.

A final example of the mediating role of psychological processes is in relation to schizophrenia. People with auditory hallucinations have biological abnormalities (e.g., poorly lateralised language areas of the brain, abnormalities in frontal lobe functioning) that lead to difficulty in discriminating auditory cues from other cognition (i.e., a memory or a thought) (Berlim et al., 2003). This difficulty affects and disrupts source monitoring (i.e., the process involved in determining the origins of knowledge, memories and precepts) (Johnson et al., 1993), resulting in a disrupted psychological process known as source misattribution (Morrison & Haddock, 1997). Therefore, the biological abnormalities are not the cause of the auditory hallucination. Instead, they disrupt the psychological processes (i.e., source monitoring), and it is these dysfunctions that result in the diagnosis of a mental disorder (i.e., schizophrenia).

Hence, according to Kinderman's (2005) model, biological, social and circumstantial factors do not directly cause mental disorder, rather it is the disruption of the psychological processes by these factors that result in a range of problems that become labelled as a mental disorder.

2.2 Behavioural Processes

This thesis investigates whether engaging in behaviours that contribute to mental health is a mediator by extending the biopsychosocial model of mental ill-health to include the Act-Belong-Commit mental health promotion constructs (Donovan et al., 2006) as behavioural mediators in the model. This section provides an overview of the Act-Belong-Commit campaign and the literature supporting the Act-Belong-Commit mental health promotion constructs in representing behavioural processes in the model.

2.2.1 The Act-Belong-Commit campaign

Founded by Professor Donovan, Act-Belong-Commit (actbelongcommit.org.au) is a world-first comprehensive, population wide, community-based mental health promotion campaign that encourages individuals to become proactive in enhancing and maintaining their mental health and wellbeing (Donovan et al., 2006). According to the principles of the Perth Charter for the Promotion of Mental Health and Wellbeing (Anwar-McHenry & Donovan, 2013) and Ottawa Charter for Health Promotion (World Health Organization, 1986), it is essential that mental health promotion occurs not only at an individual level, but also on a societal level. Mental health promotion should involve the building up of an individual's coping strategies and resilience. It should also seek to create a social environment which fosters good mental health. In line with these principles, Act-Belong-Commit encourages individuals to engage in mentally healthy activities as well as supporting organisations in offering and promoting these activities (Donovan et al., 2006; Donovan 2021).

The following literature review on the Act-Belong-Commit mental health promotion constructs provides the rationale for its use in representing behavioural processes. The words 'Act', 'Belong' and 'Commit' denote three major behavioural domains that the general public and scientific literature consider contribute to good mental health (Donovan et al., 2006; Koushede & Donovan, 2022; Nielsen et al., 2017; Rychetnik & Todd, 2004; Shah & Marks, 2004):

1. 'Act': keep physically, mentally, spiritually and socially active (i.e., 'do something');
2. 'Belong': keep up friendships, engage in group activities, participate in community events (i.e., 'do something with someone'); and
3. 'Commit': set goals and challenges, engage in activities that provide meaning and purpose in life, including taking up causes and volunteering to help others (i.e., 'do something meaningful – something that matters').

The 'Act' domain:

For 'Act', people are encouraged to keep physically, mentally, spiritually and socially active (Donovan et al., 2006; Koushede & Donovan, 2022). There is strong evidence that increasing physical activity can reduce depression and anxiety symptoms, and prevent the onset of depression and anxiety disorders (De Mello, et al., 2013; Kilpatrick et al., 2013; Physical Activity Guidelines Advisory Committee, 2008; Rebar et al., 2015 Schuch et al., 2016a, 2016b, 2018; Svensson et al., 2021; Wegner et al., 2014). For example, Schuch et al.'s (2018) meta-analysis of 49 prospective cohort studies involving 266,939 participants found that people with higher levels of physical activity had lower odds of developing depression than those with lower levels of physical activity. This finding of a protective effect of physical activity against the emergence of depression was consistent regardless of age. Rebar et al. (2015) conducted meta-

analyses of randomised trials examining the effect of physical activity on depression (N = 92 studies involving 4,310 participants) and anxiety (N = 306 studies involving 10,755 participants) in non-clinical populations. The study found that physical activity had a significant, medium reductive effect on depression and a significant, small reductive effect on anxiety.

Those who are spiritually active tend to have better mental health than their secular counterparts (Dein et al., 2012; Garfield et al., 2013; Koenig, 2009, 2012; Smith et al., 2003; Walsh, 2011). Smith et al.'s (2003) meta-analysis of 147 studies involving 98,975 participants found that religious involvement was associated with reduced depressive symptoms, and the association was stronger for people who were undergoing stress due to recent life events. Bonelli et al. (2012) conducted a systematic review of quantitative studies examining relationships between religious or spirituality involvement with depressive symptoms or disorders conducted between 1962 and 2011 (N = 444 studies). Of these studies, 61% reported less depression and faster remission from depression in those with more religious/spirituality involvement or a reduction in depression severity in response to a religious/spirituality intervention. Among the most methodologically rigorous studies (n = 178), the proportion of studies that found an inverse relationship between religious/spirituality involvement and depression was higher at 67%. Only 6% of all studies reported greater depression. Similarly, in Braam and Koenig's (2019) systematic review of 152 prospective studies, 49% of these studies reported that religiousness and spirituality predicted a decrease in depression over time, 41% showed a non-significant association, and 10% indicated an association with more depression or mixed results.

The protective effects of participating in a social activity in preventing depression or alleviating its symptoms have been reported in numerous studies (Cruwys et al., 2013, 2014; Glass et al., 2006; Santini et al., 2015; Yu et al., 2015). Furthermore, there is evidence that interventions designed to increase social interaction can reduce depression symptoms (Cattan et al., 2005; Nagy & Moore, 2017). In Nagy and Moore's (2017) systematic review, of the 24 studies on social interventions targeting depression in adults in the general population, 17 (70.8%) studies reported reductions in depressive symptoms.

The 'Belong' domain:

For 'Belong', people are encouraged to keep up friendships, engage in group activities, and participate in community events (Donovan et al., 2006; Koushede & Donovan, 2022). While similar to the social factors component in some respects, belong refers to being a member or part of a formal or informal group or organisation (Donovan & Anwar-McHenry, 2014). People have an innate tendency to want to belong and socially relate to each other. According to Deci and Ryan's (2000) self-determination theory, social relatedness involves initiating and sustaining meaningful relationships and connections with others. It enables a person to become socially accepted by others and to feel more connected. The more connected a person feels, the better their mental health and wellbeing and the greater the likelihood people will receive help in coping with life stressors and the various threats to mental health (Lakey & Orehek, 2011; McAuley et al., 2000; Milner et al., 2016; Musick & Wilson, 2003; Rychetnik & Todd, 2004; World Health Organization, 2004b).

Cruwys et al.'s (2013) study investigated the relationship between social group membership and depression among participants in the English Longitudinal Study of

Ageing across two time periods: a two-year period (N = 5,055; mean age: 63 years) and a four-year period (N = 4,087; mean age: 64 years). This study found that across a two- and a four-year period the number of groups that an individual belongs to was a significant predictor of depression. Among a non-depressed sample at baseline, group membership was protective against the development of depression. Among a depressed sample, group membership reduced the risk of relapse, with the risk decreasing with increasing number of group memberships. For example, depressed respondents with no group memberships who joined one group reduced their risk of depression relapse by 24%, and those who joined three groups reduced their risk of relapse by 63%. In addition, Yu et al.'s (2015) analyses of data from the British Household Panel Survey from 1991 to 2008 (N = 10,000+ aged 16 and over surveyed annually since 1991) found that being a member of a group (e.g., political party, environmental group, parents association, religious group, voluntary service group) strongly predicted future perceived mental health.

The 'Commit' domain:

For 'Commit', people are encouraged to set goals and challenges, and to engage in activities that provide meaning and purpose in life, including taking up causes and volunteering to help others (Donovan et al., 2006; Koushede & Donovan, 2022). Setting and achieving personal goals or overcoming a challenge provides an individual with not just a sense of accomplishment and self-worth, but also leads to greater self-efficacy and wellbeing (Csikszentmihalyi, 1990; Lyubomirsky et al., 2005; Noels et al., 2000; Taylor, 2011).

Studies have shown that volunteers who partake in activities that benefit the wider community have a sense of purpose and meaning, higher life satisfaction and better

mental health and wellbeing (Borgonovi, 2008; Clary & Snyder, 2002; Creaven et al., 2018; Greenfield & Marks, 2004; Hong & Morrow-Howell, 2010; Jenkinson et al., 2013; Li & Ferraro, 2006; Meier & Stutzer, 2008; Musick & Wilson, 2003; Piliavin & Siegl, 2007; Stukas et al., 2016; Vaananen et al., 2005; Waddell & Jacobs-Lawson, 2010). In Jenkinson et al.'s (2013) systematic review and meta-analysis that examined the effect of volunteering on volunteers' mental health, the cohort studies (n = 17) showed that volunteering had favourable effects on depression, life satisfaction, and wellbeing. In a recent longitudinal study, Tabassum et al. (2016) examined the association of volunteering with mental wellbeing across the life course using data from the British Household Panel Survey (N = 66,343 observations). The study found that volunteering was associated with better mental health in adults aged 40 years and older. In addition, among all participants, those who engaged in volunteering regularly experienced higher levels of wellbeing than those who never volunteered.

Effects of acting-belonging-committing on mental health outcomes:

Santini and colleagues conducted studies to investigate the effects of acting-belonging-committing on mental health outcomes. Santini et al.'s (2017, 2018) analyses of data obtained from a 3-year longitudinal study of a nationally representative sample of people aged 50 years and over (N = 6,098) in Ireland found that higher number of social/recreational activities (Act), greater social network integration (Belong), and higher frequency of participation in social/recreational activities (Commit) were associated with significantly lower likelihood of developing depression and anxiety, and predicted better quality of life and self-rated mental health. Similarly, Santini et al.'s (2020) study of 2,488 participants aged 15 or 16 in Denmark found that engaging in multiple activity types at least once a week compared to one single type of activity was

associated with increased odds for high mental wellbeing, and reduced odds for mental health problems.

Concluding comment:

Koushede and Donovan (2022) aptly encapsulate the Act-Belong-Commit message in the following way: "*Overall, the Act-Belong-Commit message encourages people to be physically, spiritually, socially, and mentally* ***act****ive in ways that increase their sense of* ***belong****ing to the communities in which they live, work, play, and recover, and that involve* ***commit****ments to causes or challenges that provide meaning and purpose in their lives.*" (p. 482). Overall, the Act-Belong-Commit program aims to empower people to engage in behaviours that enhance mental health.

This literature review provided the theoretical foundations of Kinderman's (2005) psychological model of mental disorder and the conceptualisation of the role of psychological factors in understanding mental disorder. Furthermore, the literature on the Act-Belong-Commit mental health promotion constructs supports its use in representing behavioural processes in the hypothesised research model.

CHAPTER 3: RESEARCH METHODOLOGY

An online survey of Australians via Qualtrics was conducted between September 2018 and January 2020. The vast majority of respondents (76%) completed the online survey between March and December 2019. This research study was approved by the Curtin University Human Research Ethics Committee.

3.1 Participants and Procedure

A variety of community organisations throughout Australia, including Act-Belong-Commit partners, were approached to promote participation in the online survey among their members (e.g., via newsletters, emails) and those who visited their website. These organisations were free to promote participation in the online survey in whatever way they deemed to be appropriate. Participants were provided with a link to the online survey. On entering the online survey, participants were provided with information on the aims of the study and the nature of their involvement in the study, and were informed that the study was being conducted by myself for my Doctoral thesis at Curtin University. Participants were informed that participation in the study was voluntary, that their responses were confidential, that they could not be identified from the questionnaire, and that only group data would be reported. Participants were provided with the contact details of Curtin personnel (i.e., PhD supervisor, Manager of Research Integrity, and an Ethics Officer) in case they wanted more information about the research or to verify that it was a bona fide study. Given that the questionnaire was on mental health and wellbeing, participants were provided with the contact numbers for confidential telephone counselling and referral services (i.e., Lifeline and Blue Knot Helpline) at the commencement and completion of the survey should they require

support. The questionnaire items are described next. Appendix 1 contains the complete survey instrument.

3.2 The Questionnaire Items

The questionnaire items were developed to measure all of the constructs in the proposed revision of the Kinderman et al.'s (2013) biopsychological model of mental ill-health, and are described below.

3.2.1 Biological factors

The biological factors component of the hypothesised model was measured in terms of respondents' reports of familial mental health problems (Milne et al., 2009; Weissman et al., 2000). Following Kinderman et al.'s (2013) study, respondents were informed that: "*We are interested in whether there is a history of psychological problems in your family; that is, the people that you are biologically related to*", and asked: "*Which of the following people in your family have had mental health problems (for example, have seen a psychiatrist or psychologist): mother; father; one brother or sister; more than one brother or sister; and an uncle, aunt or cousin*?" The response categories were 'yes' or 'no'.

3.2.2 Social factors

The social factors component of the hypothesised model was measured using the Community Integration Measure (McColl et al., 2001). It is a self-report measure that evaluates perceived integration in the community in two domains: belonging and

independent living. For pragmatic reasons (e.g., length of the survey), it was not feasible to include in the survey instrument measures of all the constructs in the social factors component discussed in Section 2.1.2. The Community Integration Measure was selected as it included items that encapsulated aspects of some of the other constructs in the social factors component (e.g., social support, social connectedness).

The Community Integration Measure has demonstrated good psychometric properties. The items of the Community Integration Measure achieved high internal consistency in the initial validation study (Cronbach's alpha of 0.87; McColl et al., 2001) and in subsequent studies (Cronbach's alpha ranged between 0.81 to 0.87; Griffen et al., 2010; Liu et al., 2014; Reistetter et al., 2005). The Community Integration Measure has demonstrated good criterion validity, with the scores having significant positive correlations with other validated measures of community integration and life satisfaction including the Community Integration Questionnaire (Willer et al., 1993) in McColl et al.'s (2001) study, the Satisfaction with Life Scale (Diener et al., 1985) and the Community Integration Measure-Revised in Reistetter et al.'s (2005) study. The Community Integration Measure has demonstrated discriminant validity by its ability to differentiate between brain injury survivors from healthy adults (McColl et al., 2001), and between participants with and without brain injuries (Reistetter et al., 2005). Furthermore, in Liu et al.'s (2014) study, the Community Integration Measure showed good test-retest reliability (intraclass correlation coefficient of 0.84).

The Community Integration Measure requires only a basic literacy level and is easy to understand as it uses language obtained from interviews with participants (McColl et al., 2001). It has been administered to people with and without mental health problems, including those with severe mental disorder (Lloyd et al., 2008, 2010).

The Community Integration Measure consists of 10 items rated on a 5-point Likert scale (1: ‘always agree’; and 5: ‘always disagree’). Respondents were presented with the following statements, and asked: “*Please choose the answer that appears most appropriate in your case*”:

1. I feel like a part of this neighbourhood/town, like I belong here.
2. I know my way around this neighbourhood/town.
3. I know the rules in this neighbourhood/town and can fit in with them.
4. I feel that I am accepted in this neighbourhood/town.
5. I can be independent in this neighbourhood/town.
6. I like where I am living now.
7. There are people I feel close to in this neighbourhood/town.
8. I know a number of people in this neighbourhood/town well enough to say hello and have them say hello back.
9. There are things I can do in this neighbourhood/town for fun in my free time.
10. I have something to do in this neighbourhood/town during the main part of the day that is useful and productive.

The response categories were: strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree.

3.2.3 Circumstantial factors

The circumstantial factors component of the hypothesised model was measured in terms of experiences of recent stressful life events and historical life events (i.e., physical, sexual and emotional abuse; and bullying).

Stressful life events:

Experience of stressful life events was measured by the 12-item self-report List of Threatening Experiences Questionnaire (Brugha & Cragg, 1990) that was derived from Tennant and Andrews' (1977) 67-item inventory of life event categories. The List of Threatening Experiences Questionnaire measures 12 life events in the last six months that are deemed to be highly likely to be threatening and have been established as resulting in long-term consequences (e.g., death of a close family member, divorce, job loss, experiencing a significant illness or injury or assault) (Brugha & Cragg, 1990).

Brugha and Cragg's (1990) study found that the questionnaire had high concurrent validity. For events in the 6 months prior to data collection, the sensitivity of the questionnaire was 0.89 and the specificity was 0.74. For events in the 3 months prior to data collection, the sensitivity of the questionnaire was 1.0 and the specificity was 0.88.

The List of Threatening Experiences Questionnaire has good test-retest reliability, with kappa of 0.63 to 0.90 in Brugha and Cragg's (1990) study and kappa of 0.61 to 0.87 in Motrico et al.'s (2013) study. In addition, in Rosmalen et al.'s (2012) study, a lifetime score was calculated and the test–retest correlation for this score was 0.61 which is satisfactory, particularly given the 2-year interval between measurements.

Rosmalen et al.'s (2012) study demonstrated construct validity of the List of Threatening Experiences Questionnaire by its positive associations with psychological distress (the General Health Questionnaire; Koeter, 1992), anxiety and depression (the Symptom Checklist; Strand et al., 2003), and neuroticism (the Eysenck Personality Questionnaire – Revised Short Scale; Sanderman et al., 1991).

Respondents were presented with the following statements, and asked: "*Read each of the events listed below, and select any event that has occurred in your life in the past six months*":

1. You yourself suffered a serious illness, injury or an assault.
2. A serious illness, injury or assault happened to a close relative.
3. Your parent, child or spouse died.
4. A close family friend or another relative (aunt, cousin, grandparent) died.
5. You had a separation due to marital difficulties.
6. You broke off a steady relationship.
7. You had a serious problem with a close friend, neighbour or relative.
8. You became unemployed or you were seeking work unsuccessfully for more than one month.
9. You were sacked from your job.
10. You had a major financial crisis.
11. You had problems with the police and a court appearance.
12. Something you valued very much was lost or stolen.

The response categories were 'yes' or 'no'.

Historical life events:

Following Kinderman et al. (2013), the circumstantial factors component also measured historical life events (Bernstein & Fink, 1994). Respondents were given a choice to either complete or skip the 5-item list of historical life events. They were informed that: "*The next few questions are about personal matters (e.g., past abuse, past bullying) that some people find difficult. You are NOT required to answer the following questions. But if you are happy to proceed, please click on the 'OK' button.*" Those who were willing

to proceed were presented with the following statements, and asked: "*In the past, how often did the following occur?*":

1. I was bullied at school.
2. I was bullied at work.
3. I was physically abused.
4. I was sexually abused.
5. I was emotionally abused.

The response categories were: never, once, a few times, many times, over many years, I do not know, I do not want to answer.

3.2.4 Psychological processes

Following Kinderman et al. (2013), the psychological processes component of the hypothesised model measured response style and attributional style.

Response style:

The first psychological process, response style, was measured using Kinderman et al.'s (2013) adaption of the Response Style Questionnaire (Nolen-Hoeksema & Morrow, 1991). The scale consists of 14 items assessing responses to stressful situations from a list of coping strategies pertaining to: (1) rumination (6 items); (2) adaptive problem-solving (4 items); and (3) dangerous activities (4 items).

The items of the ruminative response subscale have achieved high internal consistency among a number of groups: patients being treated for major depression (Cronbach's alpha of 0.88; Bagby et al., 2004); university students (Cronbach's alpha ranged from

0.88 to 0.93; Just & Alloy, 1997; Nolen-Hoeksema & Morrow, 1991; Thomas & Bentall, 2002); high school students (Cronbach's alpha 0.89; Gorski & Young, 2002); and adolescents (Cronbach's alpha of 0.95; Young et al., 2012). This subscale has been found to be valid in predicting depression (Nolen-Hoeksema & Morrow, 1991; Nolen-Hoeksema et al., 1994). For example, Nolen-Hoeksema & Morrow (1991) reported that the responses to this scale significantly correlated (r = .62) with use of ruminative responses to depressed mood in a 30-day diary study. The test–retest reliability of this subscale was high (r = .80) over a 5-month period in Nolen-Hoeksema et al.'s (1994) study and moderate (r = .47) over a longer time period of one year in Just & Alloy's (1997) study. In addition, the findings in Bagby et al.'s (2004) study were mostly supportive of the stability of the scale.

