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## The Stress Process Model for Community-Dwelling Adults with Mental Disorders

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A thesis submitted in partial fulfillment of the requirements for the Master of Science degree in Epidemiology and Biostatistics

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THE STRESS PROCESS MODEL FOR COMMUNITY-DWELLING ADULTS WITH  
MENTAL DISORDERS

(Thesis format: Integrated-Article)

by

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Graduate Program in Epidemiology and Biostatistics

A thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Science in Epidemiology and Biostatistics

The School of Graduate and Postdoctoral Studies  
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London, Ontario, Canada

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## Abstract

**Background:** Although stress has been linked to poor mental health outcomes for various populations, less is known about the impact of stress on individuals already diagnosed with mental disorders. **Objective:** Explore the association between stress and general psychological distress (GPD), using the stress process model. **Design:** Data were collected in 2011 from community-dwelling adults who have had at least one diagnosed mental disorder for at least one year in their lifetime (n=380), and are cross-sectional in nature. Multivariable linear regression was used to assess the association between stress and GPD, with various psychological resources, such as coping, social support, and mastery, tested as potential mediators or moderators. **Results:** Stress is significantly associated with GPD, and when all psychological resources are considered together, they mediate, but do not moderate, this association. **Conclusions:** The stress process model applies to individuals with mental disorders, although with different mediators compared to the general population.

## Keywords

Mental health, mental illness, stress process, coping, social support, mastery, distress, stress, cross-sectional studies, mediation, moderation, linear regression, community-university research

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## List of Abbreviations

CBT	Cognitive behavioural therapy
CCHS 1.2	Canadian Community Health Survey Cycle 1.2 on mental health and well-being
CIDI-SF	Composite International Diagnostic Interview Short Form
CURA	Community-University Research Alliance: Poverty and Social Inclusion program
DSM-5	Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
EFA	Exploratory factor analysis
GPD	General psychological distress
K6	Kessler 6 distress scale
K10	Kessler 10 distress scale
NPHS	National Population Health Survey
PAR	Participatory action research
PCA	Principal components analysis
PHAC	Public Health Agency of Canada
PTSD	Post-traumatic stress disorder
QOL	Quality of life
RCT	Randomized controlled trial
SMI	Serious mental illness
WHO	World Health Organization

## Chapter 1

### 1 Introduction

#### 1.1 Introduction

Mental illness is a growing public health concern, both worldwide and in Canada (Health Canada, 2002; World Health Organization, 2014). Mental disorders represent a leading cause of disability (Whiteford et al., 2013), and because of this heavy burden, it is imperative that health research focus on ways in which mental health symptoms can be alleviated for individuals diagnosed with mental disorders.

Research into the process by which stress affects mental health may add to our understanding of the mental health of individuals with diagnosed mental disorders. The ‘stress process model’ theorizes that individuals of different social statuses are exposed to different levels of stress, which can lead to psychological outcomes. This relationship can be affected by an individual’s psychological resources, including coping skills, social support, and their perceived level of control in life. The stress process model suggests that varying levels of stress can lead to increased mental health issues, and is an explanation for mental health disparities across social status (Avison & Thomas, 2010; Pearlin, Menaghan, Lieberman, & Mullan, 1981).

Although the association between stress and mental health has been well-established for the population at large, much less is known about the way in which stress impacts the mental health of those already diagnosed with mental disorders. Specifically, less is known about the particular mediating or moderating effects of psychological resources on the association between stress and mental health, particularly coping.

A wealth of research stemming from the Transaction Model of Stress and Coping (Lazarus & Folkman, 1984) demonstrates that three coping styles exist among the general population – problem-oriented coping, emotion-oriented coping, and avoidance (Billings & Moos, 1984; Folkman & Lazarus, 1980; Folkman, Lazarus, Dunkelschetter, DeLongis, & Gruen, 1986; Roybyrne et al., 1992). However, despite the vast amount of research in

the field of coping, much less is known about the styles of coping used by individuals with mental disorders, and what effect these types of coping may have on the relationship between stress and mental health for this population. Furthermore, the limited research that does exist often consists of referred samples recruited from clinical settings, which may not represent the true population of individuals living with mental disorders in the community.

In order to help address gaps in the stress process literature, this thesis aimed to answer two research questions. First, how well does the stress process model apply to community-dwelling adults who have been diagnosed with a mental disorder of any type? Second, what coping styles are used by this population, and how do these coping styles differ from those used by the population at large?

Answers to these questions will add to our understanding of the effect of stress on the mental health of this already disadvantaged group. It may also help to better understand which psychological resources may lead to more evidence-based interventions for alleviating the effects of stress for individuals burdened with mental disorders.

This thesis follows an Integrated Article format, and is organized as follows: Chapter 2, a detailed review of the literature on stress, coping, and the stress process model, is followed by Chapter 3, a brief statement of objectives and hypotheses. Chapter 4 contains an exposition of the methods in greater detail than is permitted in a peer reviewed manuscript, a version of which forms Chapter 5. The thesis ends with discussion and conclusions in Chapter 6.