The items of the adaptive problem-solving subscale achieved an acceptable level of reliability (Cronbach's alpha of 0.68; Nolen-Hoeksema & Morrow, 1991). An expanded dangerous activities subscale achieved an acceptable level of reliability in Thomas and Bentall's (2002) study (Cronbach's alpha of 0.71) and Fisk et al.'s (2015) study (Cronbach's alpha of 0.77).

As in Kinderman et al. (2013), respondents were presented with the following statements, and asked: "*People think and do many different things when they feel depressed. Please indicate what you generally do when you feel down, sad or depressed*":

1. Think about your shortcomings, failings, faults, mistakes.
2. Think about how angry you are with yourself.
3. Think about how passive and unmotivated you feel.
4. Try to understand yourself by focusing on your depressed feelings.

5. Isolate yourself and think about the reasons why you feel sad.
6. Think about how you don't feel up to doing anything anymore.
7. Do something that has made you feel better in the past.
8. Think 'I'm going to do something to make myself feel better'.
9. Make a plan to overcome a problem.
10. Remind yourself that these feelings won't last.
11. Drink alcohol excessively.
12. Take recreational drugs.
13. Do something reckless or dangerous.
14. Try to initiate new relationships with strangers.

The response style subscales were: rumination – items 1 to 6; adaptive problem-solving – items 7 to 10; and dangerous activities – items 11 to 14. The response categories were: never, almost never, sometimes, often, almost always.

Attributional style:

The second psychological process, attributional style (i.e., extent to which individuals generate internal, personal, or situational causes for hypothetical negative events), was measured using a modified version of the Internal, Personal and Situational Attributions Questionnaire (Kinderman & Bentall, 1996). The questionnaire asseses the extent to which individuals generate internal, personal, or situational causes in 32 hypothetical social situations: 16 with positive and 16 with negative outcomes. Participants are instructed to imagine themselves in each situation and record the most likely cause for each situation. Then they are asked to categorise this cause as being either internal (i.e., due to themselves), external-personal (i.e., due to others), or external-situational (i.e., due to circumstances or chance).

The Internal, Personal and Situational Attributions Questionnaire was found to have good internal reliability in Kinderman and Bentall (1996) and Gao et al. (2018) studies, with mean internal consistency (Cronbach's alpha) for the six subscales of 0.68 and 0.70, respectively (levels of internal consistency for each subscale were: Positive-Internal: 0.72 and 0.71; Positive-Personal 0.61 and 0.68; Positive-Situational 0.61 and 0.69; Negative-Internal 0.73 and 0.69; Negative-Personal 0.63 and 0.67; Negative-Situational 0.76 and 0.74). In both the Kinderman and Bentall (1996) and Gao et al.'s (2018) studies, concurrent validity was demonstrated as the Internal, Personal and Situational Attributions Questionnaire was significantly correlated with the Attribution Style Questionnaire (Peterson et al., 1983). In the Gao et al. (2018) study, group-comparison analyses showed that the Internal, Personal and Situational Attributions Questionnaire discriminated specific attributional biases between different patient populations (i.e., patients with depression and patients with delusions compared to normal controls).

Following Kinderman et al. (2013), respondents were asked to read each of the following six hypothetical negative scenarios and imagine themselves in each scenario when answering the internal attribution question:

Scenario 1: *"A friend made an insulting remark to you. You were at a party with a group of friends that you haven't seen for a long time. It was getting late in the evening and some of the group had quite a lot to drink. You thought that you were all getting on well; it was noisy and there were lots of jokes and a lot of laughter. But then one of your friends made an insulting remark about you."*

Scenario 2: *"A friend refused to help you. You were very busy at work, and also had a lot of jobs to do at home – cleaning, decorating, gardening, etc. You thought it would be a good idea to ask a friend to give you a lift to the shopping centre but your friend refused to help, saying they were also busy."*

Scenario 3: *"You are at work. In the middle of the afternoon, your best friend calls. They have split up with their partner and need a shoulder to cry on. You ask your boss if you can leave early. Your boss reminds you that they are expecting an important report on their desk first thing in the morning. You finish the report as quickly as you can, and send it to your boss. The following morning your boss hauls you into the office and complains that the report contains some spelling mistakes."*

Scenario 4: *"You have been looking for a job unsuccessfully for some time. You have sent off several letters to firms that are recruiting staff, and have attended a few interviews. But each time they pick another candidate. You've been getting advice on how to write your CV and interview tips from friends. You feel you have experience and skills, but in the current economic difficulties, you have yet to be successful in getting a job."*

Scenario 5: *"You can't get all the work done that other people expect of you. The firm that you work for has been struggling to deal with a backlog of orders, and you and your colleagues have been under pressure. You have been struggling to keep up, but you haven't been well recently, and you find it difficult. Your colleagues aren't sympathetic, because the work has to be shared between you all."*

Scenario 6: *"A friend ignored you. You had gone shopping to a local shopping mall. It was a typical Saturday afternoon – quite busy, and everybody seemed to be struggling with huge bags. You noticed a friend a little way away. You are pretty sure they saw and recognised you too – you made eye-contact and there was a flash of recognition. But when you moved towards your friend, they just walked away without speaking to you."*

For each scenario, respondents were asked the extent to which the cause of the situation was "*due to something about you*". The response categories ranged from 1 'not at all' to 5 'very much'.

3.2.5 Behavioural processes

The behavioural processes component of the hypothesised model was measured in terms of the frequency that respondents engaged in activities within each of the Act-Belong-Commit behaviour domains: frequency of being physically, socially, spiritually and mentally active (Act); frequency of interacting with family and friends, attending local community and large public events, belonging to and attending informal groups, clubs or organisations (Belong); and frequency of engaging in personally challenging activities, volunteer work, activism or advocacy groups; and holding office in formal or informal groups (Commit).

Jalleh et al. (2013) found that the total score on the Act-Belong-Commit indicators significantly correlates with mental wellbeing as measured by the Warwick–Edinburgh Mental Wellbeing Scale (Tennant et al., 2007). Furthermore, in Santini et al.'s (2017, 2018) studies, Act-Belong-Commit indicators were predictors of mental disorders (i.e., depression and anxiety), better quality of life and self-rated mental health.

Respondents were asked the following Act, Belong and Commit items that have been used in the annual evaluation of the Act-Belong-Commit campaign since 2007 (Jalleh et al., 2018), the *Act-Belong-Commit Guide to Keeping Mentally Healthy* booklet (the self-help guide; Robinson et al., 2013), and the *Act-Belong-Commit Online Self-Assessment Tool* (https://www.actbelongcommit.org.au/SelfAssessmentTool).

Act items:

1. Apart from your job and household tasks, how often do you do something physically active? For example, walking, gardening, dancing, golfing, swimming, jogging, etc.
2. Apart from your job, how often do you do something requiring thinking and concentration? For example, read, paint, learn something, do a crossword puzzle, play video games, etc.
3. Apart from at work and with members of your household, how often do you have contact with other people where you stop for a chat, talk on the phone or chat online?
4. How often do you engage in spiritual activities like attending a service, meeting with others for a spiritual purpose, meditating, reflecting on the meaning of life or the natural world?

For items 1 to 3, the response categories were: less than monthly, monthly, once a week, 2 to 3 times weekly, 4 to 6 times weekly, daily. For item 4, the response categories were: once a year or less, once every 4 to 6 months, once every 2 to 3 months, 1 to 2 times a month, 3 to 4 times a month, weekly.

Belong items:

5. How often do you get together with a group of friends, workmates or family for outings, meals or special events?
6. How often do you attend community events? For example, music festivals, theatre, markets, local sporting events, school fairs, residents' meetings, local government events, local business groups, local 'clean up' events, etc.
7. Do you belong to any formal or informal specific interest groups, clubs or organisations? For example, sports club, car club, book club, fitness group, dance class, theatre group, social club, cooking group, card group, hobby group, cultural or ethnic group, etc.
8. How often do you attend or have contact with members of any of these groups?
9. How often do you attend large public events such as major sporting fixtures, major musical events, or any events where there are very large crowds?

For items 5, 6, 8 and 9, the response categories were: once a year or less, a few times a year, every few months, monthly, weekly or more. For item 7, the response categories were 'yes' and 'no'.

Commit items:

10. Are you doing anything challenging at the moment? For example, learning a language, making something for the house, enrolled in a course, training for a fun run or competitive sport, learning a new skill like music or painting, etc.
11. How often do you do this challenging activity?
12. Do you hold any committee or office roles in any groups? For example, are you the treasurer, a committee member, organiser, president, vice-president, secretary, and so on in any group?

13. Are you actively involved with an activist or cause-related group seeking additional resources, legislative or policy change? For example, for disadvantaged groups, environmental preservation, etc.
14. How often do you do something as part of that group?
15. Are you a volunteer for any charitable organisations, community groups, health or social welfare organisations, or other non-government organisations? For example, coaching a sporting team, mentoring a colleague, volunteer for Red Cross.
16. How often do you do this volunteer activity?
17. Apart from any formal volunteering work, how often do you do something to help someone? For example, help a neighbour, cook a meal or clean for a sick friend, help students with projects, etc.

For items 10, 12, 13, 15, the response categories were ‘yes’ and ‘no’. For items 11, 14, 16 and 17, the response categories were: once a year or less, a few times a year, every few months, monthly, weekly or more.

3.2.6 Wellbeing

The wellbeing outcome variable of the hypothesised model was measured by the BBC Subjective Wellbeing Scale (Pontin et al., 2013). The scale was designed for the online assessment of people’s subjective experiences on a wide range of domains that are associated with wellbeing (Pontin et al., 2013). The scale consists of 24 items across three underlying measures of wellbeing: physical health and wellbeing; psychological wellbeing; and relationships. The items were mainly selected from established measures of wellbeing (e.g., The World Health Organization Quality of Life Assessment (Group

WHOQOL, 1998), and Psychological Well-Being Questionnaire (Ryff, 1989)), with additional items included to represent the 'negative cognitive triad' of thoughts about self, world and future associated with low mood (Pontin et al., 2013).

In Pontin et al.'s (2013) test of the psychometric properties of the BBC Subjective Wellbeing Scale with a large United Kingdom general population sample (N = 23,341), the scale demonstrated high internal consistency for the total 24 items (Cronbach's alpha of .94), and the three subscales of 'psychological wellbeing' (Cronbach's alpha of .93; 12 items), 'physical health and wellbeing' (Cronbach's alpha of .80; 7 items), and 'relationships' (Cronbach's alpha of .82; 5 items). High levels of internal consistency were also found across subsets of the population (i.e., gender, age group, ethnic group, education level, occupational status, relationship status, mental health status). Concurrent validity was demonstrated by the high negative correlations of the total wellbeing scale with the Goldberg Anxiety and Depression Scales (anxiety scale: $r = -.542$, $p < .001$; depression scale: $r = -.661$, $p < .001$; Goldberg et al., 1988) and the number of negative life events on the List of Threatening Experiences Questionnaire ($r = -.237$, $p < .001$; Brugha & Cragg, 1990). These significant negative correlations were replicated in the three subscales. In addition, the total wellbeing score and the three subscale scores showed no evidence of floor or ceiling effects.

Respondents were presented with the following: "*The following questions ask how you feel about the general quality of your life, health, or other areas which might be important to you. Please choose the answer that appears most appropriate*":

1. Are you satisfied with your physical health?
2. Are you satisfied with the quality of your sleep?
3. Are you satisfied with your ability to perform your daily living activities?

4. Are you satisfied with your ability to work?
5. Do you feel depressed or anxious?
6. Do you feel that you are able to enjoy life?
7. Do you feel you have a purpose in life?
8. Do you feel in control over your life?
9. Do you feel optimistic about the future?
10. Do you feel satisfied with yourself as a person?
11. Are you satisfied about your looks and appearance?
12. Do you feel able to live your life the way you want?
13. Are you confident in your own opinions and beliefs?
14. Do you feel able to do the things you choose to do?
15. Do you feel able to grow and develop as a person?
16. Are you satisfied with yourself and your achievements?
17. Are you satisfied with your personal and family life?
18. Are you satisfied with your friendships and personal relationships?
19. Are you comfortable about the way in which you relate to and connect with others?
20. Are you satisfied with your sex life?
21. Are you able to ask someone for help with a problem if you needed to?
22. Do you feel confident that you have enough money to meet your needs?
23. Are you satisfied with your opportunity for exercise and leisure activities?
24. Are you satisfied with your access to health services?

The response categories were: not at all, a little, moderately, very much, extremely. Following Pontin et al. (2013), the 'psychological wellbeing' scale consists of items 1 to

4 and 22 to 24, the ‘physical health and wellbeing’ scale consists of items 5 to 16, and the ‘relationships’ scale consists of items 17 to 21.

3.2.7 Mental health problems

The mental health problems outcome variable of the hypothesised model was measured by the Goldberg Anxiety and Depression Scales (Goldberg et al., 1988) which assesses subclinical symptom levels of anxiety and depression. The scale consists of 18 items (selected from the 36-item Psychiatric Assessment Schedule; Surtees et al., 1983), and divided into two subscales of nine items, one measuring depression and the other anxiety.

Reivan-Ortiz et al.’s (2019) psychometric test of the Goldberg Anxiety and Depression Scales in a sample of 600 students in an Ecuadorian university found that the instrument’s internal consistency was good for both the anxiety (Cronbach’s alpha of .75) and depression subscales (Cronbach’s alpha of .80).

The Goldberg Anxiety and Depression Scales can detect generalised anxiety disorder and major depressive episodes. In Goldberg et al.’s (1988) study of a sample of 427 patients, the scores on the anxiety and depression scales were compared with diagnoses made with the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition (American Psychiatric Association, 1980) criteria for generalised anxiety disorder and major depressive disorder. Using anxiety scores of five or more and/or depression scores of two or more as having a 50% chance of a clinically important disturbance, the overall specificity (i.e., the percentage of patients without psychiatric disorders who scored low on both scales) was 91% and the overall sensitivity (i.e., the percentage of

patients diagnosed as having a psychiatric disorder scoring above the threshold on at least one scale) was 86%. The anxiety scale had a sensitivity of 82% and the depression scale had a sensitivity of 85%. Similarly, Mackinnon et al.'s (1994) study found that the total scale score and the depression and anxiety subscales were sensitive and relatively specific detectors of depressive disorders assessed according to the *International Classification of Diseases*, 10th revision (World Health Organization, 1993) and the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition-revised (American Psychiatric Association, 1987) criteria.

Respondents were presented with the following items, and asked: "*Think about how you have been feeling over the past month. Decide whether or not the following* statements apply to how you have been feeling":

1. Have you felt keyed up, on edge?
2. Have you been worrying a lot?
3. Have you been irritable?
4. Have you had difficulty relaxing?
5. Have you been sleeping poorly?
6. Have you had headaches or neck aches?
7. Have you had any of the following: trembling, tingling, dizzy spells, sweating, diarrhoea?
8. Have you been worried about your health?
9. Have you had difficulty falling asleep?
10. Have you had low energy?
11. Have you had loss of interests?
12. Have you lost confidence in yourself?
13. Have you felt hopeless?

14. Have you had difficulty concentrating?
15. Have you lost weight (due to poor appetite)?
16. Have you been waking early?
17. Have you felt slowed up?
18. Have you tended to feel worse in the mornings?

The response categories were ‘yes’ or ‘no’. The anxiety scale consists of items 1 to 9, and the depression scale consists of items 10 to 18.

3.2.8 Socio-demographics and mental illness history

Respondents were asked: “*Have you ever been diagnosed with a specific mental illness?*”, and if so, “*What type of mental illness: mood disorder (depression, bipolar disorder, etc); anxiety disorder (generalised anxiety disorder, panic disorder, post-traumatic stress disorder, obsessive compulsive disorder, etc); psychotic disorder (schizophrenia, delusional disorder, etc); addictions (substance addiction, behavioural addiction, etc); other – please specify?*”

The questionnaire also collected socio-demographic information including age, gender, education level, and marital status. Appendix 1 contains the questionnaire items used to measure all of the constructs in the hypothesised model. Therefore, providing the opportunity to conduct further analysis of the data by these socio-demographic variables.

3.3 Statistical Analysis Overview

Statistical analyses were performed using IBM SPSS Statistics for Windows 27 (IBM Corp, 2020) and IBM SPSS Amos 27 (Arbuckle, 2020).

3.3.1 Missing values

Data were screened for missing values. Of the total sample (N = 859), 25.8% (n = 222) of cases were excluded due to non responses to all of the items measuring at least one of the two dependent variables (i.e., wellbeing and mental health problems; 22.9%, n = 197) or at least one of the three key independent variables (i.e., biological, social, circumstantial factors; 2.9%, n = 25). For attributional style measured by the modified version of the Internal, Personal, and Situational Attributions Questionnaire (Kinderman & Bentall, 1996), non-responses to four of the six internal attribution items ranged between 10.6% to 19.7%. According to Bennett (2001), bias is more likely to be introduced to statistical analysis with more than 10% of missing data. Hence, these four items were excluded from further analyses.

Of the remaining sample (N = 635), a non-significant Little's chi-square statistic indicated that missing data were missing completely at random (Little, 1988). Hence, missing values were replaced using the expectation maximisation method in the missing value analysis in IBM SPSS Statistics for Windows 27 (IBM Corp, 2020). As described by Peters and Enders (2002), the expectation–maximisation estimator uses a two-step iterative procedure: (1) In the 'expectation' (E) step, "*missing values are replaced with the conditional mean of the missing data given the observed data and the initial covariance matrix estimate*" (p. 84); and (2) In the 'maximisation' (M) step, "*maximum*

likelihood estimates of the mean vector and covariance matrix are obtained using the filled-in data from the E step. This updated covariance matrix is then used to derive regression equations for the next E step and the cycle begins again. The estimator repeatedly cycles through these steps until the difference between covariance matrices in subsequent M steps falls below some specified convergence criterion" (p. 84). This method has been found to outperform ad hoc techniques (e.g., listwise deletion, pairwise deletion, mean imputation) in terms of parameter estimate bias, model fit and parameter estimate efficiency (Peters & Enders, 2002; Scheffer, 2002).

3.3.2 Multivariate outliers and normality

Mahalanobis distance was computed to identify multivariate outliers. Given that only 30 cases were found, these cases were retained. Tabachnick and Fidell (2001) cautioned that transformation or score alteration of multivariate outliers may be ineffective as it is the combination of scores on two or more variables that is aberrant rather than the score on a particular variable. In addition, removal of multivariate outliers reduces the generalisability of the results.

An assessment of multivariate normality was conducted. The multivariate kurtosis statistics (i.e., Mardia's coefficient) suggested significant multivariate non-normality in the data. Given that the assumption of multivariate normality was violated, the method of bootstrapping was incorporated (Bollen & Stine, 1992; Byrne, 2016; Shrout & Bolger, 2002). For non-normal data, bootstrapping allows more accurate estimation of standard errors, confidence intervals, and significance by repeatedly resampling from the total sample to estimate the distribution of the population (Mooney & Duvall, 1993; Tabachnick & Fidell, 2001).

3.3.3 Multicollinearity

The level of multicollinearity among the three exogenous variables in the model (i.e., biological, social and circumstantial factors) was assessed by the variance inflation factor values in IBM SPSS Statistics for Windows 27 (IBM Corp, 2020). There was an acceptable range of collinearity between the variables (i.e., all variance inflation factor values were less than three; Hair et al., 2018; Knock & Lynn, 2012).

3.3.4 Item parcelling

The hypothesised model contains a number of constructs, and the total number of items representing the constructs was large. Therefore, the number of parameters to estimate concurrently in a structural model would be too large for the sample size in this study. Hence, item parcelling (Kishton & Widaman, 1994) was used to best evaluate the hypothesised model. The parcel approach has psychometric advantages as it leads to more stable solutions by decreasing the construct to sample size ratio, and parcels are more likely to be strongly related to the constructs (Bandalos & Finney, 2001; Hau & Marsh, 2004; Little et al., 2002, 2013).

The method of item parcelling used was domain representative parcelling, where parcels of randomly assigned items are created for different dimensions within the same construct. For example, the wellbeing construct was measured by the BBC Subjective Wellbeing Scale (Pontin et al., 2013), which consists of three dimensions: physical health and wellbeing; psychological wellbeing; and relationships. Items within each of these three dimensions were randomly assigned into parcels to most accurately represent the overall wellbeing construct. Given that some dimensions had an uneven

number of items within each parcel (and for consistency), items were averaged (instead of summed) to create the composite for all item parcels.

3.3.5 Analytical procedures for testing the measurement and structural models

Structural equation modelling was used to test the hypothesised relationships in the research model. The measurement model and the structural model were evaluated using a two-step covariance-based structural equation modelling as recommended by Anderson and Gerbing (1988).

In the first step, a maximum likelihood confirmatory factor analysis was performed to assess the measurement model. The construct reliability, convergent validity and discriminant validity of the latent variables were assessed. Construct reliability was assessed using composite reliability and maximal reliability, with values greater than 0.7 indicating good construct reliability (Fornell & Larcker, 1981; Peterson & Kim, 2013). Convergent validity of the constructs (i.e., extent to which the items of a construct are highly correlated) was established by the following criteria: all factor loadings are statistically significant; standardised loading estimates are 0.5 or higher; average variance extracted is greater than 0.5; and composite reliability is greater than average variance extracted (Sharif & Mura, 2019). Discriminant validity of the constructs (i.e., extent to which the constructs are different from one another) was assessed via two methods: (1) the square root of a construct's average variance extracted is greater than the correlations with other latent constructs (Fornell & Larcker, 1981); and (2) using the heterotrait-monotrait ratio of correlations, with thresholds of 0.85 for strict and 0.90 for liberal discriminant validity (Henseler et al., 2015).

In the second step, the paths in the structural model were examined to test the research hypotheses. To test the mediating effects of psychological and behavioural processes, the direct and indirect effects of the mediation models were estimated using maximum likelihood and their significance was assessed using bootstrapping with 2,000 replications. Bootstrapping also provided the upper and lower bounds of the estimates with a 95% confidence interval. This bootstrapping approach in testing mediation relationships is more accurate and has higher statistical power than Baron and Kenny (1986) and Sobel's (1982) suggested methods (Hayes, 2013). The relationships between the study variables were assessed using Pearson correlation analysis. For all tests, a p value of less than 0.05 was considered to be statistically significant; all p values were two-tailed.

The measurement and structural models were evaluated by assessing the models' goodness-of-fit with the sample data. Model fit was assessed using the chi-squared statistic. For a model to be regarded as an acceptable fit, the chi-squared statistic should be non-significant ($p > .05$; Meyers et al., 2005). However, the chi-squared statistic is sensitive to sample size, where a large sample size (as in this study) can result in a statistically significant p value (Byrne, 2016). Hence, a number of statistical indices were used to assess model fit. The chi-square/degrees of freedom ($\chi 2/df$), with values of less than 3 indicate a good fit, and between 3 and 5 an acceptable fit (Bentler, 1990; Hair et al., 2018; Marsh & Hocevar, 1985).

Root mean square error of approximation (RMSEA), standardised root-mean-square residual (SRMR), goodness-of-fit index (GFI) and adjusted goodness-of-fit index (AGFI) are absolute fit indices that evaluate the extent to which a hypothesised model fits the sample data (McDonald & Ho, 2002). For the RMSEA and SRMR, values of

0.05 or less indicate a good fit, and between 0.05 and 0.08 a moderate fit (Brown & Cudeck, 1993; Byrne, 2016; Hu & Bentler, 1999; Meyers et al., 2005). The RMSEA 90% confidence intervals are also provided to assist in interpreting the point estimate (MacCallum & Austin, 2000). For GFI, values of 0.90 and 0.95 reflect acceptable and excellent fit to the data, respectively. For AGFI, values of 0.80 and 0.90 reflect acceptable and excellent fit to the data, respectively (Byrne, 2016; Hair et al., 2018; Hu & Bentler, 1999; Kline, 2015).

The Comparative fit index (CFI), Tucker-Lewis index (TLI) and Incremental fit index (IFI) are incremental fit indices that compare the hypothesised model to a baseline null model (i.e., assess the relative position of the hypothesised model between worse fit to perfect fit; Hooper et al., 2008), with values of 0.90 and 0.95 reflecting acceptable and excellent fit to the data, respectively (Bentler, 1990; Byrne, 2016; Hu & Bentler, 1999; Meyers et al., 2005). Together, these indices provide a comprehensive evaluation of model fit.

Based on the modification indices and standardised residual covariance matrix, suggested modifications of the measurement and structural models to attain a good fit model were accepted only when conceptually and theoretically justified (Kline, 2015; Molenaar et al., 2000). After each modification, the new model was re-analysed in a sequential manner to improve model fit.

CHAPTER 4: SAMPLE CHARACTERISTICS AND DESCRIPTIVE DATA

This Chapter presents the sample characteristics and descriptive statistics. The purpose of this descriptive investigation is to describe the distribution of the items comprising each of the measures that assessed the constructs in the hypothesised research model. It provides an in-depth view of the data without inferring causal relationships.

4.1 Sample Characteristics

Table 4.1 shows the socio-demographic characteristics of respondents. A majority of respondents were female (68.8%). Eighteen percent of respondents were aged 18 to 29 years, 35.6% aged 30 to 49 years, 36.3% aged 50 to 69 years and 10.2% aged 70 years or older. Of the total sample, 20.0% had up to Year 12 education, 6.0% had a trade qualification, and 73.6% had TAFE or university education. Approximately one in two respondents were married (54.0%), and a further 12.4% were living with someone. A majority of respondents were employed (67.2%) (full-time: 36.2%; part-time: 31.0%). The proportion of ‘retired or age pension’ was 18.3% and ‘unemployed’ was 5.8%. The proportion of respondents of Aboriginal or Torres Strait Islander background was 1.6%. Almost all of the respondents lived in Western Australia (95.1%).

Table 4.1: Socio-demographic characteristics

Characteristics	N = 635 n (%)
Gender:	
Male	190 (29.9)
Female	437 (68.8)
Prefer not to answer	3 (0.5)
No response	5 (0.8)
Age group:	
18 to 29 years	113 (17.8)
30 to 39 years	112 (17.6)
40 to 49 years	114 (18.0)
50 to 59 years	131 (20.6)
60 to 69 years	100 (15.7)
70+ years	65 (10.2)
Highest education level:	
Year 10 or less	36 (5.7)
Years 11 to 12	91 (14.3)
Trade qualification	38 (6.0)
TAFE qualification	130 (20.5)
TAFE or university education (undetermined)	22 (3.5)
Some/currently enrolled in university	6 (0.9)
University degree	309 (48.7)
No response	3 (0.5)
Relationship status:	
Married	343 (54.0)
Living with someone	79 (12.4)
In a relationship, but not living together	38 (6.0)
Divorced	32 (5.0)
Separated	17 (2.7)
Widowed	19 (3.0)
Single	102 (16.1)
No response	5 (0.8)

Table 4.1: Socio-demographic characteristics (Cont'd)

Characteristics	N = 635 n (%)
Occupation:*	
Working full-time	230 (36.2)
Working part-time	197 (31.0)
Studying full-time	64 (10.1)
Studying part-time	37 (5.8)
Full-time home duties	55 (8.7)
Unemployed	37 (5.8)
Retired or aged pension	116 (18.3)
Sickness, invalid or disability pension	17 (2.7)
No response	5 (0.8)
Aboriginal or Torres Strait Islander background:	
Yes	10 (1.6)
No	617 (97.2)
Prefer not to answer	2 (0.3)
No response	6 (0.9)
Geographic location:	
Western Australia	604 (95.1)
Other Australian states/territories	14 (2.2)
No response	17 (2.7)

* Note: The total exceeds 100% as multiple responses were permitted.

4.2 Social Factors

The social factors component was measured in terms of perceived integration in the community in two domains: belonging and independent living. Respondents were presented with the community integration items in Table 4.2, and asked to rate the extent to which they agreed or disagreed with each statement. The response categories and results are shown in Table 4.2.

For the belonging items, a majority of respondents agreed with each of the statements (ranged between 64.3% and 82.1%; ‘strongly agree’: 26.0% to 49.9%). Most respondents reported ‘liking where they are living’ (82.1% agreement), and ‘knowing a number of people in their neighbourhood/town well enough to say hello and have them say hello back’ (81.2% agreement).

For the independent living items, a majority of respondents agreed with each of the statements (ranged between 57.6% and 92.0%; ‘strongly agree’: 29.6% to 60.8%). Most respondents felt that ‘in their neighbourhood/town they know their way around’ (92.0% agreement), ‘can be independent’ (86.9% agreement), and ‘know the rules and can fit in with them’ (82.5% agreement).

Table 4.2: Frequencies, means and standard deviations (SD) of the Community Integration Measure items (N = 635)

Item	Strongly agree n (%)	Somewhat agree n (%)	Neutral n (%)	Somewhat disagree n (%)	Strongly disagree n (%)	No response n (%)	Mean	SD
Belonging:								
1. I feel like a part of this neighbourhood/town, like I belong here	165 (26.0)	243 (38.3)	155 (24.4)	46 (7.2)	26 (4.1)	0 (0.0)	2.25	1.05
4. I feel that I am accepted in this neighbourhood/town	238 (37.5)	231 (36.4)	131 (20.6)	24 (3.8)	11 (1.7)	0 (0.0)	1.96	0.94
6. I like where I am living now	335 (52.8)	186 (29.3)	66 (10.4)	28 (4.4)	20 (3.1)	0 (0.0)	1.76	1.02
7. There are people I feel close to in this neighbourhood/ town	209 (32.9)	203 (32.0)	124 (19.5)	63 (9.9)	36 (5.7)	0 (0.0)	2.23	1.17
8. I know a number of people in this neighbourhood/ town well enough to say hello and have them say hello back	317 (49.9)	199 (31.3)	54 (8.5)	34 (5.4)	30 (4.7)	1 (0.2)	1.83	1.10
Independent living:								
2. I know my way around this neighbourhood/town	386 (60.8)	198 (31.2)	32 (5.0)	12 (1.9)	4 (0.6)	3 (0.5)	1.50	0.74
3. I know the rules in this neighbourhood/town and can fit in with them	310 (48.8)	214 (33.7)	89 (14.0)	13 (2.0)	7 (1.1)	2 (0.3)	1.73	0.86
5. I can be independent in this neighbourhood/town	346 (54.5)	206 (32.4)	62 (9.8)	14 (2.2)	7 (1.1)	0 (0.0)	1.63	0.83
9. There are things I can do in this neighbourhood/town for fun in my free time	230 (36.2)	215 (33.9)	110 (17.3)	45 (7.1)	34 (5.4)	1 (0.2)	2.11	1.14
10. I have something to do in this neighbourhood/town during the main part of the day that is useful and productive	188 (29.6)	178 (28.0)	155 (24.4)	68 (10.7)	44 (6.9)	2 (0.3)	2.37	1.21

4.3 Circumstantial Factors

The circumstantial factors component was measured in terms of experiences of recent stressful life events and historical life events. Respondents were presented with the stressful life events listed in Table 4.3, and asked to "*select any event that has occurred in your life in the past six months.*" The results are shown in Table 4.3.

The most frequently nominated stressful life event was 'a serious illness, injury or assault happened to a close relative' (27.9%), followed by 'a close family friend or another relative (aunt, cousin, grandparent) died' (23.6%) and 'you had a serious problem with a close friend, neighbour or relative' (19.8%).

Table 4.3: Frequencies of recent stressful life events

	N = 635 **n (%)**
A serious illness, injury or assault happened to a close relative	177 (27.9)
A close family friend or another relative (aunt, cousin, grandparent) died	150 (23.6)
You had a serious problem with a close friend, neighbour or relative	126 (19.8)
You yourself suffered a serious illness, injury or an assault	100 (15.7)
You had a major financial crisis	81 (12.8)
You became unemployed or you were seeking work unsuccessfully for more than one month	79 (12.4)
Something you valued very much was lost or stolen	46 (7.2)
Your parent, child or spouse died	39 (6.1)
You broke off a steady relationship	38 (6.0)
You had a separation due to marital difficulties	21 (3.3)
You were sacked from your job	14 (2.2)
You had problems with the police and a court appearance	12 (1.9)

Respondents were then given a choice to either complete or skip the historical life events questions. The vast majority of respondents chose to answer these questions (n =

601, 94.6%). These respondents were presented with the statements in Table 4.4, and asked: "*In the past, how often did the following occur?*" The response categories and results are shown in Table 4.4.

Approximately three in four respondents (71.1%) reported being bullied at school, and one in two respondents (51.9%) reported being bullied at work. Fifty-six percent of respondents reported experiencing emotional abuse, 29.4% physical abuse, and 25.9% sexual abuse. Females were far more likely than males to report each of these types of abuses (emotional abuse: 61.1% vs 42.9%, $p < .001$; physical abuse: 31.6% vs 23.8%, $p = .05$; and sexual abuse: 32.7% vs 10.1%; $p < .001$)

Table 4.4: Frequencies of historic life events

	N = 635 **n (%)**
I was bullied at school:	
Never	144 (22.7)
Once	65 (10.2)
A few times	221 (34.8)
Many times	87 (13.7)
Over many years	79 (12.4)
I do not know	4 (0.6)
I do not want to answer	0 (0.0)
No response	35 (5.5)
I was bullied at work:	
Never	267 (42.0)
Once	69 (10.9)
A few times	183 (28.8)
Many times	55 (8.7)
Over many years	22 (3.5)
I do not know	4 (0.6)
I do not want to answer	0 (0.0)
No response	35 (5.5)

Table 4.4: Frequencies of historic life events (Cont'd)

	N = 635 n (%)
I was emotionally abused:	
Never	240 (37.8)
Once	24 (3.8)
A few times	126 (19.8)
Many times	102 (16.1)
Over many years	101 (15.9)
I do not know	5 (0.8)
I do not want to answer	1 (0.2)
No response	36 (5.7)
I was physically abused:	
Never	407 (64.1)
Once	43 (6.8)
A few times	85 (13.4)
Many times	27 (4.3)
Over many years	31 (4.9)
I do not know	4 (0.6)
I do not want to answer	0 (0.0)
No response	38 (6.0)
I was sexually abused:	
Never	421 (66.3)
Once	59 (9.3)
A few times	70 (11.0)
Many times	20 (3.1)
Over many years	16 (2.5)
I do not know	5 (0.8)
I do not want to answer	6 (0.9)
No response	38 (6.0)

Table 4.5 shows the frequency of respondents reporting these stressful or historic life events. Table 4.5 shows that 8.8% reported none of these events; that is, 91.2% of

respondents reported experiencing at least one stressful life event or historic life event (stressful life event: 64.1%; historic life event: 83.1%).

Table 4.5: Number of recent stressful life events and historic life events (N = 635)

Score	Stressful life events n (%)	Historic life events n (%)	Total n (%)
0	228 (35.9)	107 (16.9)	56 (8.8)
1	188 (29.6)	108 (17.0)	80 (12.6)
2	94 (14.8)	121 (19.1)	89 (14.0)
3	62 (9.8)	133 (20.9)	104 (16.4)
4	30 (4.7)	94 (14.8)	90 (14.2)
5	16 (2.5)	72 (11.3)	76 (12.0)
6	5 (0.8)	---	54 (8.5)
7	6 (0.9)	---	30 (4.7)
8	5 (0.8)	---	22 (3.5)
9	1 (0.2)	---	16 (2.5)
10	---	---	6 (0.9)
11	---	---	4 (0.6)
12	---	---	5 (0.8)
13	---	---	2 (0.3)
14	---	---	1 (0.2)
Mean (SD)	1.39 (1.61)	2.34 (1.60)	3.73 (2.62)

Note: standard deviation (SD).

4.4 Psychological Processes

Psychological processes were measured in terms of response style (i.e., rumination, adaptive problem-solving, dangerous activities) and attributional style (i.e., internal attribution to negative events).

Response style:

Respondents were informed that: "*People think and do many different things when they feel depressed*". They were then presented with the statements in Table 4.6, and asked: "*Please indicate what you generally do when you feel down, sad or depressed.*" The response categories and results are shown in Table 4.6.

For each of the adaptive problem-solving items, approximately one in two respondents (47.6% to 54.6%) reported that they 'almost always' or 'often' reacted in that way. For each of the rumination items, a substantial minority of respondents (26.5% to 46.0%) 'almost always' or 'often' reacted in that way. In contrast, the proportions of 'almost always' or 'often' responses were 8% or less for each of the dangerous activities items, and a majority of respondents responded 'never' or 'almost never' to each of the dangerous activities items (73.7% to 94.3%).

Attributional style:

Respondents were presented with a scenario of 'a friend making an insulting remark to you at a party' (scenario 1) and another scenario of 'a friend ignoring you at a shopping mall' (scenario 2). For each scenario, respondents were asked the extent to which the cause of the situation was "*due to something about you*". The response categories and results are shown in Table 4.7.

For both scenarios 1 and 2, the distribution of responses was skewed towards 'not due to something about you' (ratings 1-2): 38.1% and 43.0% of the total sample, respectively. The proportions of respondents who felt that it was due to something about them (ratings 4-5), were 22.8% and 26.1%, respectively.

Table 4.6: Frequencies, means and standard deviations (SD) of the Response Style Questionnaire items (N = 635)

Item	Never 1 n (%)	Almost never 2 n (%)	Sometimes 3 n (%)	Often 4 n (%)	Almost always 5 n (%)	No response n (%)	Mean	SD
Rumination:								
1. Think about your shortcomings, failings, faults, mistakes	22 (3.5)	91 (14.3)	226 (35.6)	165 (26.0)	127 (20.0)	4 (0.6)	3.45	1.07
2. Think about how angry you are with yourself	69 (10.9)	166 (26.1)	229 (36.1)	102 (16.1)	66 (10.4)	3 (0.5)	2.89	1.13
3. Think about how passive and unmotivated you feel	54 (8.5)	115 (18.1)	204 (32.1)	157 (24.7)	103 (16.2)	2 (0.3)	3.22	1.17
4. Try to understand yourself by focusing on your depressed feelings	85 (13.4)	149 (23.5)	225 (35.4)	126 (19.8)	48 (7.6)	2 (0.3)	2.85	1.12
5. Isolate yourself and think about the reasons why you feel sad	95 (15.0)	129 (20.3)	206 (32.4)	131 (20.6)	73 (11.5)	1 (0.2)	2.93	1.21
6. Think about how you don't feel up to doing anything anymore	89 (14.0)	134 (21.1)	192 (30.2)	156 (24.6)	63 (9.9)	1 (0.2)	2.95	1.19
Adaptive problem-solving:								
7. Do something that has made you feel better in the past	19 (3.0)	67 (10.6)	246 (38.7)	221 (34.8)	81 (12.8)	1 (0.2)	3.44	0.95
8. Think 'I'm going to do something to make myself feel better'	29 (4.6)	81 (12.8)	201 (31.7)	222 (35.0)	101 (15.9)	1 (0.2)	3.45	1.05
9. Make a plan to overcome a problem	18 (2.8)	70 (11.0)	215 (33.9)	216 (34.0)	116 (18.3)	0 (0.0)	3.54	1.00
10. Remind yourself that these feelings won't last	28 (4.4)	76 (12.0)	181 (28.5)	204 (32.1)	143 (22.5)	3 (0.5)	3.57	1.10
Dangerous activities:								
11. Drink alcohol excessively	332 (52.3)	136 (21.4)	114 (18.0)	40 (6.3)	11 (1.7)	2 (0.3)	1.83	1.04
12. Take recreational drugs	562 (88.5)	37 (5.8)	26 (4.1)	6 (0.9)	3 (0.5)	1 (0.2)	1.19	0.59
13. Do something reckless or dangerous	461 (72.6)	121 (19.1)	40 (6.3)	6 (0.9)	5 (0.8)	2 (0.3)	1.38	0.72
14. Try to initiate new relationships with strangers	349 (55.0)	141 (22.2)	117 (18.4)	17 (2.7)	8 (1.3)	3 (0.5)	1.72	0.94

Note: For calculating means, items 1 to 6 (rumination) and items 11 to 14 (dangerous activities) were reverse coded.