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## Chapter 2

### 2 Literature Review

This literature review is intended to describe the stress process model and how it applies to those diagnosed with mental disorders. Specifically, this chapter explains the impact of stress on the mental health of the general population, before focusing on the impact of stress on those already diagnosed with mental disorders. Of particular focus are methods of coping, which are discussed for both the general population as well as those with mental disorders. This review identifies gaps in the literature, discusses the contribution of a community-based sample with a variety of mental disorders to the study of stress and coping, and orients the reader to the topic of stress, coping, and mental health.

#### 2.1 A Description of Mental Disorders

Mental disorders represent a serious public health concern, both worldwide and in a Canadian context. From an international perspective, the World Health Organization (WHO) estimates that over 450 million people suffer from a mental disorder worldwide (World Health Organization, 2014), with mental and substance use disorders contributing more years lived with a disability than any other disorder (Whiteford et al., 2013). In a Canadian context, the Public Health Agency of Canada estimated the lifetime prevalence of mental disorders to be approximately twenty percent in 2002, with anxiety and mood disorders as the most common types of mental disorders (Health Canada, 2002). As prevalence levels – and associated costs – rise, so too do questions regarding how mental health for individuals with mental disorders can be improved. Although different studies use various methods to detect mental disorders, this thesis will rely on self-report on a diagnosed mental disorder.

There are various types of treatment available for individuals with mental disorders, including pharmacological and behavioural therapies (Health Canada, 2002). Although pharmacological treatments show promise, so too do treatments that seek to improve the cognitive processes of those with mental disorders. Such behavioural

treatments involve helping those with mental disorders to deal effectively with stressors, which have been shown to be associated with poor mental health outcomes. Coping strategies have been suggested to affect the relationship between stress and mental health, and interventions intended to improve coping skills have been suggested as an effective treatment – alone or in combination with other treatments – to alleviate the burden on those with mental disorders (Grinage, 2003; Moore, 2012; Temple, 2004).

## 2.2 Stress, Coping, and General Psychological Distress in the General Population

Stressors are a pervasive fact of life. Accordingly, the causes of stress, the ways in which stress is attenuated, and the effects of stress have been the focus of much psychosocial research. The stress process model, first described by Pearlin et al. (1981), has been the prevailing model for explaining stress and its effects on mental health outcomes. Although the stress process model is sometimes called by other names, such as the social stress theory, I will refer to this theoretical framework as the stress process model, understanding that this term encompasses other similar theories.

Pearlin et al. (1981) conceptualized the stress process model as involving three main concepts: sources of stress, mediating resources, and manifestations of stress. Sources of stress are twofold: life events, which cause stress as they happen at a point in time; and life strains, which develop over longer periods of time. Factors that mediate the relationship between stress and mental health outcomes are termed psychological resources, and include, but are certainly not limited to, coping, social support, and mastery (locus of control), which generally intervene after stress. Manifestations of stress can be both physical and mental in nature, and global or local in their effects.

Because stress can have such powerful effects, and because of the central role coping plays in the stress process model, the way in which individuals cope with stressors is of particular interest. Coping can be conceptualized in two ways: as a static personality trait that is relatively constant over time, and as a process that differs depending on the specific stressor (Lazarus, 1993; Somerfield & McCrae, 2000). Recent literature has echoed this duality of thinking; at times coping questionnaires seem to show that coping

is indeed dependent on context (supporting coping as a process), while at other times coping seems to remain consistent across different stressors (supporting coping as a trait) (Penacoba-Puente, Javier Carmona-Monge, Marin-Morales, & Naber, 2013).

Coping research has been heavily influenced by Lazarus & Folkman's Transactional Model of Stress and Coping (1984). Guided by this model, research over the past three decades has revealed two dominant types of coping: problem-oriented coping, in which the individual copes by attempting to directly alter the stressor itself; and emotion-oriented coping, in which the individual copes by attempting to alter their emotional reaction to the stressor (Billings & Moos, 1984; Folkman & Lazarus, 1980; Folkman et al., 1986; Roybyrne et al., 1992). Although most of the coping literature focuses on these two types, a third type – avoidance, where the individual copes by distraction or social diversion – is sometimes invoked. Authors differ on whether avoidance is a third distinct domain or should be included within the emotion-oriented domain (Kohn, Hay, & Legere, 1994). Taylor and Stanton (2007) substantiated the vagueness of the avoidance domain by pointing out that some other specific coping strategies, such as spiritual coping, have been conceptualized as both a form of problem-oriented coping and avoidance. However, it is important to note that avoidance is the most poorly studied form of coping (Roesch et al., 2005), which could account for the ambiguity of the avoidance domain. Although there are other models of coping aside from the Transactional Model of Stress and Coping, I used the terms problem-oriented, emotion-oriented, and avoidance consistently throughout this thesis, acknowledging that other styles of coping have been suggested by different coping models. The only exception is when describing studies where authors identify coping styles and label such styles differently.

With the increased interest in coping, there has been a keen interest in whether coping strategies affect psychological outcomes. Although research has investigated the relationship between stress, coping, and mental disorder diagnoses, using psychiatric diagnoses as an outcome is problematic because of ambiguity and bias surrounding the diagnosis of mental disorders. Therefore, more general psychological outcomes are preferred. General psychological distress (GPD) represents a promising avenue for the

study of coping among those with mental health disorders. The concept of GPD was conceptualized as far back as 1983, when Veit and Ware pointed out that GPD not only encompasses symptoms such as anxiety and depression, but is a more inclusive concept that includes “characteristics of psychological well-being, such as cheerfulness, interest in, and enjoyment of life” (p. 730). Therefore, the nature of the relationship between stress, coping, and GPD is reviewed here.

Due to the large volume of research on the association between stress and GPD for the general population, a comprehensive review of the entire literature was beyond the scope of this thesis. Rather, in order to determine how stress and coping affect psychological outcomes in the adult population at large, a recent and widely cited review article was consulted, which conceptualized coping as a trait that intervenes between the onset of a stressor and the change in mental health (Taylor & Stanton, 2007). Although coping is only one part of the stress process model, the association between stress and GPD has been well-established for the general population, and less is known about the role coping plays in this association. Therefore, the relationship between coping and psychological outcomes was considered rather than the relationship between stress and psychological outcomes.

Taylor and Stanton (2007) summarized the relationship between coping and psychological outcomes. The authors conceptualized coping as a trait that remains stable in individuals over time. They found that coping can both mediate and moderate the relationship between stressors and GPD. They also demonstrated that individuals’ levels of chronic psychological distress were associated with their coping resources. More specifically, Taylor and Stanton (2007) considered the effect of coping on the relationship between stress and psychological outcomes, including GPD. With respect to the three coping domains discussed earlier, they found that problem-oriented coping was negatively associated with depressive symptoms and GPD, while emotion-oriented and avoidance were positively associated with GPD for a variety of populations. Although the impact of coping on psychological outcomes has been well-established for the adult population at large, one cannot assume that this relationship holds true for those who have already been diagnosed with mental disorders.

## 2.3 Coping and General Psychological Distress for Individuals with Mental Disorders

Finding ways to alleviate the mental distress of those with mental disorders is of crucial importance. Examining the association between coping and GPD could provide the evidence necessary to develop interventions that may help to improve coping skills, and potentially decrease GPD. In order to evaluate what is known about how well the stress process model applies to those with mental disorders, the association between coping and mental health is discussed, followed by a literature review of the relationship between coping and GPD specifically.

Literature suggests that those with depressive symptoms use more emotion-oriented and less problem-oriented coping than those without depressive symptoms (Endler & Parker, 1990; Ravindran, Griffiths, Merali, & Anisman, 1996; Roybyrne et al., 1992; Turner, King, & Tremblay, 1992; Whatley, Foreman, & Richards, 1998). The evidence for an association between avoidance and depressive symptoms is mixed (Endler & Parker, 1990; Man, Dougan, & Rector, 2012; Nagase et al., 2009; Turner et al., 1992). Additionally, it has been found that the presence of comorbid depression in those with an anxiety disorder further increases the use of emotion-oriented coping strategies and decreases the use of problem-oriented coping strategies (Man et al., 2012).

Although the association between coping and mood disorders – especially major depressive disorders – has been well-researched, the effect of coping in those already diagnosed with mental disorders is less clear, especially for those who may not be receiving treatment. Most of the research surrounding coping and psychological outcomes has been conducted on clinical populations; relatively few studies have examined this issue within a population of those with mental disorders recruited from the larger community to see if the same associations hold (Nagase et al., 2009). Another issue that complicates the study of coping among individuals with mental disorders is that the effect of coping on a diagnosis of a mental disorder cannot be assessed, since this population has already been diagnosed. Therefore, it remains unclear whether coping has an effect on psychological outcomes among those already diagnosed with one or more mental disorders. Consequently, less is known about whether interventions to improve

coping strategies will have a beneficial effect for those who already have mental disorders.

In order to assess the relationship between coping and GPD, a review of the literature was conducted. Articles assessing coping were identified using the following search terms: psychological adaptation, coping, avoidance, cognitive (re)appraisal, adaptive behaviour, coping behaviour, coping assessment, and psychological adjustment. Articles assessing GPD were identified using the following search terms: psychological distress, psychological stress, distress, emotional (dis)tress, mental (dis)stress, mental suffering, and life stress. Finally, to restrict the sample to those with mental disorders, articles containing the following terms were located: mental disorder, mental illness, psychiatric diagnosis, behaviour disorder, mental disease, psychiatric disease, psychiatric disorder, psychodiagnosis, psychosocial diagnosis, mood disorders, anxiety disorders, schizophrenia, psychiatric illness, psychological disorder, and psychological illness. Within each set of terms, terms were connected using the 'OR' Boolean operator, while these three sets of terms were connected using the 'AND' Boolean operator. These terms were applied to the Pubmed, PsycINFO, EMBASE, CINAHL, Web of Science, and ProQuest Dissertations and Theses databases. Results were filtered to include only English language original or review articles, and by age to include only adults over the age of 18, but not exclusively elderly (i.e. no papers were included with only subjects over age 65). A Google search was also conducted to identify any relevant grey literature that may exist. Finally, articles published earlier than 1993 were excluded, as the diagnosis of mental disorders may have changed dramatically since this time.