Table 4.7: Frequencies, means and standard deviations (SD) of the internal attribution items (N = 635)

	Not at all		Somewhat		Very much	No response		
	1	2	3	4	5			
Item	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**n (%)**	**Mean**	**SD**
Due to something about you:								
Scenario 1: A friend made an insulting remark to you	108 (17.0)	134 (21.1)	208 (32.8)	86 (13.5)	59 (9.3)	40 (6.3)	2.75	1.20
Scenario 2: A friend ignored you	160 (25.2)	113 (17.8)	164 (25.8)	94 (14.8)	72 (11.3)	32 (5.0)	2.68	1.33

4.5 Behavioural Processes

Behavioural processes were assessed by items measuring the Act-Belong-Commit constructs (Donovan et al., 2006). There were four Act indicators: (1) frequency of doing something physically active; (2) frequency of doing something requiring thinking and concentration; (3) frequency of contact with other people; and (4) frequency of engaging in spiritual activities. The frequency of engaging in these behaviours was assessed by asking respondents: "*Apart from your job and household tasks, how often do you do something physically active?*" (physically active); "*Apart from your job, how often do you do something requiring thinking and concentration?*" (mentally active); "*Apart from at work and with members of your household, how often do you have contact with other people where you stop for a chat, talk on the phone or chat online?*" (socially active); and "*How often do you engage in spiritual activities like attending a service, meeting with others for a spiritual purpose, meditating, reflecting on the meaning of life or the natural world?*" (spiritually active). The response categories and results are shown in Table 4.8.

For the physically, mentally and socially active items, the vast majority of respondents engage in each of these behaviours at least once a week (88.5% to 93.8%). Reflecting the different response scale and type of activity, almost one in four respondents are spiritually active on a 'weekly' basis (22.7%), with 48.0% responding 'once a year or less'.

Table 4.8: Frequencies of the 'Act' indicators

	N = 635 n (%)
Frequency of doing something physically active:	
Less than monthly	39 (6.1)
Monthly	34 (5.4)
Once a week	99 (15.6)
2 to 3 times weekly	179 (28.2)
4 to 6 times weekly	136 (21.4)
Daily	148 (23.3)
No response	0 (0.0)
Frequency of doing something requiring thinking and concentration:	
Less than monthly	17 (2.7)
Monthly	21 (3.3)
Once a week	71 (11.2)
2 to 3 times weekly	108 (17.0)
4 to 6 times weekly	93 (14.6)
Daily	324 (51.0)
No response	1 (0.2)
Frequency of contact with other people:	
Less than monthly	20 (3.1)
Monthly	30 (4.7)
Once a week	81 (12.8)
2 to 3 times weekly	149 (23.5)
4 to 6 times weekly	148 (23.3)
Daily	205 (32.3)
No response	2 (0.3)
Frequency of engaging in spiritual activities:	
Once a year or less	305 (48.0)
Once every 4 to 6 months	60 (9.4)
Once every 2 to 3 months	49 (7.7)
1 to 2 times a month	49 (7.7)
3 to 4 times a month	27 (4.3)
Weekly	144 (22.7)
No response	1 (0.2)

There were four Belong indicators: (1) frequency of getting together with a group of friends, workmates or family for outings, meals or special events; (2) frequency of attending community events; (3) frequency of attending or contacting members of any specific interest groups, clubs or organisations; and (4) frequency of attending large public events. Respondents were asked: "*How often do you get together with a group of friends, workmates or family for outings, meals or special events?*"; "*How often do you attend community events?*"; "*Do you belong to any formal or informal specific interest groups, clubs or organisations?*", and if so, "*How often do you attend or have contact with members of any of these groups?*"; and "*How often do you attend large public events such as major sporting fixtures, major musical events, or any events where there are very large crowds?*" The response categories and results are shown in Table 4.9.

Forty percent of respondents get together with family and friends at least weekly, with a further 26.8% doing so on a monthly basis. For attendance at community events, 13.2% of the total sample responded 'weekly or more', 28.0% 'monthly', 22.2% 'every few months', and 36.2% 'a few times a year' or less. The frequency of attendance at large public events was lower, with 71.5% responding 'a few times a year' or less.

Approximately two in three respondents (63.8%) reported belonging to a specific interest group, club or organisation. Of these respondents (n = 405), 67.2% have contact with members of at least one or more of these groups at least weekly, with a further 23.7% having contact on a monthly basis.

Table 4.9: Frequencies of the 'Belong' indicators

	N = 635 n (%)
Frequency of getting together with a group of friends, workmates or family for outings, meals or special events:	
Once a year or less	25 (3.9)
A few times a year	76 (12.0)
Every few months	114 (18.0)
Monthly	170 (26.8)
Weekly or more	250 (39.4)
No response	0 (0.0)
Frequency of attending community events:	
Once a year or less	78 (12.3)
A few times a year	152 (23.9)
Every few months	141 (22.2)
Monthly	178 (28.0)
Weekly or more	84 (13.2)
No response	2 (0.3)
Frequency of attending or contacting members of any specific interest groups, clubs or organisations:	
Once a year or less	5 (0.8)
A few times a year	6 (0.9)
Every few months	26 (4.1)
Monthly	96 (15.1)
Weekly or more	272 (42.8)
Do not belong to any specific interest groups, clubs or organisations	230 (36.2)
Frequency of attending large public events:	
Once a year or less	248 (39.1)
A few times a year	206 (32.4)
Every few months	102 (16.1)
Monthly	60 (9.4)
Weekly or more	16 (2.5)
No response	3 (0.5)

There were five Commit indicators: (1) frequency of engaging in challenging activities; (2) frequency of doing something with an activist or cause-related group seeking additional resources, legislative or policy change; (3) frequency of volunteering for any charitable organisations, community groups, health or social welfare organisations, or other non-government organisations; (4) frequency of doing something to help someone; and (5) if belong to any formal or informal specific interest groups, clubs or organisations, whether or not hold any committee or office roles in any of these groups. Respondents were asked: "*Are you doing anything challenging at the moment?*", and if so, "*How often do you do this challenging activity?*"; "*Are you actively involved with an activist or cause-related group seeking additional resources, legislative or policy change?*", and if so, "*How often do you do something as part of that group?*"; "*Are you a volunteer for any charitable organisations, community groups, health or social welfare organisations, or other non-government organisations?*", and if so, "*How often do you do this volunteer activity?*"; "*Apart from any formal volunteering work, how often do you do something to help someone?*"; and "*Do you hold any committee or office roles in any groups?*" The response categories and results are shown in Table 4.10.

Of the total sample, the proportion of respondents who reported engaging in challenging activities was 63.1%, volunteering was 41.3%, and doing something with an activist or cause-related group was 18.7%. A majority of the total sample (61.6%) reported engaging in challenging activities, volunteering, doing something with a cause-related group or help someone at least weekly, with a further 16.9% engaging in one or more of these behaviours on a monthly basis. Of the total sample, 37.3% held a committee or office role in a group.

Table 4.10: Frequencies of the 'Commit' indicators

	N = 635 n (%)
Frequency of engaging in challenging activities:	
Once a year or less	17 (2.7)
A few times a year	19 (3.0)
Every few months	29 (4.6)
Monthly	59 (9.3)
Weekly or more	277 (43.6)
Not doing anything challenging at the moment	232 (36.5)
No response	2 (0.3)
Frequency of doing something with an activist or cause-related group seeking additional resources, legislative or policy change:	
Once a year or less	6 (0.9)
A few times a year	15 (2.4)
Every few months	20 (3.1)
Monthly	37 (5.8)
Weekly or more	41 (6.5)
Not actively involved with an activist or cause-related group	516 (81.3)
Frequency of volunteering:	
Once a year or less	4 (0.6)
A few times a year	24 (3.8)
Every few months	35 (5.5)
Monthly	76 (12.0)
Weekly or more	123 (19.4)
Not a volunteer	373 (58.7)
Frequency of doing something to help someone:	
Once a year or less	81 (12.8)
A few times a year	131 (20.6)
Every few months	121 (19.1)
Monthly	158 (24.9)
Weekly or more	143 (22.5)
No response	1 (0.2)
Holding a committee or office role in any group:	
Yes	237 (37.3)
No	239 (37.6)
Not a member of any group	159 (25.0)

4.6 Wellbeing

Respondents were presented with the statements and response categories in Table 4.11, and asked: "*The following questions ask how you feel about the general quality of your life, health, or other areas which might be important to you. Please choose the answer that appears most appropriate*". The results are shown in Table 4.11.

Of the total sample, 27.2% of respondents reported that they were 'extremely' or 'very much' satisfied with their physical health, with a further 42.0% 'moderately' satisfied. Sixteen percent of respondents were not satisfied with their physical health. For each of the physical health and wellbeing items, the proportion of respondents who responded at least 'moderately' satisfied/confident ranged between 63.3% to 85.4%.

Responses to feeling depressed or anxious were more evenly distributed across the response categories, with 36.2% of the total sample responding at least moderately depressed or anxious, 33.1% 'a little', and 30.6% 'not at all'. For each of the other psychological wellbeing items, the proportion of respondents who responded at least 'moderately' satisfied ranged between 69.1% to 92.1%.

Of the total sample, 53.2% of respondents reported that they were 'extremely' or 'very much' satisfied with their friendships and personal relationships, with a further 37.5% 'moderately' satisfied. Six percent of respondents were not satisfied with their friendships and personal relationships. This response distribution was similar for each of the other relationship items, with the exception of satisfaction with their sex life where a far greater proportion responded 'not at all' satisfied: 25.2% vs 4.7%-7.6% for each of the other relationship items.

Table 4.11: Frequencies, means and standard deviations (SD) of the BBC Subjective Wellbeing Scale (N = 635)

Item	Not at all 1 n (%)	A little 2 n (%)	Moderately 3 n (%)	Very much 4 n (%)	Extremely 5 n (%)	No response n (%)	Mean	SD
Physical health and wellbeing:								
1. Are you satisfied with your physical health?	101 (15.9)	93 (14.6)	267 (42.0)	148 (23.3)	25 (3.9)	1 (0.2)	2.85	1.07
2. Are you satisfied with the quality of your sleep?	119 (18.7)	114 (18.0)	224 (35.3)	148 (23.3)	30 (4.7)	0 (0.0)	2.77	1.14
3. Are you satisfied with your ability to perform your daily living activities?	34 (5.4)	59 (9.3)	191 (30.1)	283 (44.6)	68 (10.7)	0 (0.0)	3.46	0.98
4. Are you satisfied with your ability to work?	44 (6.9)	54 (8.5)	175 (27.6)	284 (44.7)	75 (11.8)	3 (0.5)	3.46	1.04
22. Do you feel confident that you have enough money to meet your needs?	84 (13.2)	94 (14.8)	174 (27.4)	206 (32.4)	76 (12.0)	1 (0.2)	3.15	1.21
23. Are you satisfied with your opportunity for exercise and leisure activities?	56 (8.8)	84 (13.2)	168 (26.5)	232 (36.5)	94 (14.8)	1 (0.2)	3.35	1.15
24. Are you satisfied with your access to health services?	37 (5.8)	55 (8.7)	121 (19.1)	267 (42.0)	154 (24.3)	1 (0.2)	3.70	1.10

Table 4.11: Frequencies, means and standard deviations (SD) of the BBC Subjective Wellbeing Scale (N = 635) (Cont'd)

Item	Not at all 1 n (%)	A little 2 n (%)	Moderately 3 n (%)	Very much 4 n (%)	Extremely 5 n (%)	No response n (%)	Mean	SD
Psychological wellbeing:								
5. Do you feel depressed or anxious?	194 (30.6)	210 (33.1)	128 (20.2)	72 (11.3)	30 (4.7)	1 (0.2)	3.74	1.15
6. Do you feel that you are able to enjoy life?	16 (2.5)	86 (13.5)	174 (27.4)	275 (43.3)	83 (13.1)	1 (0.2)	3.51	0.97
7. Do you feel you have a purpose in life?	42 (6.6)	82 (12.9)	161 (25.4)	245 (38.6)	105 (16.5)	0 (0.0)	3.46	1.11
8. Do you feel in control over your life?	43 (6.8)	88 (13.9)	201 (31.7)	218 (34.3)	85 (13.4)	0 (0.0)	3.34	1.08
9. Do you feel optimistic about the future?	39 (6.1)	83 (13.1)	189 (29.8)	229 (36.1)	93 (14.6)	2 (0.3)	3.40	1.08
10. Do you feel satisfied with yourself as a person?	40 (6.3)	92 (14.5)	195 (30.7)	230 (36.2)	75 (11.8)	3 (0.5)	3.33	1.06
11. Are you satisfied about your looks and appearance?	79 (12.4)	117 (18.4)	271 (42.7)	140 (22.0)	28 (4.4)	0 (0.0)	2.88	1.03
12. Do you feel able to live your life the way you want?	65 (10.2)	124 (19.5)	198 (31.2)	190 (29.9)	58 (9.1)	0 (0.0)	3.08	1.12
13. Are you confident in your own opinions and beliefs?	13 (2.0)	36 (5.7)	147 (23.1)	310 (48.8)	128 (20.2)	1 (0.2)	3.79	0.90
14. Do you feel able to do the things you choose to do?	25 (3.9)	90 (14.2)	198 (31.2)	251 (39.5)	71 (11.2)	0 (0.0)	3.40	0.99
15. Do you feel able to grow and develop as a person?	28 (4.4)	82 (12.9)	161 (25.4)	275 (43.3)	89 (14.0)	0 (0.0)	3.50	1.03
16. Are you satisfied with yourself and your achievements?	30 (4.7)	88 (13.9)	186 (29.3)	245 (38.6)	86 (13.5)	0 (0.0)	3.42	1.04

Note: For calculating means, item 5 was reverse coded.

Table 4.11: Frequencies, means and standard deviations (SD) of the BBC Subjective Wellbeing Scale (N = 635) (Cont'd)

Item	Not at all 1 n (%)	A little 2 n (%)	Moderately 3 n (%)	Very much 4 n (%)	Extremely 5 n (%)	No response n (%)	Mean	SD
Relationships:								
17. Are you satisfied with your personal and family life?	48 (7.6)	72 (11.3)	171 (26.9)	226 (35.6)	117 (18.4)	1 (0.2)	3.46	1.14
18. Are you satisfied with your friendships and personal relationships?	36 (5.7)	76 (12.0)	183 (28.8)	238 (37.5)	100 (15.7)	2 (0.3)	3.46	1.07
19. Are you comfortable about the way in which you relate to and connect with others?	30 (4.7)	74 (11.7)	204 (32.1)	249 (39.2)	76 (12.0)	2 (0.3)	3.42	1.00
20. Are you satisfied with your sex life?	160 (25.2)	114 (18.0)	173 (27.2)	135 (21.3)	45 (7.1)	8 (1.3)	2.67	1.26
21. Are you able to ask someone for help with a problem if you needed to?	41 (6.5)	110 (17.3)	156 (24.6)	239 (37.6)	87 (13.7)	2 (0.3)	3.35	1.11

4.7 Mental Health Status

4.7.1 Familial history of mental health problems

Respondents were informed that: "*We are interested in whether there is a history of psychological problems in your family; that is, the people that you are biologically related to.*" They were then presented with the list of people in Table 4.12, and asked: "*Which of the following people in your family have had mental health problems (for example, have seen a psychiatrist or psychologist)?*" A majority of respondents (58.1%) reported that at least one family member has had a mental health problem.

Table 4.12: Self-reported familial history of mental health problems (% yes)

	N = 635 **n (%)**
Mother	163 (25.7)
Father	102 (16.1)
Brother or sister	207 (32.6)
An uncle, aunt or cousin	164 (25.8)
None of these	266 (41.9)

4.7.2 Self-reported history of mental illness

Respondents were asked: "*Have you ever been diagnosed with a specific mental illness?*" And if so, "*What type of mental illness?*" The results are shown in Table 4.13. Approximately 1 in 3 respondents (32.4%) reported that they have been diagnosed with a mental illness, with the proportion significantly higher among females than males (35.5% vs 25.4%, p = .014). Among respondents diagnosed with a mental illness, the

most frequent mental illness was mood disorder (78.2%), followed by anxiety disorder (62.1%) (mood or anxiety disorder: 96.1%; both disorders: 44.2%). The other mental illnesses were mentioned by 5% of respondents or less. It is noteworthy that in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition (American Psychiatric Association, 2013), 'attention deficit/hyperactivity disorder' is not classified as a mental disorder.

Table 4.13: Self-reported history of mental illness

	N = 635 **n (%)**
Ever diagnosed with a specific mental illness:	
Yes	206 (32.4)
No	429 (67.6)
Type of mental illness among those who have been diagnosed (N = 206):*	
Mood disorder	161 (78.2)
Anxiety disorder	128 (62.1)
Addictions	11 (5.3)
Attention deficit/hyperactivity disorder	8 (3.9)
Eating disorder	7 (3.4)
Personality disorder	6 (2.9)
Psychotic disorder	5 (2.4)

* Note: The total exceeds 100% as multiple responses were permitted.

Table 4.14 shows that respondents with a familial history of mental health problems were substantially more likely to have been diagnosed with a specific mental illness than those who did not have a familial history of mental health problems (41.7% vs 19.5%, $p < .001$).

Table 4.14: Self-reported history of mental illness by familial history of mental health problems

	Familial history of mental health problems N = 369 n (%)	No familial history of mental health problems N = 266 n (%)	Total N = 635 n (%)
Ever diagnosed with a specific mental illness:			
Yes	154 (41.7)	52 (19.5)	206 (32.4)
No	215 (58.3)	214 (80.5)	429 (67.6)

4.7.3 Self-reported anxiety and depression symptoms

Table 4.15 shows the frequency distributions of anxiety and depression scores on the Goldberg Anxiety and Depression Scale (Goldberg et al., 1988). Respondents with an anxiety score of five and/or a depression score of two have a 50% chance of having a clinically important disturbance, with the probability increasing above these cut-off scores. Of the total sample, the proportions of respondents with anxiety and depression scores at or above the cut-offs were 50.5% and 70.4%, respectively (both anxiety and depression scores at or above the cut-offs: 46.6%). Overall, 73.2% of the total sample had at least a 50% chance of having a clinically important disturbance (see Table 4.16).

Table 4.15: Frequency distributions of anxiety and depression scores (N = 635)

Score	Anxiety scale n (%)	Depression scale n (%)
0	71 (11.2)	80 (12.6)
1	54 (8.5)	108 (17.0)
2	54 (8.5)	83 (13.1)
3	72 (11.3)	75 (11.8)
4	70 (11.0)	54 (8.5)
5	54 (8.5)	56 (8.8)
6	66 (10.4)	64 (10.1)
7	53 (8.3)	62 (9.8)
8	68 (10.7)	44 (6.9)
9	73 (11.5)	9 (1.4)

Table 4.16: Proportion of respondents with at least a 50% chance of having a clinically important disturbance according to anxiety and depression cut-off scores

	N = 635 n (%)
Anxiety only	18 (2.8)
Depression only	151 (23.8)
Both anxiety and depression	296 (46.6)
Neither	170 (26.8)

4.8 Summary of Findings

In relation to integration in the community, a majority of respondents felt a sense of belonging in the area where they live and that they have personal independence, with level of agreement on each of the community integration items at 58% or higher. Of the

total sample, 91.2% of respondents reported experiencing at least one stressful life event or historic life event (stressful life event: 64.1%; historic life events: 83.1%).

When presented with two hypothetical negative events, respondents were more likely to not attribute the cause of the event to themselves (ratings 1-2: 38.1% and 43.0% vs ratings 4-5: 22.8% and 26.1%; lower numbers represent less self-blame). In response to feeling depressed, respondents were more likely to adopt adaptive problem-solving strategies than ruminate, with 'almost always' or 'often' responses higher for adaptive problem-solving than ruminate items: 47.6% to 54.6% vs 26.5% to 46.0%. The vast majority of respondents do not engage in dangerous activities when depressed, with 'never' or 'almost never' responses for each of the dangerous activities items ranging from 73.7% to 94.3%.

Responses to the Act-Belong-Commit indicators suggest that a majority of respondents are engaging in acting-belonging-committing behaviours. For the physically, mentally and socially active items, the vast majority of respondents engage in each of these behaviours at least once a week (88.5% to 93.8%). For the spiritually active item, around one in four respondents engage in this behaviour on a 'weekly' basis (22.7%), with 48.0% responding 'once a year or less'. Approximately two in three respondents (63.8%) reported belonging to a specific interest group, club or organisation. Of these respondents (n = 405), 67.2% have contact with members of one or more of these groups at least weekly, with a further 23.7% having contact on a monthly basis. A majority of the total sample (61.6%) reported engaging in challenging activities, volunteering, doing something with a cause-related group or help someone at least weekly, with a further 16.9% engaging in one or more of these behaviours on a monthly basis. Of the total sample, 37.3% held a committee or office role in a group.

A majority of respondents appears to have moderate-high levels of wellbeing (i.e., physical health and wellbeing, psychological wellbeing). Of the total sample, 27.2% of respondents reported that they were ‘extremely’ or ‘very much’ satisfied with their physical health, with a further 42.0% ‘moderately’ satisfied. Sixteen percent of respondents were not satisfied with their physical health. For each of the physical health and wellbeing items, the proportion of respondents who responded at least ‘moderately’ satisfied/confident ranged between 63.3% to 85.4%. Responses to feeling depressed or anxious were mixed, with 36.2% of the total sample responding at least moderately depressed or anxious, 33.1% ‘a little’, and 30.6% ‘not at all’. For each of the other psychological wellbeing items, the proportion of respondents who responded at least ‘moderately’ satisfied ranged between 69.1% to 92.1%. Of the total sample, 53.2% of respondents reported that they were ‘extremely’ or ‘very much’ satisfied with their friendships and personal relationships, with a further 37.5% ‘moderately’ satisfied. Six percent of respondents were not satisfied with their friendships and personal relationships.

In this convenience sample of Australian adults, 32.4% reported having been diagnosed with a specific mental illness. Among these respondents, the most frequent type of mental illness diagnosed was mood disorder (78.2%), followed by anxiety disorder (62.1%). Of the total sample, the proportions of respondents with anxiety and depression scores at levels indicating at least a 50% chance of having a clinically important disturbance were 50.5% and 70.4%, respectively.

This chapter presented descriptive data on the variables in the hypothesised research model. It provides an in-depth view of the data without inferring causal relationships

among the variables. The next chapter presents the development of each of the constructs for use in testing the model.

CHAPTER 5: MODEL DEVELOPMENT

This chapter presents the development of each of the constructs for use in testing the hypothesised model. Assessments of the reliability of the scales are also presented.

5.1 Composite Variables

For the biological factors, circumstantial factors and behavioural processes constructs, a composite variable was created to represent each construct.

5.1.1 Biological factors

A biological factors variable to represent a familial history of mental illness was computed. Familial history of mental illness was defined as self-reported mental health problems in any of the following people in the family: mother, father, brother, sister, uncle, aunt or cousin. The computed biological factors variable was therefore a dichotomous scale: 0 (no self-reported familial history of mental illness), and 1 (self-reported familial history of mental illness).

5.1.2 Circumstantial factors

A circumstantial factors variable was computed based on responses to the recent negative life events and historical life events measures. Responses to the 12 negative life events as measured by the List of Threatening Experiences questionnaire (Brugha & Cragg, 1990) were scored dichotomously: ‘yes’: 1; ‘no’: 0. There were five historical life events measures: (1) frequency of being bullied at school; (2) frequency of being

bullied at work; (3) frequency of physical abuse; (4) frequency of sexual abuse; and (5) frequency of emotional abuse. The responses to these measures were dichomotised as follows: ‘once’, ‘a few times’, ‘many times’ and ‘over many years’: 1; and ‘never’, ‘I do not know’, ‘I do not want to answer’ and no response: 0. A composite score was calculated by summing the incidences of recent negative life events and historical life events. The computed circumstantial factors variable ranged from 0 to 17**.**

5.1.3 Behavioural processes

Following Robinson et al. (2013), a behavioural processes variable was computed by summing responses to the act, belong, and commit indicators. Hence, assessing the overall level of frequency of engaging in acting, belonging and committing activities. Taking into account the sample size and number of parameters in the hypothesised model, creating a composite variable was preferrable to creating a separate composite variable for each of these three types of activities.

There were four Act indicators: (1) frequency of doing something physically active; (2) frequency of doing something requiring thinking and concentration; (3) frequency of contact with other people; and (4) frequency of engaging in spiritual activities. The responses to the first three measures were scored as follows: ‘less than monthly’: 1; ‘monthly’: 2; ‘once a week’: 3; ‘2 to 3 times weekly’: 4; ‘4 to 6 times weekly’: 5; and ‘daily’: 6. The responses to the fourth measure were scored as follows: ‘once a year or less’: 1; ‘once every 4 to 6 months’: 2; ‘once every 2 to 3 months’: 3; ‘1 to 2 times a month’: 4; ‘3 to 4 times a month’: 5; and ‘weekly’: 6.

There were four Belong indicators: (1) frequency of getting together with a group of friends, workmates or family for outings, meals or special events; (2) frequency of attending community events; (3) frequency of attending or contacting members of any specific interest groups, clubs or organisations; and (4) frequency of attending large public events. The responses to these measures were scored as follows: ‘once a year or less’: 1; ‘a few times a year’: 2; ‘every few months’: 3; ‘monthly’: 4; and ‘weekly or more’: 5.

There were five Commit indicators: (1) frequency of engaging in challenging activities; (2) frequency of doing something with an activist or cause-related group seeking additional resources, legislative or policy change; (3) frequency of volunteering for any charitable organisations, community groups, health or social welfare organisations, or other non-government organisations; (4) frequency of doing something to help someone; and (5) if belong to any formal or informal specific interest groups, clubs or organisations, whether or not holding any committee or office roles in any of these groups. The responses to the first four measures were scored as follows: ‘once a year or less’: 1; ‘a few times a year’: 2; ‘every few months’: 3; ‘monthly’: 4; and ‘weekly or more’: 5. For each of these four measures, if the respondent did not engage in the activity, a score of ‘0’ was applied. The responses to the fifth measure were scored as follows: ‘yes’: 5; ‘no’: 2. For this measure, if the respondent did not belong to any groups, a score of ‘0’ was applied.

A behavioural processes variable was calculated by summing the scores on the act, belong, and commit indicators. The computed behavioural processes variable ranged from 8 to 69, where higher numbers represented greater frequency of engaging in acting, belonging and committing activities.

5.2 Item Parcelling

Item parcelling was conducted for the social factors, psychological processes, wellbeing and mental health problems constructs. Table 5.1 shows the item parcels resulting from the parcelling approach. Social factors were measured using the Community Integration Measure (McColl et al., 2001). The scale consists of 10 items representing two dimensions: (1) belonging (items 1, 4, 6, 7, 8); and (2) independent living (items 2, 3, 5, 9, 10). For the social factors construct, the first parcel was randomly assigned items 4 and 7, the second parcel was randomly assigned items 1, 6 and 8, the third parcel was randomly assigned items 5 and 10, and the fourth parcel was randomly assigned items 2, 3 and 9. The first two parcels represented the belonging dimension of the social factors construct, and the next two parcels represented the independent living dimension.

For psychological processes, the adapted Response Style Questionnaire consists of 14 items representing three dimensions: (1) rumination (items 1 to 6; reverse coded); (2) adaptive problem-solving (items 7 to 10); and (3) dangerous activities (items 11 to 14; reverse coded). For the psychological processes construct, the first parcel was randomly assigned items 4 and 6, the second parcel was randomly assigned items 2 and 3, the third parcel was randomly assigned items 1 and 5, the fourth parcel was randomly assigned items 8 and 9, the fifth parcel was randomly assigned items 7 and 10, the sixth parcel was randomly assigned items 11 and 12, and the seventh parcel was randomly assigned items 13 and 14. The first three parcels represented the rumination dimension of the psychological processes construct, the fourth and fifth parcels represented the adaptive problem-solving dimension; and the sixth and seventh parcels represented the

dangerous activities dimension. For attributional style, item parcelling was not required as there were only two internal attribution items.

Table 5.1: Assignment of items into the dimensions of the latent constructs

Construct/dimension	Parcel number	Scale item number
Social factors:		
Belonging:	1	4, 7
	2	1, 6, 8
Independent living:	3	5, 10
	4	2, 3, 9
Psychological processes (Response style):		
Rumination:	1	4, 6
	2	2, 3
	3	1, 5
Adaptive problem-solving:	4	8, 9
	5	7, 10
Dangerous activities:	6	11, 12
	7	13, 14
Wellbeing:		
Physical health and wellbeing:	1	1, 2, 23
	2	3, 4, 22, 24
Psychological wellbeing:	3	6, 7, 10, 12
	4	9, 11, 14, 16
	5	5, 8, 13, 15
Relationships:	6	18, 21
	7	17, 19, 20

The BBC Subjective Wellbeing Scale consists of 24 items representing three dimensions: (1) physical health and wellbeing (items 1 to 4, 22 to 24); (2) psychological wellbeing (items 5 to 16; item 5 was reverse coded); and (3) relationships (items 17 to 21). For the wellbeing construct, the first parcel was randomly assigned items 1, 2 and 23, the second parcel was randomly assigned items 3, 4, 22 and 24, the third parcel was randomly assigned items 6, 7, 10 and 12, the fourth parcel was randomly assigned items 9, 11, 14 and 16, the fifth parcel was randomly assigned items 5, 8, 13 and 15, the sixth parcel was randomly assigned items 18 and 21, and the seventh parcel was randomly assigned items 17, 19 and 20. The first two parcels represented the physical health and wellbeing dimension of the wellbeing construct, the third, fourth and fifth parcels represented the psychological wellbeing dimension; and the sixth and seventh parcels represented the relationships dimension.

5.3 Measurement Model Assessment

The social factors, psychological processes, wellbeing and mental health problems constructs were represented by latent variables. A maximum likelihood confirmatory factor analysis was performed to assess the measurement model of the overall research model.

Figure 5.1 is a representation of the initial measurement model. Examination of the fit index values suggested a poor model fit: $\chi 2(201) = 1386.82$, $p < .001$, $\chi 2/df = 6.900$, CFI = .871, TLI = .852, IFI = .872, GFI = .833, AGFI = .790, SRMR = .080, and RMSEA (90% CI) = .096 (.092–.101). Items with factor loadings of less than 0.5 were removed one at a time, commencing with the item with the lowest factor loading. Hence, the psychological processes item parcels 7, 6, 4 and 5 were removed. The

modification indices suggested a covariance path between the error terms for the wellbeing item parcels 6 and 7. These two item parcels were related to the relationships dimension of the wellbeing construct. Hence, these two items' measurement errors were allowed to freely covary.

Figure 5.1: The initial measurement model

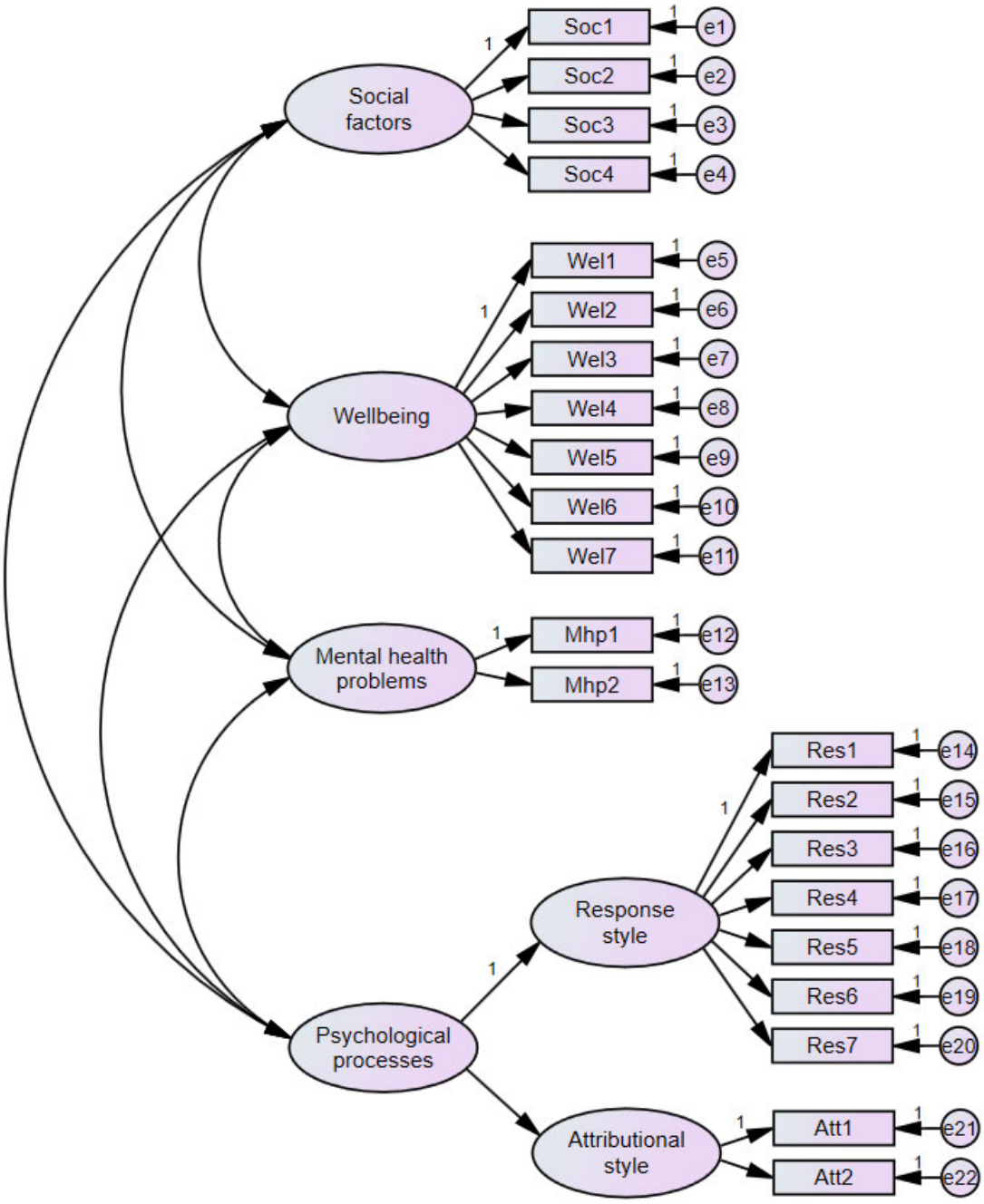


Figure 5.2 is a representation of the final modified measurement model that demonstrated a good fit to the data: $\chi 2(126) = 533.36$, $p < .001$, $\chi 2/df = 4.233$, CFI = .952, TLI = .942, IFI = .952, GFI = .911, AGFI = .879, SRMR = .038, and RMSEA (90% CI) = .071 (.065–.078).

Figure 5.2: The final measurement model

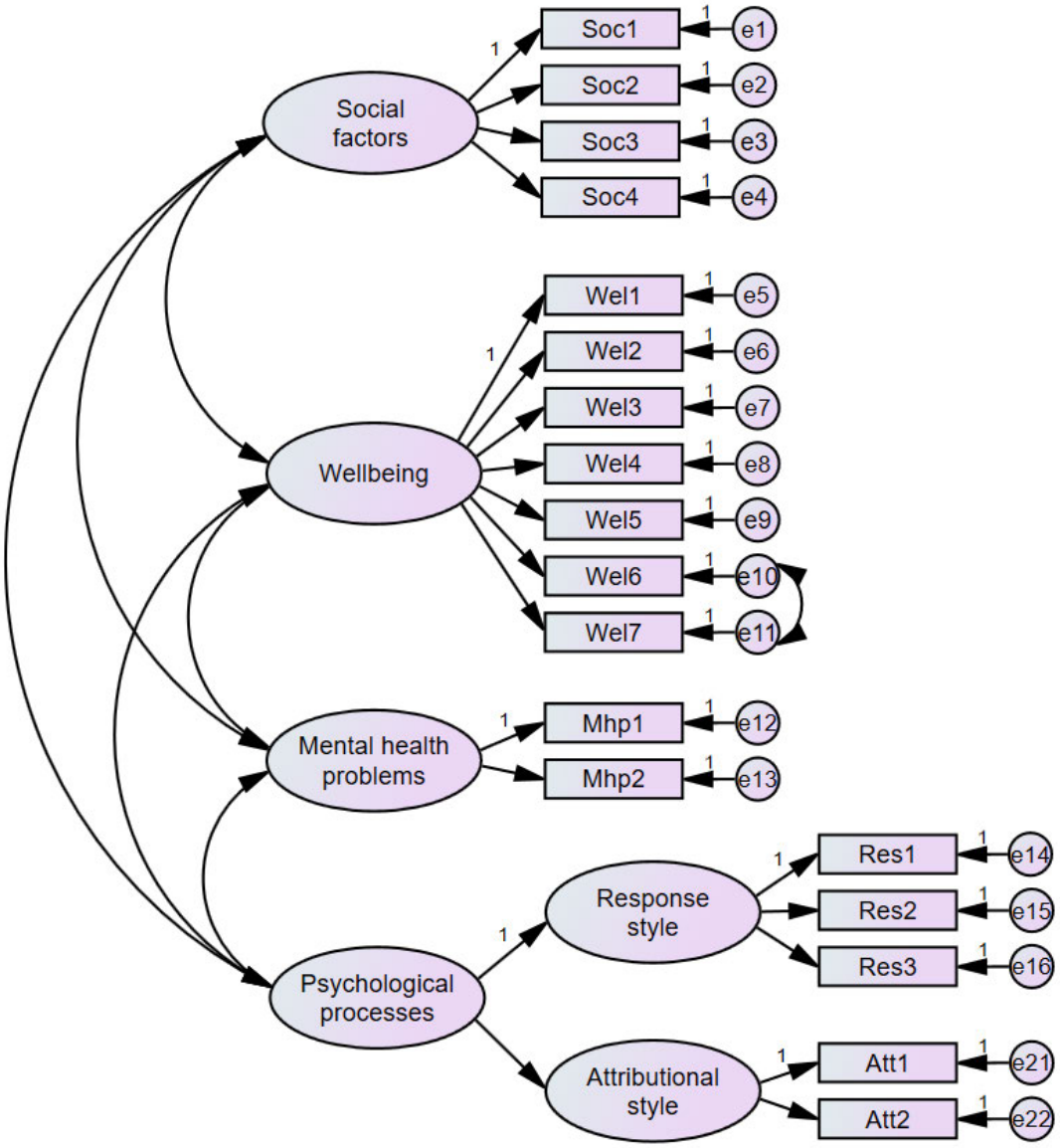


Table 5.2 shows the results of the measurement model assessment. For all constructs, composite reliability (range .772 to .930) and maximal reliability (range .850 to .961) were greater than 0.7, demonstrating good construct reliability.