In total, 478 articles were identified from all databases. After removing duplicates and reviewing titles and abstracts for relevance, 25 articles that explored the association between coping and distress for adults with a mental disorder of any form remained. These studies varied dramatically, with a mix of quantitative and qualitative methodology and a mix of various study populations, including clinical samples and community samples, and a wide variety of mental disorders.

The methodology varied greatly among the 25 relevant articles. A total of 22 studies were quantitative in nature, 2 were qualitative, and 1 used a mixed methods approach. Among the quantitative studies, the specific study design varied; 11 were cross-sectional surveys, 3 were longitudinal surveys, 3 were cohort studies, and 5 were interventional studies. The qualitative studies did not vary widely in their general design, as both were descriptive narratives. Finally, the mixed methods study was longitudinal in its design. In addition to variation in methodology, these studies also looked into different aspects of the association between coping and GPD, with subtle distinctions. Although some studies directly addressed the association between coping and GPD, others used slightly different concepts of either coping or GPD. Nonetheless, after reading each article, concepts that may be similar to coping or GPD were included to get a full picture of the possible associations for those with mental disorders.

A total of eight studies directly assessed whether coping was associated with GPD for those with a mental disorder. Ritsner, Lisker, Arbitman, and Grinshpoon (2012) found that among 95 individuals with schizophrenia, coping was associated with distress and social support. Scott, Hides, Allen, and Lubman (2013) reported that among 190 ecstasy users, emotion-oriented coping was associated with increased distress, and avoidance was associated with decreased distress. The authors also found that coping mediated, but did not moderate the association between stress and distress. This article was included because ecstasy users could have included individuals with substance-related or addictive disorders, which constitute a diagnostic category in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) (American Psychiatric Association, 2013). Engeman (2013) demonstrated that among 113 individuals with a mental disorder of any sort, problem-oriented coping and social support were associated with more positive mood and lower distress. Rudnick (2001) found that stress was related to distress, although coping did not moderate this association. Velligan et al. (2009) conducted a randomized controlled trial (RCT) in which they randomized 148 individuals with schizophrenia to receive cognitive behavioural therapy (CBT) with coping skills training or CBT without coping skills training. They demonstrated that including coping skills training improved positive symptoms and GPD beyond the improvements observed for those only receiving CBT. Finally, Hembree, and Foa (2000) reported a dose-response

relationship between CBT and GPD for individuals with post-traumatic stress disorder (PTSD). Although these studies found an association between coping and GPD, other studies that directly investigated this association did not.

Null findings were reported by two studies. A prospective study conducted by Havermans, Nicolson, and deVries (2007) found that among 39 individuals with bipolar disorder, those who utilized problem-oriented coping styles and had increased levels of social support were no less likely to experience distress as a result of exposure to a stressor than those who utilized emotion-oriented or avoidance and had less social support. However, the negative results found in Havermans et al. (2007) could be due to the small sample size of 39. Minato and Zemke (2004) reported that in a sample of 89 individuals with schizophrenia, avoidance coping strategies such as sleeping, listening to music, or talking to others did not reduce levels of GPD. However, a major caveat for this study is that it was conducted in Japan, which may have a different cultural approach to mental disorders. Therefore, their findings may not be generalizable to a Canadian context. In addition to articles that directly assessed the association between coping and GPD, there are some studies that assessed a similar research question, but with slightly different concepts.

Although coping is generally conceptualized using the three broad styles discussed above –problem-oriented coping, emotion-oriented coping, and avoidance – there are some other conceptualizations of coping that merit consideration. For example, Miller, Campbell, and Pilkonis (2007), using a longitudinal study design, found that among 152 individuals with narcissistic personality disorder, increased narcissism was related to distress. The authors conceptualized narcissism as a maladaptive response to a stressor, and sometimes as a personality style, which seems similar to coping. Eifert et al. (2009) described a case series in which three individuals with anxiety disorders received acceptance and behavioural therapy with the aim of decreasing their GPD. Acceptance and behavioural therapy had two aims: to foster acceptance of unchangeable situations, and action toward living desirable ways (Eifert et al., 2009). The authors considered acceptance to be an alternative to avoidance. Overall, they demonstrated that all three individuals experienced lower GPD after their acceptance and behavioural intervention,



which supports an association between coping and GPD. Dimaggio et al. (2011) detailed a case study in which one individual with obsessive-compulsive personality disorder received metacognitive interpersonal therapy with the aim of improving their GPD level. Metacognition was conceptualized in a similar manner as coping, and was found to decrease GPD for three years following treatment. Although each of these studies investigated slightly different coping concepts and suggested associations with GPD, not all studies using distinct coping definitions found positive results.