Table 5.2: Reliability and validity of the measurement model

Construct/items	Factor loading	CR	AVE	MSV	MaxR(H)
Social factors:		.897	.686	.254	.900
Soc1	.850***				
Soc2	.859***				
Soc3	.800***				
Soc4	.803***				
Psychological processes:		.772	.638	.634	.893
Response style:	.941***				
Res1	.799**				
Res2	.827***				
Res3	.896***				
Attributional style:	.625***				
Att1	.758***				
Att2	.630***				
Wellbeing:		.930	.658	.628	.961
Wel1	.693***				
Wel2	.758***				
Wel3	.943***				
Wel4	.941***				
Wel5	.912***				
Wel6	.680***				
Wel7	.695***				
Mental health problems:		.848	.736	.666	.850
Mhp1	.845***				
Mhp2	.870***				

Note: composite reliability (CR), average variance extracted (AVE), maximum shared variance (MSV), maximal reliability (MaxR(H)).

Significance testing: ***p = .001; **p = .002

For convergent validity, all factor loadings were statistically significant ($p < .05$), standardised loading estimates (range .625 to .941) were 0.5 or higher, average variance extracted was greater than 0.5 and composite reliability was greater than average variance extracted for all constructs, which satisfied the criteria for convergent validity. For discriminant validity, average variance extracted of each construct was greater than its maximum shared variance, the square root of each construct's average variance extracted was greater than the correlations with other latent constructs (Fornell & Larcker, 1981; see Table 5.3), and the values of the heterotrait-monotrait ratio of correlations matrix were less than 0.85 (Henseler et al., 2015; Kline, 2015; see Table 5.4), which satisfied the criteria for discriminant validity.

Table 5.3: Discriminant validity assessment using Fornell and Larcker (1981) criterion

	Social factors	Psychological processes	Wellbeing	Mental health problems
Social factors	.828			
Psychological processes	-.445***	.799		
Wellbeing	-.502***	.729***	.811	
Mental health problems	.422***	-.796***	-.792***	.858

Significance testing: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Table 5.4: Heterotrait–Monotrait ratio of correlations matrix

	Social factors	Psychological processes	Wellbeing	Mental health problems
Social factors				
Psychological processes	.433			
Wellbeing	.521	.717		
Mental health problems	.418	.750	.809	

CHAPTER 6: RESULTS

6.1 Descriptive Statistics and Normality Assessments

Table 6.1 shows the descriptive statistics and results of the normality assessments (i.e., skewness and kurtosis) for all study variables. The range of values for skewness (from -.669 to 1.115) and kurtosis (from -1.892 to 1.420) were within the acceptable range of values for both tests of normality (between − 3 and + 3, and between − 7 and + 7, respectively; Kline, 2015; Tabachnick & Fidell, 2019).

Table 6.1: Mean, standard deviation, skewness, kurtosis and minimum-maximum range for all variables (N = 635)

	Mean	Standard deviation	Skewness	Kurtosis	Min-max range	Response scales
Biological factors:	.581	.494	-.329	-1.892	0-1	(0) no self-reported familial history of mental illness to (1) self-reported familial history of mental illness
Social factors:						(1) high community integration to (5) low community integration
Soc1	2.097	.926	.766	.278	1-5	
Soc2	1.948	.847	1.017	.851	1-5	
Soc3	2.003	.859	.719	.249	1-5	
Soc4	1.778	.731	1.115	1.420	1-5	
Circumstantial factors:	3.729	2.616	.828	.733	0-14	(0) No recent negative life events or historical life events to (17) maximum number of recent negative life events or historical life events

Table 6.1: Mean, standard deviation, skewness, kurtosis and minimum-maximum range for all variables (N = 635) (Cont'd)

	Mean	Standard deviation	Skewness	Kurtosis	Min-max range	Response scales
Psychological processes:						
Response style:						(1) negative response style to (5) positive response style
Res1	3.101	.970	.118	-.451	1-5	
Res2	2.946	.994	-.066	-.445	1-5	
Res3	2.809	1.006	.114	-.658	1-5	
Attributional style:						(1) 'not at all' due to something about me to (5) 'very much' due to something about me
Att1	3.241	1.163	-.183	-.608	1-5	
Att2	3.309	1.306	-.210	-1.009	1-5	
Behavioural processes:	39.378	10.624	.028	-.457	13-67	(8) minimum score on the act, belong, commit indicators to (69) maximum score on the act, belong, commit indicators
Mental health problems:						
Mhp1	4.561	2.923	-.015	-1.223	0-9	(0) minimum anxiety score to (9) maximum anxiety score
Mhp2	3.537	2.611	.308	-1.148	0-9	(0) minimum depression score to (9) maximum depression score
Wellbeing:						(1) low wellbeing score to (5) high wellbeing score
Wel1	2.991	.899	-.256	-.541	1-5	
Wel2	3.444	.815	-.669	.289	1-5	
Wel3	3.345	.913	-.344	-.520	1-5	
Wel4	3.274	.842	-.426	-.183	1-5	
Wel5	3.591	.825	-.479	-.156	1-5	
Wel6	3.406	.922	-.421	-.378	1-5	
Wel7	3.184	.906	-.261	-.394	1-5	

6.2 Correlation Analysis

Table 6.2 shows the results of the Pearson correlation analysis of the relationships between the study variables. Psychological processes had significant negative relationships with biological factors (r = -0.135, p = 0.008), social factors (r = -0.445, p = 0.001) and circumstantial factors (r = -0.379, p = 0.001). Psychological processes had a significant positive relationship with wellbeing (r = 0.822, p = 0.001) and a significant negative relationship with mental health problems (r = -0.886, p = 0.001).

Table 6.2: Correlation analysis of the relationships between the study variables (N = 635)

	Psychological processes	Behavioural processes	Wellbeing	Mental health problems
Biological factors	-.135**	.019	-.027	.093*
Social factors	-.445**	-.350**	-.449**	.338**
Circumstantial factors	-.379**	.016	-.337**	.464**
Psychological processes	1.000	.147**	.822**	-.886**
Behavioural processes		1.000	.297**	-.249**
Wellbeing			1.000	-.753**
Mental health problems				1.000

Significance testing: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Behavioural processes had a significant negative relationship with social factors (r = -0.350, p = 0.001). The relationships between behavioural processes with biological factors and circumstantial factors were non-significant. Behavioural processes had a significant positive relationship with wellbeing (r = 0.297, p = 0.001) and a significant negative relationship with mental health problems (r = -0.249, p = 0.001). Also,

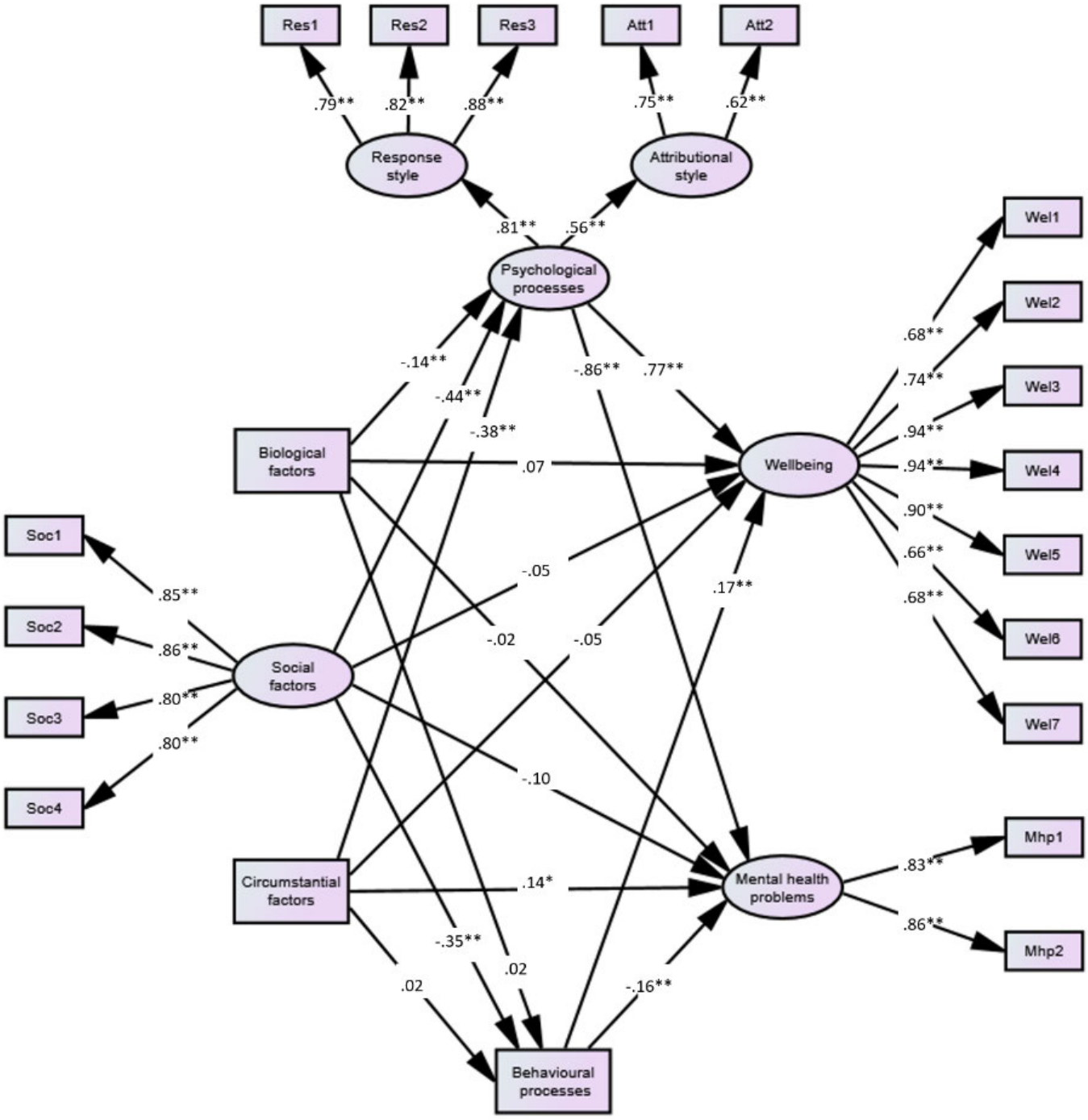
behavioural processes had a significant positive relationship with psychological processes ($r = 0.147$, $p = 0.001$).

Wellbeing had a significant negative relationship with mental health problems ($r = -0.753$, $p = 0.002$).

6.3 Structural Equation Modelling Analyses

The following section presents the findings of the test of the structural model with psychological and behavioural processes as mediators in the relationships between biological, social and circumstantial factors with mental health outcomes (i.e., wellbeing and mental health problems). Figure 6.1 shows the proposed structural equation modelling mediational model, with residual variances omitted for clarity. Examination of the fit index values suggested a good fit of the data: $\chi2(173) = 742.93$, $p < .001$, $\chi2/df = 4.294$, CFI = .936, TLI = .922, IFI = .936, GFI = .898, AGFI = .863, SRMR = .067, and RMSEA (90% CI) = .072 (.067–.077).

Figure 6.1: Path coefficients of the structural research model



Note: Standardised estimates shown. Error terms not shown.

Significance testing: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Tables 6.3 to 6.5 show the results of assessing the structural model. Testing the total effects of biological factors showed that the relationship between biological factors with wellbeing (B = -0.033, p > .05) was not significant, which did not provide support for Hypothesis 1a (see Table 6.3). In the mediation model, the indirect relationship between biological factors with wellbeing (B = 0.004, p > .05) through behavioural processes was not significant, which did not provide support for Hypothesis 1b. However, the indirect relationship between biological factors with mental health problems (B = -.125, p = .007) through psychological processes was significant, which provided support for Hypothesis 1c. In the mediation model, the direct relationship between biological factors with wellbeing (B = 0.089, p > .05) was not significant. This indicated that in this sample there is no relationship between biological factors with wellbeing through behavioural processes, but there is an indirect relationship between biological factors with wellbeing through psychological processes.

Testing the total effects of biological factors showed that there was a significant positive relationship between biological factors with mental health problems (B = 0.437, p = .025), which provided support for Hypothesis 2a. In the mediation model, the indirect relationship between biological factors with mental health problems (B = -0.014, p > .05) through behavioural processes was not significant, which did not provide support for Hypothesis 2b. However, the indirect relationship between biological factors with mental health problems (B = 0.547, p = .008) through psychological processes was significant, which provided support for Hypothesis 2c. In the mediation model, the direct relationship between biological factors with mental health problems (B = -0.095, p > .05) was not significant. This indicated that psychological processes fully mediated the relationship between biological factors with mental health problems.

Table 6.3: Direct and indirect effects of biological factors through psychological and behavioural processes, total effects, and 95% bootstrap confidence intervals (95% CI)

			95% CI	
	Unstandardised estimate	**SE**	**Lower bound**	**Upper bound**
Biological factors → Wellbeing				
Direct effect:	.089^{+}	.047	-.007	.183
Total indirect effect:	-.122*	.051	-.222	-.018
– Indirect effect through psychological processes	-.125**	.048	-.223	-.030
– Indirect effect through behavioural processes	.004	.008	-.011	.021
Total effect:	-.033	.043	-.116	.055
Biological factors → Mental health problems				
Direct effect:	-.095	.200	-.477	.300
Total indirect effect:	.533*	.221	.096	.968
– Indirect effect through psychological processes	.547**	.213	.128	.969
– Indirect effect through behavioural processes	-.014	.030	-.077	.040
Total effect:	.437*	.189	.068	.810

Note: bootstrap standard error (SE).

Significance testing: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; $^{+}p < 0.10$

Testing the total effects of social factors showed that there was a significant negative relationship between social factors with wellbeing (B = -.456, p = .001) and a significant positive relationship between social factors with mental health problems (B = 1.343, p = .001), which provided support for Hypotheses 3a and 4a, respectively (see Table 6.4). In the mediation model, the indirect relationships between social factors with wellbeing (B = -0.059, p = .001) and mental health problems (B = 0.221, p = .001) through behavioural processes were significant, which provided support for Hypotheses 3b and 4b, respectively. In addition, the indirect relationships between social factors with wellbeing (B = -0.346, p = .001) and mental health problems (B = 1.510, p = .001) through psychological processes were significant which provided support for Hypotheses 3c and 4c, respectively. In the mediation model, the direct relationships

between social factors with wellbeing (B = -0.051, p > .05) and mental health problems (B = -0.389, p > .05) were not significant. This indicated that psychological and behavioural processes fully mediated the relationships between social factors with wellbeing and mental health problems. In addition, the mediation analyses indicated that psychological processes was a stronger mediator than behavioural processes in the relationships between social factors with wellbeing and mental health problems.

Table 6.4: Direct and indirect effects of social factors through psychological and behavioural processes, total effects, and 95% bootstrap confidence intervals (95% CI)

			95% CI	
	Unstandardised estimate	**SE**	**Lower bound**	**Upper bound**
Social factors → Wellbeing				
Direct effect:	-.051	.055	-.159	.060
Total indirect effect:	-.406**	.063	-.546	-.300
– Indirect effect through psychological processes	-.346**	.059	-.473	-.249
– Indirect effect through behavioural processes	-.059**	.013	-.088	-.035
Total effect:	-.456**	.063	-.585	-.335
Social factors → Mental health problems				
Direct effect:	-.389	.257	-.901	.085
Total indirect effect:	1.732**	.282	1.244	2.349
– Indirect effect through psychological processes	1.510**	.256	1.077	2.060
– Indirect effect through behavioural processes	.221**	.056	.123	.344
Total effect:	1.343**	.178	1.010	1.709

Note: bootstrap standard error (SE). Significance testing: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Testing the total effects of circumstantial factors showed that there was a significant negative relationship between circumstantial factors with wellbeing (B = -.077, p = .001) and a significant positive relationship between circumstantial factors with mental health problems (B = 0.414, p = .001), which provided support for Hypotheses 5a and 6a (see Table 6.5). In the mediation model, the indirect relationships between

circumstantial factors with wellbeing (B = .001, p > .05) and mental health problems (B = -0.002, p > .05) through behavioural processes were not significant, which did not provide support for Hypotheses 5b and 6b, respectively. However, the indirect relationships between circumstantial factors with wellbeing (B = -0.066, p = .001) and mental health problems (B = 0.289, p = .001) through psychological processes were significant, which provided support for Hypotheses 5c and 6c, respectively. In the mediation model, the direct relationship between circumstantial factors with wellbeing (B = -0.011, p > .05) was not significant, and the direct relationship between circumstantial factors with mental health problems (B = 0.127, p = .011) was still significant. This indicated that psychological processes fully mediated the relationship between circumstantial factors with wellbeing and partially mediated the relationship between circumstantial factors with mental health problems. In addition, the mediation analyses indicated that the indirect path from circumstantial factors to mental health problems through psychological processes was stronger than the direct path.

Analysis of the path from behavioural processes to wellbeing (B = 0.009, p = .001) indicated a significant positive relationship, which supported Hypothesis 7. Analysis of the path from behavioural processes to mental health problems (B = -0.035, p = .001) indicated a significant negative relationship, which supported Hypothesis 8. Table 6.6 shows the results of the hypotheses testing.

The squared multiple correlation indicated that the model explained 71.6% of the variance in wellbeing and 82.8% of the variance in mental health problems.

Table 6.5: Direct and indirect effects of circumstantial factors through psychological and behavioural processes, total effects, and 95% bootstrap confidence intervals (95% CI)

			95% CI	
	Unstandardised estimate	**SE**	**Lower bound**	**Upper bound**
Circumstantial factors → Wellbeing				
Direct effect:	-.011	.012	-.034	.013
Total indirect effect:	-.066**	.011	-.088	-.045
– Indirect effect through psychological processes	-.066**	.011	-.089	-.046
– Indirect effect through behavioural processes	.001	.002	-.002	.004
Total effect:	-.077**	.010	-.098	-.057
Circumstantial factors → Mental health problems				
Direct effect:	.127*	.046	.033	.214
Total indirect effect:	.287**	.045	.201	.377
– Indirect effect through psychological processes	.289**	.044	.203	.382
– Indirect effect through behavioural processes	-.002	.006	-.016	.009
Total effect:	.414**	.036	.343	.483

Note: bootstrap standard error (SE). Significance testing: ***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Table 6.6: Results of the hypotheses testing

Hypothesis	**Decision**
1a: There is a negative relationship between adverse biological factors and wellbeing	Not supported
1b: Behavioural processes mediate the relationship between biological factors and wellbeing	Not supported
1c: Psychological processes mediate the relationship between biological factors and wellbeing	Indirect relationship
2a: There is a positive relationship between adverse biological factors and mental health problems	Supported
2b: Behavioural processes mediate the relationship between biological factors and mental health problems	Not supported
2c: Psychological processes mediate the relationship between biological factors and mental health problems	Supported

Table 6.6: Results of the hypotheses testing (Cont'd)

Hypothesis	Decision
3a: There is a negative relationship between adverse social factors and wellbeing	Supported
3b: Behavioural processes mediate the relationship between social factors and wellbeing	Supported
3c: Psychological processes mediate the relationship between social factors and wellbeing	Supported
4a: There is a positive relationship between adverse social factors and mental health problems	Supported
4b: Behavioural processes mediate the relationship between social factors and mental health problems	Supported
4c: Psychological processes mediate the relationship between social factors and mental health problems	Supported
5a: There is a negative relationship between adverse circumstantial and wellbeing	Supported
5b: Behavioural processes mediate the relationship between circumstantial factors and wellbeing	Not supported
5c: Psychological processes mediate the relationship between circumstantial factors and wellbeing	Supported
6a: There is a positive relationship between adverse circumstantial factors and mental health problems	Supported
6b: Behavioural processes mediate the relationship between circumstantial factors and mental health problems	Not supported
6c: Psychological processes mediate the relationship between circumstantial factors and mental health problems	Supported
7: There is a positive relationship between behavioural processes and wellbeing	Supported
8: There is a negative relationship between behavioural processes and mental health problems	Supported

CHAPTER 7: DISCUSSION, IMPLICATIONS AND CONCLUSIONS

There is a growing number of people with mental health problems in Australia and globally, which has been exacerbated by the COVID-19 pandemic. In addition, the economic cost and burden of disease of mental disorders are considerable. Hence, new insights for prevention and early intervention of mental health problems are needed. This study tested Kinderman et al.'s (2013) revised biopsychosocial model of mental ill-health and assessed via structural equation modelling whether behavioural processes as represented by the Act-Belong-Commit constructs (Donovan et al., 2006) mediate the relationships between biological, social and circumstantial factors on mental health outcomes (i.e., mental health problems and wellbeing).

An online survey of a convenience sample of 635 Australian adults was conducted via Qualtrics. Of the total sample, 32.4% reported having been diagnosed with a specific mental illness, with the proportion significantly higher among females than males (35.5% vs 25.4%). This gender difference is consistent with the Global Burden of Disease study's annual prevalence data on mental disorders in Australia and globally from 1990 to 2019 (Global Burden of Disease, n.d.). In the 2007 National Survey of Mental Health and Wellbeing (Council of Australian Governments, 2013), a higher proportion of Australians (45%) reported that they had a mental disorder at some point in their life. However, respondents in that survey were not specifically asked whether they had been diagnosed with a specific mental illness.

In this study, of the total sample, the most frequent type of mental illness diagnosed was mood disorder (e.g., depression and bi-polar disorder; 25.4%), followed by anxiety

disorder (20.2%). The other types of mental illness were mentioned by 2% of respondents or less. These data on the specific types of mental disorders are in line with the Australian and global data in the Global Burden of Disease (n.d.) study.

Of the total sample, the proportions of respondents with anxiety and depression scores at levels indicating at least a 50% chance of having a clinically important disturbance (Goldberg et al., 1988) were 50.5% and 70.4%, respectively. These proportions are similar to those in Meng et al.'s (2020) study of an occupational group (i.e., medical workers) with elevated levels of anxiety and depression (anxiety: 49.4%; depression: 71.1%).

7.1 Testing the Hypothesised Model

The tested model hypothesised that three variables (i.e., biological, social and circumstantial factors) were predictors of two mental health outcomes (i.e., wellbeing and mental health problems), and that psychological and behavioural processes mediate these relationships. Results from structural equation modelling supported the hypothesised model, and the model explained a large percentage of the variances of wellbeing (71.6%) and mental health problems (82.8%). Most, but not all, of the specific hypothesised relationships were supported.

7.1.1 The impact of biological, social and circumstantial factors on mental health outcomes

Other than the non-significant relationship between biological factors and wellbeing (i.e., Hypothesis 1a was not supported), each of the three variables (i.e., biological,

social and circumstantial factors) were significant predictors of both mental health outcomes (i.e., wellbeing and mental health problems), which supported Hypotheses 2a, 3a, 4a, 5a, and 6a. Social factors and circumstantial factors were stronger predictors of both mental health outcomes than biological factors. These results support Kinderman et al.'s (2013) findings that a family history of mental health problems (biological factors), social deprivation (social factors), and traumatic or abusive life experiences (circumstantial factors) were strongly associated with lower levels of wellbeing and higher levels of anxiety and depression (mental health problems).

These findings are consistent with a large body of research that highlights the importance of each of these factors in relation to mental disorders. Biological factors such as genetics have been shown to be associated with mental disorders in twin studies (Hilker et al., 2018; Kendler et al., 2005; Scaini et al., 2012, 2014; Smoller et al., 2009; Sullivan et al., 2000; Tambs et al., 2009) and family studies (Byrne et al., 2002; Coelho et al., 2007; Klein et al., 2003; Newman & Bland, 2006; Stein et al., 2004). Social factors such as lack of social connections and social isolation have been implicated in mental disorders and lower levels of wellbeing (Chou et al., 2011; Ge et al., 2017; Saeri et al., 2018; Smith & Victor, 2019; Wade & Kendler, 2000; Yu et al., 2015). In addition, longitudinal studies provide support for the pathway from social factors to mental health, and not vice versa (Cacioppo et al., 2010; Saeri et al., 2018; Yu et al., 2015). Circumstantial factors such as abuse and other negative life events have been found to be associated with mental disorders (Chapman et al., 2004; Francis et al., 2012; Gilman et al., 2003; Hammen, 2015; Handley et al., 2019; Hsu, 2011; Kaushal et al., 2017; Kendler et al., 1998; Kessler et al., 1997, 2003; Kraaij et al., 2002; Paykel, 2003; Repetti et al., 2002; Roca et al., 2013; Siegrist, 2008; Stroud et al., 2008; Tibubos et al., 2019; Widom et al., 2007).

7.1.2 Mediating effects of psychological and behavioural processes on biological, social and circumstantial factors

Psychological processes mediated the relationships between biological, social and circumstantial factors with wellbeing and mental health problems, which supported Hypotheses 1c, 2c, 3c, 4c, 5c, and 6c. These results are consistent with the findings in Kinderman et al. (2013) and Michl et al. (2013) that rumination (psychological processes) mediated the relationship between stressful life events (circumstantial factors) and anxiety and depression. Hence, these results provide support for and an empirical test of Kinderman's revised biopsychosocial model of mental ill-health in which the disruption of psychological processes plays a crucial role in the development of mental disorder (Kinderman, 2005; Kinderman et al., 2013).

This study did not find that behavioural processes mediated the relationships between biological and circumstantial factors with the two mental health outcomes, which did not support Hypotheses 1b, 2b, 5b and 6b. However, behavioural processes mediated the relationships between social factors with wellbeing and mental health problems, which supported Hypotheses 3b and 4b. Behavioural processes were represented by the Act-Belong-Commit constructs (Donovan et al., 2006). All of the three behavioural domains (Act, Belong, and Commit) include social factors: 'Act' encourages people to be socially active; 'Belong' encourages people to keep up friendships, engage in group activities, and participate in community events; and 'Commit' encourages volunteering and assisting others. All of these activities involve social interactions. Nevertheless, behavioural processes and social factors are distinct constructs. In this study, behavioural processes was measured in terms of the frequency of engaging in acting,

belonging and committing activities, while social factors was measured in terms of perceived integration in the community.

Behavioural processes had a significant negative relationship with mental health problems and a significant positive relationship with wellbeing, which supported Hypotheses 7 and 8, respectively. These findings were consistent with the correlation analysis data that higher levels of acting-belonging-committing is associated with higher levels of wellbeing and lower levels of mental health problems. Previous studies also provide evidence of the protective effects of acting-belonging-committing in preventing mental health problems (i.e., depression and anxiety) and enhancing wellbeing in the elderly (Santini et al., 2017, 2018), among university students (Ketcham et al., 2020), and adolescents (Santini et al., 2020).

The findings of this study are now discussed in terms of practical implications for policy, clinical practice, the content of mental health promotion programs, and directions for future research.

7.2 Implications for Policy and Clinical Practice

In Australia, government expenditure on mental health-related services as a proportion of the total health expenditure has remained relative stable over the years: 7.3% in 1992-93 when data collection commenced; 7.6% in 2015-16; and 7.6% ($11 billion) in 2019-20 (Australian Institute of Health and Welfare, 2022). According to Rosenberg and Harvey (2021), psychosocial support services represent a small proportion of the total spending on mental health care in Australia.

In 2019, approximately 1.4 million Australians with mental ill-health accessed government-subsidised psychological therapy, mainly via Medicare Benefits Schedule-rebated psychological therapy (approximately 1.3 million people a year) (Productivity Commission, 2020). In that year, these patients spent more than $230 million on co-payments and more than $630 million was paid by taxpayers (Productivity Commission, 2020). It is of concern that there has been no rigorous evaluation of this program to determine what types of psychological therapies are being used and the outcomes of these treatments. Such evaluations are crucial to ensure patients are receiving the most effective psychological therapies based on the current literature. Furthermore, the Medicare Benefits Schedule-rebated psychological therapy is delivered by a range of health professionals (i.e., psychologists, social workers, occupational therapists, and GPs in private practice) with varying expertise in psychological therapies. Recently, all nine governments in Australia have decided to shift most of the funding for psychosocial mental health support services to the National Disability Insurance Scheme (Rosenberg & Harvey, 2021). This is an opportune time to put in place an evaluation framework to assess the impact of psychological therapy services on patient outcomes.

In both this study and Kinderman et al.'s (2013) study, the finding that psychological processes mediated the causal risk factors of mental health problems suggest the prioritising of interventions targeting underlying psychological processes in the treatment of mental disorders. Psychological processes such as rumination are amenable to change. For example, Perestelo-Perez et al.'s (2017) systematic review and meta-analysis of 11 studies (nine randomly controlled trials and two pseudo-randomly controlled trials) found that compared to usual care, mindfulness-based cognitive therapy resulted in a significant and moderate reduction in ruminative thoughts in

patients hospitalised with depression, which mediated the clinical effects of interventions. The effect on rumination was maintained one-month post-treatment regardless of the number of previous depressive episodes or the treatment phase (i.e., acute or maintenance).

There is growing evidence of the efficacy of rumination-focused cognitive behavioural therapy in treating mental disorders (Feldhaus et al., 2020; Spinhoven et al., 2018; Watkins et al., 2011, 2015). For example, in Spinhoven et al.'s (2018) meta-analysis of 36 studies involving 3,307 participants, rumination-focused cognitive behavioural therapy had the most impact on reduction in repetitive negative thinking (i.e., rumination) than other types of interventions (i.e., anti-depressant medication, light therapy, engagement counselling, life review, expressive writing, yoga), and reduction in repetitive negative thinking was strongly associated with a decrease in depression severity. In a recent study, Feldhaus et al. (2020) found that rumination-focused cognitive behavioural therapy reduced anxiety symptoms among adolescents in remission from depression. These studies suggest that rumination-focused cognitive behavioural therapy should be more widely used in the treatment of mental disorders.

Another evidence-based psychological intervention is the Groups 4 Health program (Haslam et al., 2016) that targets the development and maintenance of social group relationships to treat psychological distress arising from social isolation. The 5-module program raises awareness of the ways that group memberships influence health, and develops strategies to harness existing group ties as well as develop new ones to support connectedness. Haslam et al.'s (2016) phase 1 pilot study involving young adults experiencing social isolation and associated psychological distress found that those who received the Groups 4 Health program (N = 83) reported reduced symptoms of

depression, anxiety and loneliness relative to a control group (N = 75), both at program completion and 6-month follow-up. In Haslam et al.'s (2019) phase 2 randomised controlled trial, 120 adults experiencing loneliness in association with clinically severe psychological distress or a diagnosed mental illness were assigned to the Groups 4 Health program or treatment-as-usual. Compared to treatment-as-usual, the program was more effective in reducing social anxiety (and loneliness) and increasing group belonging. In Cruwys et al.'s (2022) phase 3 randomised controlled trial, 174 people aged 15 to 25 years who were experiencing loneliness and clinically significant symptoms of depression were assigned to the Groups 4 Health program or cognitive behavioural therapy. The trial found that both the program and cognitive behavioural therapy were effective in reducing depression symptoms. As stated by the authors, the effect sizes were greater than the average reported in García-Escalera et al.'s (2016) meta-analysis of cognitive behavioural therapy and Weisz et al.'s (2006) meta-analysis of psychotherapy, which may be partly due to the controlled setting of the trial (e.g., manualised nature of the treatments, monitoring of facilitator adherence, and the group-based format). However, Cuijpers (2017) reviewed a series of meta-analyses that he and his colleagues conducted on approximately 500 randomised trials that have examined the effects of psychological treatments (e.g., cognitive behaviour therapy, behavioural activation therapy, interpersonal psychotherapy, problem-solving therapy, nondirective supportive therapy, short-term psychodynamic psychotherapy) of adult depression and concluded that all psychological treatments are effective and there are no significant differences between treatments. Hence, he cautioned against developing new psychotherapies for depression because all new therapies examined in the randomised trials appeared to be effective in the treatment of depression, but not more so than existing therapies. Nevertheless, research into the development of evidence-based

psychological interventions such as these are essential, particularly with a call to give a higher priority to interventions that target psychological processes.

Currently, the emphasis on recovery is focused on psychological therapies and pharmacological interventions. The findings of this study that behavioural processes are associated with wellbeing and mental health problems suggest that behavioural interventions could be useful in assisting recovery from mental disorders. A promising approach is the Act-Belong-Commit in Recovery project (Wedin et al., 2016) that applies the Act-Belong-Commit concepts to enhance recovery and prevent relapse by empowering individuals recovering from mental illness to engage proactively in behaviours conducive to building good mental health (e.g., get active, engage in the community, and find meaningful things to do). As part of this project, mental health professionals and other support workers who assist patients in their recovery were provided training on the principles of the Act-Belong-Commit concepts and how it can be used as a positive framework to support patients in the recovery process. A rigorous evaluation of the project has not been conducted. However, in a follow-up survey of a small sample (N = 35) of health professionals who attended the Act-Belong-Commit in Recovery workshops, the vast majority (91%) reported using the Act-Belong-Commit message with their patients (Wedin et al., 2016). In addition, among a small sample of patients (N = 13) who attended an Act-Belong-Commit in Recovery workshop and were encouraged to complete the Act-Belong-Commit *Guide to Keeping Mentally Healthy*, there was a relationship between benefiting from the intervention as a function of engagement with the Guide (Wedin et al., 2016). That is, the more a patient read the Guide, the more likely they were to report an increase in their mental health, quality of life, ability to get on with others and overall mental health. None of these patients reported a decreased on these four measures.

In January/February 2022, the Australian Psychological Society conducted a national survey of its members (Australian Psychological Society, 2022). Of the total sample (N = 1,456), 88% of psychologists reported an increase in demand for their services since the start of the COVID-19 pandemic. Due to this increase in demand, one in three psychologists were unable to take on new clients, which is up from one in five psychologists in June 2021 and one in 100 psychologists prior to the pandemic. According to an Australian Government Productivity Commission report (Productivity Commission, 2020), the number of psychiatrists for Australia's population is low compared to other developed countries. In addition, access to psychiatric care is constrained, with high costs, lack of specialists and long wait times in some areas. A shortage in mental health professionals is also evident in other countries (Ku et al., 2021; Rimmer, 2021; Royal College of Psychiatrists, 2021). Given the shortage of psychologists and other health professionals in treating people with a mental disorder, evidence-based interventions to prevent mental disorders are of increasing importance.

7.3 Implications for Mental Health Promotion Interventions

As discussed in Chapter 1, the burden of disease associated with mental disorders is considerable. A number of international health organisations and countries around the world have emphasised the need for the promotion of mental health and the prevention of mental disorders. The World Health Organization's *Comprehensive Mental Health Action Plan 2013–2030* (World Health Organization, 2021) consists of four major objectives, one of which is the implementation of strategies for promotion and prevention of mental health. In 2015, the United Nations included mental health in its Sustainable Development Goals (Votruba et al., 2016). Specifically, a key target under

the “Good health and wellbeing” goal is the promotion of mental health and wellbeing to reduce premature mortality from non-communicable diseases.

This study’s findings provide a theoretical framework and empirical validation for the adoption of mental health promotion interventions that focus on increasing engagement in behaviours that can prevent mental illness and enhance wellbeing such as the Act-Belong-Commit campaign. Act-Belong-Commit utilises a behavioural intervention with an underlying focus on increasing behaviours that both the literature and the general public consider contribute to good mental health. The intervention does not require trained specialist health professionals, and therefore is not associated with major additional costs to the healthcare system. In addition, the cost of implementation of Act-Belong-Commit is substantially lower than the costs of treating people with mental disorders. To illustrate, the Act-Belong-Commit campaign in Western Australia receives up to $1 million in funding a year (Healthway, 2021; Mental Health Commission, 2020), and the Danish Ministry of Health provided approximately $1 million to adapt and pilot Act-Belong-Commit in Denmark (Koushede et al., 2015). In contrast, as stated above, just the costs of Australian government-subsidised psychological therapy via the Medicare Benefits Schedule was more than $630 million in 2019 (Productivity Commission, 2020).

Despite the Act-Belong-Commit campaign being prevention-focused, Donovan et al.’s (2016) study found that the campaign empowers people with a mental illness or who recently sought help to take actions to enhance their mental health. Hence, it appears that population-wide mental health promotion campaigns can affect the mental health and wellbeing of not only the general population, but also those with a diagnosed mental illness or experiencing a mental health problem. Consistent with this view,

Handley et al. (2019) suggest that community-based programs such as Act-Belong-Commit that encourage involvement in local activities may be beneficial for individuals with mild depressive symptoms to maintain their mental health.

7.4 Limitations and Future Research

This study has some limitations that provide opportunities for future research. First, a convenience sampling method was used to recruit respondents mainly from one Australian state (i.e., Western Australia), which limits the generalisability of the findings. In addition, it is estimated that approximately one in four respondents were recruited via promotion of the online survey by Act-Belong-Commit partners. There were insufficient numbers to conduct multigroup analysis to test the hypothesised model among these respondents versus other respondents. Therefore, future studies could survey a representative sample of the Australian population and international samples to provide cross-cultural research to confirm (and extend) the current findings.

Second, the cross-sectional nature of the data limits the causal conclusions that can be drawn from the results. Conducting longitudinal studies to validate these cross-sectional findings and make assertions about cause-and-effect relationships is suggested for future studies.

Third, the behavioural processes component of the hypothesised model was represented in terms of the overall level of frequency of engaging in acting, belonging and committing activities. Future studies with sufficient sample size may model these three activities as a second-order construct in the measurement model. In addition,

behavioural processes could be represented by measures that are not associated with a mental health promotion program.

Fourth, self-report measures were used to collect the data. Future studies may consider combining self-report data with objective measures to provide a more comprehensive measure of the research constructs. For example, the use of smartphones and fitness trackers to collect passive sensing data (e.g., physical activity, communication, sleep, and movement patterns) to provide indicators for not only the behavioural processes construct, but also, the mental health problems construct. The feasibility of the latter is demonstrated in a recent study by Chikersal et al. (2021). Their analysis of the data from smartphones and fitness trackers of 138 college students in the United States identified students who experienced depressive symptoms at the end of a semester with 85.7% accuracy, and students whose depressive symptoms worsened over a semester with 85.4% accuracy.

7.5 Conclusions

This study tested a hypothesised research model in which the effects of biological, social and circumstantial factors on mental health problems and wellbeing are mediated by psychological and behavioural processes. Data on all the constructs in the hypothesised model were collected via a cross-sectional online survey of 635 Australian adults. Results from structural equation modelling supported the hypothesised model, and the model explained a large percentage of the variances of mental health problems and wellbeing.

The major findings of this thesis were that psychological processes mediated the relationships between biological, social and circumstantial factors with mental health problems and wellbeing, and behavioural processes mediated the relationships between social factors with wellbeing and mental health problems. In addition, behavioural processes had a significant positive relationship with wellbeing and a significant negative relationship with mental health problems. These findings have important implications for policy and practice. Higher priority should be given to psychological therapies in treating people with mental disorders. Furthermore, there is a need to develop interventions that directly target the underlying psychological mechanisms implicated in mental disorders. In addition, these findings provide support for mental health promotion interventions such as the Act-Belong-Commit campaign that focus on increasing engagement in behaviours that can prevent mental illness and enhance wellbeing.