One study using a coping concept distinct from traditional coping conceptualizations had results that did not support an association with GPD. Huang, Sousa, Tsai, and Hwang (2008) found that among 129 Taiwanese individuals with any diagnosed mental disorder, social support and adaptation did not moderate the association between the stress and mental disorder symptoms and distress. Adaptation was thought of as similar to coping, as both are a response to a stressor. However, it has been suggested that Asians may experience greater stigma of their mental disorder when compared to White Europeans (Cheon & Chiao, 2012). Therefore, this study of Taiwanese adults may not be directly applicable to a Canadian context. Although narcissism, acceptance, metacognition, and adaptation are not exactly the same as the tradition conceptualization of coping, each of these studies still makes a valuable contribution to the overall understanding of the association between coping and GPD for individuals with mental disorders. So too do studies that conceptualize GPD in slightly different forms.

As mentioned above, the concept of GPD is far-reaching in its implications, incorporating concepts of depression, anxiety, and overall psychological well-being (Veit & Ware, 1983). In light of this comprehensive definition, it would have been too restrictive to review only studies that directly assess GPD, as this may have excluded studies that assessed components of GPD. Therefore, studies that investigated the association between coping and depression, anxiety, and other psychiatric symptoms are of particular value. In addition, studies that examined quality of life (QOL) were also included, as QOL includes many of the same aspects as GPD. Finally, studies that assessed the association between coping and functional adaptation with respect to

psychiatric symptoms, including substance use issues, were included in this review as it is possible that these concepts relate to GPD as well.

First, studies that investigated the association between coping and psychiatric symptoms are discussed. Grinage (2003) wrote a descriptive essay where he reviewed management strategies for PTSD. He found that CBT, including coping skills training, improved PTSD symptoms and decreased distress. Myin-Germeys, Delespaul, and Van Os (2005) demonstrated that among 150 individuals with psychotic disorders in remission, stress and vulnerability were associated with increased psychosis, which can be thought of as a component of GPD. MacAuley and Cohen (2013) reported that in a sample of 115 individuals with schizophrenia, coping strategies were associated with schizophrenic symptoms. Arroyo, Steinberg, and Katz (2012) noted that improved coping skills were associated with symptom improvement for individuals with mood and anxiety disorders. However, these results should be interpreted with caution as this was a brief report rather than a full article, and did not clearly detail their methodology. Trumpf, Margraf, Vriends, Meyer, and Becker (2010) demonstrated that among 137 individuals with a specific phobia, coping and cognitive style were not associated with anxiety, which is a key component of GPD. An RCT conducted by Norman et al. (2002) randomized 130 individuals with schizophrenia to receive either the best practice stress-vulnerability intervention as the control or coping skills training and stress management program as the intervention, and found no statistically significant findings in terms of symptoms. In addition to studies investigating psychiatric symptoms, this review also included studies assessing the association between coping and QOL.

Roe et al. (2010) found that interventions aimed to improve the coping skills of individuals with serious mental illness contributed to six domains of positive change – experiential learning, positive change in experience of self, cognitive skills, hope, coping, and emotional change – all of which contributed to improvement in individuals' QOL and distress. Temple (2004) described a case study in which an intervention intended to improve the coping skills of an individual with schizophrenia helped decrease distress and improve QOL. Bechdolf et al. (2003) reported that among 66 individuals with schizophrenia, emotion-oriented coping was associated with decreased QOL, and social

support and self-efficacy was associated with increased QOL. Another longitudinal study by Ritsner (2003) demonstrated that among 199 individuals with schizophrenia or mood disorders with psychosis, stress process factors had an impact on QOL. Specifically, they found that coping, self-efficacy, self-esteem, and perceived social support predicted QOL. Although QOL is a slightly different concept from GPD, these studies still provide valuable insight into the impact coping has on the mental health of individual with mental disorders, as QOL and GPD share similar aspects.

Holahan, Moos, Holahan, Cronkite, and Randall (2003) investigated the associations between drinking alcohol as a coping mechanism, alcohol use issues at ten years follow-up, and depressive symptoms. Using a cohort study design that excluded individuals with an existing alcohol use issue, the authors found that among 412 individuals with unipolar depression, drinking alcohol as a coping mechanism was a risk factor for developing an alcohol issue. While a substance use issues do not represent a component of GPD, the authors pointed out that alcohol use issues were often associated with greatly increased depression and anxiety for those with unipolar depression, which is a large component of GPD. Additionally, this study is particularly valuable as it helps to establish temporality; because those with existing alcohol use issues were excluded from the baseline sample, it is certain that drinking alcohol to cope with stress preceded the development of an alcohol use issue. In a Canadian context, Lecomte and Mercier (2005) reported that among 101 individuals with schizophrenia, coping explained the same amount of variance in adaptation as demographic and clinical variables. The authors defined adaptation as having two main concepts: the presence of social skills necessary to function in social roles, and successful performance in social roles. Although this is not defined in the same way as GPD, these two concepts may be related. Further, the authors found that mastery was a moderator for the association between stress and adaptation. Another Canadian study by Lecomte, Stip, Caron, and Renaud (2005) demonstrated that among 153 individuals with schizophrenia, coping and stress variables did not contribute to adaptation. Tarrier et al. (1993) reported no significant findings with respect to functioning with psychiatric symptoms in their RCT where they randomized 27 individuals with schizophrenia to receive the intervention, a coping strategy enhancement program, or the control, a problem solving program. Although not all the studies above

directly examined the association between coping and GPD, some assessed related concepts, which glean important information about the association between coping and GPD, a key component to understanding how the stress process model applies to individuals with mental disorders.

Taken in tandem, the 25 studies comprising this review suggest an association between coping and GPD. In total, 19 studies found an association of some kind between stress, coping, and GPD, while 6 studies demonstrated no such association. Although this balance suggests an association, there remain two major issues with these studies. First, the mental disorders of interest were often highly specific, with very strict exclusion criteria. Almost certainly, these samples represented very select groups, and may not accurately reflect the majority of individuals with mental disorders living in the community at large. Therefore, generalizability of these studies is in question. Second, many of the studies presented here used samples that were clinical in nature. While not all samples were inpatients, almost all were recruited from clinical centres of some sort. However, there are individuals with diagnosed mental disorders who may have discontinued treatment, and therefore would have been excluded from these studies. These issues represent serious gaps in the literature that merit further attention.

Mental disorders are highly heterogeneous; in fact, the DSM-5 has over twenty broad categories of disorders, each with multiple diagnoses that fall under their umbrella (American Psychiatric Association, 2013). Despite considerable heterogeneity, many health and social services are organized such that individuals with any mental disorder are treated similarly, which may result in a similar set of stressors for individuals with mental disorders of varying types. However, most of the studies described above assess components of the stress process model for individuals with particular mental disorders. More specifically, 13 studies included only individuals with schizophrenia or psychosis, 2 included only individuals with anxiety disorders or specific phobias, 1 included only ecstasy users, 2 included only individuals with personality disorders, 1 included only individuals with PTSD, and 2 included only individuals with depressive or bipolar disorders. A final 4 studies were more comprehensive, and considered samples of individuals with a variety of mental disorders. More problematic, however, is the

stringent exclusion criteria that were applied to most studies, as individuals with comorbid mental and physical disorders or issues were often excluded from studies. For example, specific exclusion criteria that appeared more than once in the above studies included substance use issues, retardation, organic disorders or causes, physical disorders, and head injuries. This seems very selective and may have excluded large groups of individuals with mental disorders. In fact, these studies may have failed to sample the sickest individuals – those with mental or physical comorbidities. Therefore, although the above studies suggest an association between coping and GPD for their selective populations, the restrictive nature of the samples in these studies affects the generalizability of the results as a whole. Therefore, it remains unclear whether this association holds when such exclusion criteria are relaxed and reflect a more real population of individuals with mental disorders.

The second issue affecting the generalizability of these studies lies in the clinical nature of many of the samples. Out of the 25 relevant studies, 19 had samples recruited from clinical settings, including both inpatient and outpatient clinics, and 2 studies had unclear sampling strategies. Since the population of interest for this thesis is individuals with diagnosed mental disorders, it seems logical that such a population would have been in a clinical setting at some point in time in order to obtain a diagnosis from a health professional. However, just because an individual was in treatment at one time certainly does not mean that they are currently in treatment. Rather, individuals with mental disorders may have complicated treatment histories, including psychiatric hospitalization, outpatient treatment, no treatment at all, or being in recovery. Therefore, it cannot be assumed that recruiting a sample from a clinical setting is best way to understand the behaviour of individuals with mental disorders, as this will only capture individuals currently being treated for that disorder. This represents a crucial gap in the literature addressing the association between coping and GPD, as only four studies recruited samples from the community at large who may or may not be receiving treatment for their mental disorder.

In order to appropriately assess whether the stress process model applies to individuals with diagnosed mental disorders, it is necessary to address some of the

knowledge gaps identified in the current review. Mainly, addressing such gaps involves improving upon the generalizability of the studies comprising this review. Therefore, it is necessary to include a wide variety of individuals with mental disorders, as they may face similar stressors. Additionally, it is crucial for such a sample to be recruited from a community, rather than a clinical setting, in order to include those with mental disorders who may not be receiving formal treatment. By addressing these knowledge gaps, this thesis can explore how the stress process model applies to a natural, community-dwelling population of individuals with wide-ranging mental disorders.

## 2.4 Mediators and Moderators for the Stress Process Model

The association between stress and GPD does not occur in isolation; rather, there are various contributing factors that may impact the relationship. Such mediating factors are termed psychological resources, and are diverse in their nature. Potential mediating psychological resources include social support, various coping styles, mastery, self-esteem, self-efficacy, a purpose in life, mattering, interpersonal dependency, helplessness, fatalism, emotional resilience, and autonomy (Aneshensel, 2009; Avison & Thomas, 2010; Kiviruusu, Huurre, Haukkala, & Aro, 2013; Pearlin, 1989; Pearlin et al., 1981; Pearlin, Schieman, Fazio, & Meersman, 2005; Romero-Moreno et al., 2011).