Overall, the findings of this study supported Kinderman et al.'s (2013) revised biopsychosocial model of mental ill-health among a sample of Australian adults and provided evidence that behavioural processes fit into this theoretical framework designed to explain mental health problems and wellbeing. This study is the first test of Kinderman et al.'s (2013) model outside the United Kingdom.

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Appendix 1: The Questionnaire

SURVEY ON MENTAL HEALTH AND WELLBEING

Thank you for agreeing to participate in this survey. This study aims to investigate factors that contribute to good mental health and well-being in the Australian population, as well as factors that contribute to mental ill-health. It is being conducted by Jacintha Hee as part of a requirement for her Doctoral thesis at Curtin University. With the growing number of people with mental health problems in Australia, and the associated rising economic cost and loss of human life, new insights for prevention and early intervention for mental health problems are needed. Your help and support in this research study is greatly appreciated as this study could offer new understanding to enhance people's mental health. For completing the survey, you are eligible to go into a draw to win $50. There are 5 prizes of $50 to be won.

Procedure and confidentiality

Your participation in this study is completely voluntary. The survey will take approximately 25 minutes to complete. It will ask questions regarding your physical and mental health, well-being, life stressors, and the extent to which you engage in various everyday activities. All the information you provide will be kept confidential. You will not be able to be identified. The findings of the research will be reported in a manner which prevents identification of any participant. We will only report on combined information.

Contacts

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC2017-0169). Should you wish to discuss the study with someone not directly involved, in particular any matters concerning the conduct of the study or your rights as a participant, or if you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093, or email hrec@curtin.edu.au.

If you, or someone you know would like to talk confidentially over the telephone with a trained counsellor regarding a personal crisis we suggest you call Lifeline on 13 11 14. Lifeline is available from anywhere in Australia 24 hours a day (toll free) and provides crisis counselling, information and referral services. To talk to someone about trauma and abuse, we suggest you call Blue Knot Helpline on 1300 657 380 between 9am to 5pm on any day of the week. If you want advice on how to keep more mentally healthy, you could visit the Act-Belong-Commit website (actbelongcommit.org.au). Should you have any questions about this research please contact Dr Chad Lin on (08)92661872 or c.lin@.curtin.edu.au. Also, if you need help to answer the questions, please feel free to get help.

Please click on the "Start" button to begin the survey.

Q1. Into which of these age groups do you fall?

- O Below 18 years
- O 18-24 years
- O 25-29 years
- O 30-39 years
- O 40-49 years
- O 50-59 years
- O 60-69 years
- O 70 years or over

If "Below 18 years" in Q1:
Thank you for your interest in this survey. Unfortunately we are looking for people aged 18 and above. Please visit the Act-Belong-Commit website (actbelongcommit.org.au) if you are interested in keeping mentally healthy. Thanks again.

Q2. Do you have a physical disability?

- O Yes
- O No

Q3. Do you have any person assisting you with your self-care, shopping or other daily activities?

O Yes

O No

Q4. What is the level of assistance you require?

O Minimal assistance: 25% or less of the time

O Moderate assistance: 26% to 50% of the time

O Maximum assistance: over 50% of the time

Q5. Do you have a cognitive disability?

O Yes

O No

Now a few questions about how active you are.

Q6. Apart from your job and household tasks, how often do you do something physically active? For example, walking, gardening, dancing, golfing, swimming, jogging, etc.

O Less than monthly

O Monthly

O Once a week

O 2 to 3 times weekly

O 4 to 6 times weekly

O Daily

Q7. Apart from your job, how often do you do something requiring thinking and concentration? For example, read, paint, learn something, do a crossword puzzle, play video games, etc.

O Less than monthly

O Monthly

O Once a week

O 2 to 3 times weekly

O 4 to 6 times weekly

O Daily

Q8. Apart from at work and with members of your household, how often do you have contact with other people where you stop for a chat, talk on the phone or chat online?

O Less than monthly

O Monthly

O Once a week

O 2 to 3 times weekly

O 4 to 6 times weekly

O Daily

Q9. How often do you engage in spiritual activities like attending a service, meeting with others for a spiritual purpose, meditating, reflecting on the meaning of life or the natural world?

O Once a year or less

O Once every 4 to 6 months

O Once every 2 to 3 months

O 1 to 2 times a month

O 3 to 4 times a month

O Weekly

Here are two events to imagine yourself in and then answer some questions. In the first event a friend makes an insulting remark to you; in the second, a friend refuse to help you. Please imagine yourself in each of the events when you answer the questions.

Event 1:
A friend made an insulting remark to you. You were at a party with a group of friends that you haven't seen for a long time. It was getting late in the evening and some of the group had quite a lot to drink. You thought that you were all getting on well; it was noisy and there were lots of jokes and a lot of laughter. But then one of your friends made an insulting remark about you.

Q10. Think of who or what was the main cause of your friend making an insulting remark to you. How much is the cause of your friend making an insulting remark to you:

	Not at all 1	2	Somewhat 3	4	Very much 5
a) Due to something about you	O	O	O	O	O
b) Due to another person or other people	O	O	O	O	O
c) Due to situational or circumstantial factors	O	O	O	O	O

Event 2:
A friend refused to help you. You were very busy at work, and also had a lot of jobs to do at home – cleaning, decorating, gardening, etc. You thought it would be a good idea to ask a friend to give you a lift to the shopping centre but your friend refused to help, saying they were also busy.

Q11. Think of who or what was the main cause of your friend refusing to help you. How much is the cause of your friend refusing to help you:

	Not at all 1	2	Somewhat 3	4	Very much 5
a) Due to something about you	O	O	O	O	O
b) Due to another person or other people	O	O	O	O	O
c) Due to situational or circumstantial factors	O	O	O	O	O

Now a little more about what you do.

Q12. How often do you get together with a group of friends, workmates or family for outings, meals or special events?

- O Once a year or less
- O A few times a year
- O Every few months
- O Monthly
- O Weekly or more

Q13. How often do you attend community events? For example, music festivals, theatre, markets, local sporting events, school fairs, residents' meetings, local government events, local business groups, local 'clean up' events, etc.

- O Once a year or less
- O A few times a year
- O Every few months
- O Monthly
- O Weekly or more

Q14. Do you belong to any formal or informal specific interest groups, clubs or organisations? For example, sports club, car club, book club, fitness group, dance class, theatre group, social club, cooking group, card group, hobby group, cultural or ethnic group, etc.

- O Yes
- O No

Q15. How often do you attend or have contact with members of any of these groups?

- O Once a year or less
- O A few times a year
- O Every few months
- O Monthly
- O Weekly or more

Q16. How often do you attend large public events such as major sporting fixtures, major musical events, or any events where there are very large crowds?

O Once a year or less

O A few times a year

O Every few months

O Monthly

O Weekly or more

Here are two more events to imagine yourself in and then answer some questions.

Event 3:
You are at work. In the middle of the afternoon, your best friend calls. They have split up with their partner and need a shoulder to cry on. You ask your boss if you can leave early. Your boss reminds you that they are expecting an important report on their desk first thing in the morning. You finish the report as quickly as you can, and send it to your boss. The following morning your boss hauls you into the office and complains that the report contains some spelling mistakes.

Q17. Think of who or what was the main cause of you receiving that complaint. How much is the cause of you receiving that complaint:

	Not at all 1	2	Somewhat 3	4	Very much 5
a) Due to something about you	O	O	O	O	O
b) Due to another person or other people	O	O	O	O	O
c) Due to situational or circumstantial factors	O	O	O	O	O

Event 4:
You have been looking for a job unsuccessfully for some time. You have sent off several letters to firms that are recruiting staff, and have attended a few interviews. But each time they pick another candidate. You've been getting advice on how to write your CV and interview tips from friends. You feel you have experience and skills, but in the current economic difficulties, you have yet to be successful in getting a job.

Q18. Think of who or what was the main cause of you being unsuccessful in your search for a job. How much is the cause of you not getting a job:

	Not at all 1	2	Somewhat 3	4	Very much 5
a) Due to something about you	O	O	O	O	O
b) Due to another person or other people	O	O	O	O	O
c) Due to situational or circumstantial factors	O	O	O	O	O

Q19. Are you doing anything challenging at the moment? For example, learning a language, making something for the house, enrolled in a course, training for a fun run or competitive sport, learning a new skill like music or painting, etc.

O Yes

O No

Q20. How often do you do this challenging activity?

O Once a year or less

O A few times a year

O Every few months

O Monthly

O Weekly or more

Q21. Do you hold any committee or office roles in any groups? For example, are you the treasurer, a committee member, organiser, president, vice-president, secretary, and so on in any group.

O Yes

O No

O I am not a member of any groups

Q22. Are you actively involved with an activist or cause-related group seeking additional resources, legislative or policy change? For example, for disadvantaged groups, environmental preservation, etc.

O Yes

O No

Q23. How often do you do something as part of that group?

O Once a year or less

O A few times a year

O Every few months

O Monthly

O Weekly or more

Q24. Are you a volunteer for any charitable organisations, community groups, health or social welfare organisations, or other non-government organisations? For example, coaching a sporting team, mentoring a colleague, volunteer for Red Cross, meals on wheels, etc.

O Yes

O No

Q25. How often do you do this volunteer activity?

O Once a year or less

O A few times a year

O Every few months

O Monthly

O Weekly or more

Q26. Apart from any formal volunteering work, how often do you do something to help someone? For example, help a neighbour, cook a meal or clean for a sick friend, help students with projects, etc.

O Once a year or less

O A few times a year

O Every few months

O Monthly

O Weekly or more

Here are two more events to imagine yourself in and then answer some questions.

Event 5:
You can't get all the work done that other people expect of you. The firm that you work for has been struggling to deal with a backlog of orders, and you and your colleagues have been under pressure. You have been struggling to keep up, but you haven't been well recently, and you find it difficult. Your colleagues aren't sympathetic, because the work has to be shared between you all.

Q27. Think of who or what was the main cause of you not being able to get all the work done that other people expect of you. How much is the cause of you not being able to get all the work done that other people expect of you:

	Not at all 1	2	Somewhat 3	4	Very much 5
a) Due to something about you	O	O	O	O	O
b) Due to another person or other people	O	O	O	O	O
c) Due to situational or circumstantial factors	O	O	O	O	O

Event 6:
A friend ignored you. You had gone shopping to a local shopping mall. It was a typical Saturday afternoon – quite busy, and everybody seemed to be struggling with huge bags. You noticed a friend a little way away. You are pretty sure they saw and recognised you too – you made eye-contact and there was a flash of recognition. But when you moved towards your friend, they just walked away without speaking to you.

Q28. Think of who or what was the main cause of your friend ignoring you. How much is the cause of your friend ignoring you:

	Not at all 1	2	Somewhat 3	4	Very much 5
a) Due to something about you	O	O	O	O	O
b) Due to another person or other people	O	O	O	O	O
c) Due to situational or circumstantial factors	O	O	O	O	O

Q29. People think and do many different things when they feel depressed. Please indicate what you generally do when you feel down, sad or depressed.

	Never	Almost never	Sometimes	Often	Almost always
a) Think about your shortcomings, failings, faults, mistakes?	O	O	O	O	O
b) Think about how angry you are with yourself?	O	O	O	O	O
c) Think about how passive and unmotivated you feel?	O	O	O	O	O
d) Try to understand yourself by focusing on your depressed feelings?	O	O	O	O	O
e) Isolate yourself and think about the reasons why you feel sad?	O	O	O	O	O
f) Think about how you don't feel up to doing anything anymore?	O	O	O	O	O
g) Do something that has made you feel better in the past?	O	O	O	O	O
h) Think 'I'm going to do something to make myself feel better'?	O	O	O	O	O
i) Make a plan to overcome a problem?	O	O	O	O	O
j) Remind yourself that these feelings won't last?	O	O	O	O	O
k) Drink alcohol excessively?	O	O	O	O	O
l) Take recreational drugs?	O	O	O	O	O
m) Do something reckless or dangerous?	O	O	O	O	O
n) Try to initiate new relationships with strangers?	O	O	O	O	O

Q30. Think about how you have been feeling over the past month. Decide whether or not the following statements apply to how you have been feeling.

	Yes	No
a) Have you felt keyed up, on edge?	O	O
b) Have you been worrying a lot?	O	O
c) Have you been irritable?	O	O
d) Have you had difficulty relaxing?	O	O
e) Have you been sleeping poorly?	O	O
f) Have you had headaches or neck aches?	O	O
g) Have you had any of the following: trembling, tingling, dizzy spells, sweating, diarrhoea?	O	O
h) Have you been worried about your health?	O	O
i) Have you had difficulty falling asleep?	O	O
j) Have you had low energy?	O	O
k) Have you had loss of interests?	O	O
l) Have you lost confidence in yourself?	O	O
m) Have you felt hopeless?	O	O
n) Have you had difficulty concentrating?	O	O
o) Have you lost weight (due to poor appetite)?	O	O
p) Have you been waking early?	O	O
q) Have you felt slowed up?	O	O
r) Have you tended to feel worse in the mornings?	O	O

Q31. The following questions ask how you feel about the general quality of your life, health, or other areas which might be important to you. Please choose the answer that appears most appropriate.

	Not at all	A little	Moderately	Very much	Extremely
a) Are you satisfied with your physical health?	O	O	O	O	O
b) Are you satisfied with the quality of your sleep?	O	O	O	O	O
c) Are you satisfied with your ability to perform your daily living activities?	O	O	O	O	O
d) Are you satisfied with your ability to work?	O	O	O	O	O
e) Do you feel depressed or anxious?	O	O	O	O	O
f) Do you feel that you are able to enjoy life?	O	O	O	O	O
g) Do you feel you have a purpose in life?	O	O	O	O	O
h) Do you feel in control over your life?	O	O	O	O	O
i) Do you feel optimistic about the future?	O	O	O	O	O
j) Do you feel satisfied with yourself as a person?	O	O	O	O	O
k) Are you satisfied about your looks and appearance?	O	O	O	O	O
l) Do you feel able to live your life the way you want?	O	O	O	O	O
m) Are you confident in your own opinions and beliefs?	O	O	O	O	O
n) Do you feel able to do the things you choose to do?	O	O	O	O	O
o) Do you feel able to grow and develop as a person?	O	O	O	O	O
p) Are you satisfied with yourself and your achievements?	O	O	O	O	O
q) Are you satisfied with your personal and family life?	O	O	O	O	O

	Not at all	A little	Moderately	Very much	Extremely
r) Are you satisfied with your friendships and personal relationships?	O	O	O	O	O
s) Are you comfortable about the way in which you relate to and connect with others?	O	O	O	O	O
t) Are you satisfied with your sex life?	O	O	O	O	O
u) Are you able to ask someone for help with a problem if you needed to?	O	O	O	O	O
v) Do you feel confident that you have enough money to meet your needs?	O	O	O	O	O
w) Are you satisfied with your opportunity for exercise and leisure activities?	O	O	O	O	O
x) Are you satisfied with your access to health services?	O	O	O	O	O

Q32. Now a little more about you and your community. Please choose the answer that appears most appropriate in your case.

	Strongly agree	Somewhat agree	Neutral	Somewhat disagree	Strongly disagree
a) I feel like a part of this neighbourhood/town, like I belong here	O	O	O	O	O
b) I know my way around this neighbourhood/town	O	O	O	O	O
c) I know the rules in this neighbourhood/town and can fit in with them	O	O	O	O	O
d) I feel that I am accepted in this neighbourhood/town	O	O	O	O	O
e) I can be independent in this neighbourhood/town	O	O	O	O	O
f) I like where I am living now	O	O	O	O	O
g) There are people I feel close to in this neighbourhood/town	O	O	O	O	O
h) I know a number of people in this neighbourhood/town well enough to say hello and have them say hello back	O	O	O	O	O
i) There are things I can do in this neighbourhood/town for fun in my free time	O	O	O	O	O
j) I have something to do in this neighbourhood/town during the main part of the day that is useful and productive	O	O	O	O	O

Q33. Read each of the events listed below, and select any event that has occurred in your life in the past six months.

	Yes	No
a) You yourself suffered a serious illness, injury or an assault	O	O
b) A serious illness, injury or assault happened to a close relative	O	O
c) Your parent, child or spouse died	O	O
d) A close family friend or another relative (aunt, cousin, grandparent) died	O	O
e) You had a separation due to marital difficulties	O	O
f) You broke off a steady relationship	O	O
g) You had a serious problem with a close friend, neighbour or relative	O	O
h) You became unemployed or you were seeking work unsuccessfully for more than one month	O	O
i) You were sacked from your job	O	O
j) You had a major financial crisis	O	O
k) You had problems with the police and a court appearance	O	O
l) Something you valued very much was lost or stolen	O	O

Q34. The next few questions are about personal matters (e.g., past abuse, past bullying) that some people find difficult. You are NOT required to answer the following questions.

But if you are happy to proceed, please click on the "OK" button.

O OK

O Skip

Q35. In the past, how often did the following occur?

	Never	Once	A few times	Many times	Over many years	I do not know	I do not want to answer
a) I was bullied at school.	O	O	O	O	O	O	O
b) I was bullied at work.	O	O	O	O	O	O	O
c) I was physically abused.	O	O	O	O	O	O	O
d) I was sexually abused.	O	O	O	O	O	O	O
e) I was emotionally abused.	O	O	O	O	O	O	O

Q36. We are interested in whether there is a history of psychological problems in your family; that is, the people that you are biologically related to. Which of the following people in your family have had mental health problems (for example, have seen a psychiatrist or psychologist)? Please select all that apply.

O Mother

O Father

O One brother or sister

O More than one brother or sister

O An uncle, aunt or cousin

O None of these

Q37. In the past 12 months or so have you seen a counsellor, doctor, psychologist or psychiatrist because of a mental health problem?

O Yes

O No

Q38. Have you ever been diagnosed with a specific mental illness?

O Yes

O No

Q39. What type of mental illness? Please select all that apply.

- O Mood disorder. For example, depression, bipolar disorder, etc.
- O Anxiety disorder. For example, generalised anxiety disorder, panic disorder, post traumatic stress disorder, obsessive compulsive disorder, etc.
- O Psychotic disorder. For example, schizophrenia, delusional disorder, etc.
- O Addictions. For example, substance addiction, behavioural addiction, etc.
- O Other (Please specify): _____

Q40. What is your sex?

- O Male
- O Female
- O Other (Please specify): _____
- O I prefer not to answer

Q41. Are you currently…? Please select <u>all</u> that apply.

- O Working full time
- O Working part time
- O Studying full time
- O Studying part time
- O Full-time home duties
- O Unemployed
- O Retired or aged pension
- O Sickness, invalid or disability pension

Q42. What is the <u>highest</u> education level that you have achieved?

- O Never attended school
- O Primary school only
- O Secondary school up to Year 10
- O Secondary school Year 11 or 12 / TEE / TAE
- O Trade qualifications
- O TAFE qualification
- O University degree
- O Other (Please specify): _____

Q43. Do you identify yourself as a person of Aboriginal or Torres Strait Islander background?

O Yes

O No

O I don't want to answer

Q44. What is your relationship status?

O Married

O Living with someone

O In a relationship but not living together

O Divorced

O Separated

O Widowed

O Single

Q45. What is your postcode? If you don't know, could you please tell me the suburb in which you live?

_____

Q46. Lastly, if you received help to complete this questionnaire, how much help did someone else give you?

O Did not get any help

O A little

O A moderate amount

O A lot

That is the end of the questions. Thank you for your participation in this survey. If you, or someone you know would like to talk confidentially over the telephone with a trained counsellor regarding a personal crisis we suggest you call Lifeline on 13 11 14. Lifeline is available from anywhere in Australia 24 hours a day (toll free) and provide crisis counselling, information and referral services. To talk to someone about trauma and abuse, we suggest you call Blue Knot Helpline on 1300 657 380 between 9am to 5pm on any day of the week. You could also visit the Act-Belong-Commit website (actbelongcommit.org.au) for tips on how to keep more mentally healthy. Thanks again.