Although psychological resources have been hypothesized to mediate or moderate the relationship between stress and GPD, the mechanism by which this occurs varies. In fact, mediating and moderating factors are a crucial component of the stress process model, and although psychological resources can have an impact at any point in the stress process, they are thought to largely intervene between the onset of a stressor and the manifestations of those stressors (Pearlin et al., 1981). Specifically, Pearlin explained that the indirect effect of stress on psychological outcomes is equally as important as the direct effect (1989). Furthermore, by investigating the mediating effects of psychological resources in the stress process, we can explore the vulnerability of individuals to the effects of stress (Pearlin, 1989).

Although much research exists on the mediating effects of these psychological resources in the stress process model, considerably less exists on potential moderating effects of these variables (Matthews, Gallo, & Taylor, 2010; Schnittker, 2004). The moderating effect of psychological resources is termed the buffering effect, whereby the effect of stress on psychological outcomes differs depending on an individual's level of psychological resources (Turner, Taylor, & Van Gundy, 2004). The lack of research on the buffering effect represents a significant gap in the stress process literature that must be addressed in order to have a full understanding of the mechanism by which stress impacts the mental health of individuals with mental disorders.

## 2.5 The Structure of Coping for Individuals with Mental Disorders

As mentioned earlier, psychological resources are a key aspect of the stress process model in that they have been demonstrated to mediate or moderate the association between stress and GPD. Coping is a crucial psychological resource, and is of particular interest for this thesis. Although the structure of coping had been extensively researched, and is summarized above, considerably less is known about the structure of coping for individuals with mental disorders.

A brief literature search was done to investigate the coping structure of Canadians specifically, which identified three relevant papers. Baetz and Bowen (2008) examined a representative sample of Canadians with chronic pain, and found three coping styles factors that accounted for 41 percent of the variance: negative coping, positive coping, and alcohol, drug, or medication coping. Graff et al. (2009) also investigated a nationally representative Canadian sample, and reported three coping styles that accounted for 39 percent of the variance: avoidant coping, active coping, and self-soothing. Similarly, Wang et al. (2009) conducted an analysis on the same sample. They also detected three factors: avoidant coping, problem-solving, and behaviours. These three studies seem to differ slightly from the coping styles historically found in the literature, problem-oriented, emotion-oriented, and avoidance, although they demonstrated both positive and negative coping styles. Despite the value of these three studies, they focus on the population at large or those with physical disorders. It seems that the factor structure of

coping for Canadians with mental disorders remains largely unexamined. This thesis represents a unique opportunity to address this knowledge gap, as it helps to identify whether coping is similar for individuals with mental disorders and the general Canadian population. As coping is so crucial to the stress process model, determining the factor structure of coping for individuals with mental disorders is a key component of exploring how the stress process model applies to this population.

## 2.6 Contributions to Knowledge

The current thesis was undertaken to help fill several gaps in our current knowledge. First, it examines the association between stress and GPD for a community-dwelling sample of adults with mental disorders, an understudied area in stress process research. Additionally, psychological resources impacting the stress process model are explored in-depth. Specifically, this thesis assesses whether forms of coping differ between the general Canadian population and Canadians with mental disorders. Each of these aspects represents an understudied area in stress process research, and addresses crucial knowledge gaps. More in-depth knowledge about the specific mechanism by which stress impacts the mental health of individuals with mental disorders is crucial, especially given the prevalence of mental disorders and the ubiquity of stress in modern society.



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## Chapter 3

### 3 Objectives and Hypotheses

The objectives and hypotheses listed below seek to fill the knowledge gaps outlined in Chapter 2.

#### 3.1 Objectives

The primary purpose of this thesis was to explore the impacts of stress on the mental health of individuals already diagnosed with mental disorders. Each specific objective is listed below, with hypotheses following in each subsection.

##### *Objective 1*

Explore how the stress process model applies to individuals with mental disorders.

##### *Objective 2*

Determine whether coping styles found among the general population differ from those found among individuals with mental disorders.

#### 3.2 Hypotheses

##### 3.2.1 Hypothesis 1

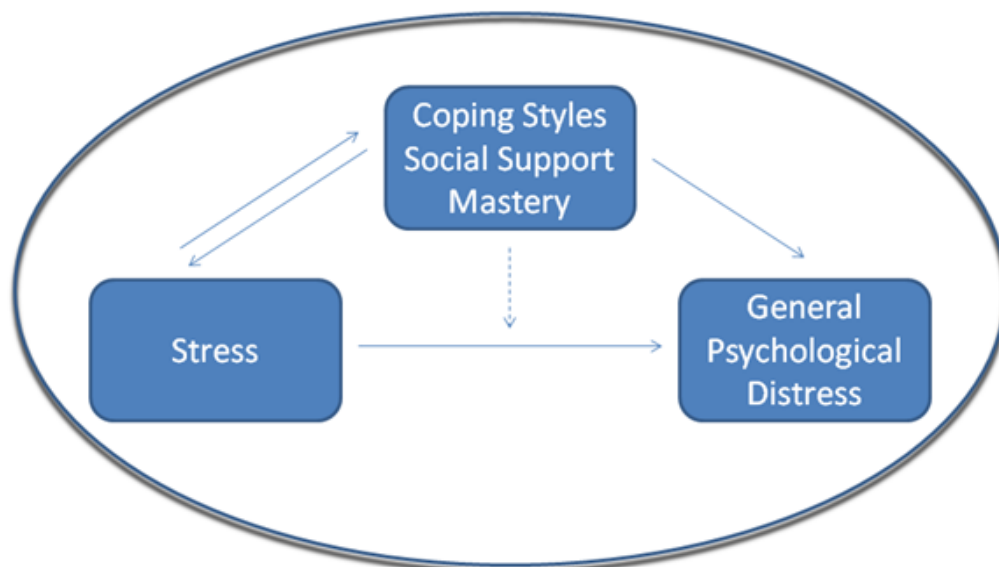
General stress will be positively related to general psychological distress (GPD). Social support and mastery will mediate the association between general stress and GPD (i.e. considered separately, social support and mastery will change the regression coefficient for the effect of general stress on GPD by at least ten percent), and coping will moderate the association between general stress and GPD (i.e. there will be a statistically significant interaction term between general stress and at least one of the coping factors determined from a factor analysis), with those with higher levels of problem-oriented coping strategies having a weaker association between stress and GPD.

### 3.2.2 Hypothesis 2

The factor structure of coping among individuals with mental disorders will differ from that found among the general population. Particularly, the use of substances to cope will be a distinct factor. Also, avoidance will be a factor, but will not include sleeping more than usual or changing eating habits, as these specific coping responses may be a reaction to mental disorder and/or medication rather than a coping effort. Finally, there will be a third factor indicating problem-oriented coping.

## 3.3 Thesis Framework

Although there are numerous visual depictions of the stress process model that vary in complexity, most share the same basic elements: sources of stress, mediators and moderators of the relationship between stress and health outcomes, and manifestations of stress (Pearlin, 1989; Pearlin et al., 1981). This thesis used a stress process model adapted from Avison and Thomas (2010), with available data and variables of interest identified in Figure 3.1.



**Figure 3.1.** The stress process model for individuals with mental disorders. Adapted from Avison, W. R., & Thomas, S. S. (2010). Stress. In W. C. Cockerham (Ed.), *The new Blackwell companion to medical sociology* (pp. 242-267). West Sussex, UK: Blackwell Publishing Ltd.

Figure 3.1 includes two of the three main elements of the stress process model, modified for the objectives of this thesis, the population of interest, and data availability. Although this thesis was not equipped to study sources of stress, coping, social support, and mastery are considered for their potential mediation of moderation effects, and GPD was assessed as a manifestation of stress.

Although the research design used in this thesis is cross-sectional, stress was conceptualized as the independent variable and GPD as the dependent variable, as this is the directionality that is most often hypothesized in the literature.

### 3.4 References

- Avison, W. R., & Thomas, S. S. (2010). Stress. In W. C. Cockerham (Ed.), *The new Blackwell companion to medical sociology* (pp. 242-267). West Sussex, UK: Blackwell Publishing Ltd.
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## Chapter 4

### 4 Methodology

The purpose of this chapter is to describe the methods used in this thesis (e.g. sample, measures, and analyses), aligned with the objectives that were presented in Chapter 3. The methods are presented in greater detail than is permitted in a peer-reviewed manuscript, a version of which appears as Chapter 5.

#### 4.1 Data Sources

Data for this thesis were from the Community-University Research Alliance: Poverty and Social Inclusion program (CURA).

##### 4.1.1 The Community-University Research Alliance: Poverty and Social Inclusion Program

CURA was a five-year longitudinal study conducted in the London, Ontario area to investigate the relationship between poverty and social inclusion for adults diagnosed with a mental disorder. The CURA program was funded by the Social Sciences and Humanities Research Council of Canada from 2011 to 2016. Ethics approval was received from Western University's Research Ethics Board in April, 2011 (see Appendix C).

CURA used a participatory action research (PAR) methodology. As a part of the PAR process, academics, community partners, government, and individuals with mental disorders – some of whom became research participants – were integrated into all aspects of the research process, including research scope and objectives, study design, data collection, data analysis, disseminations of results, and curriculum development.

##### 4.1.2 Quantitative Instruments

CURA was a mixed-methods study, using both qualitative and quantitative instruments. Qualitative instruments included open-ended questions within structured interviews and focus groups. Quantitative instruments were administered in structured

interviews. Such interviews provided the quantitative data for this study. Participants were identified using public advertising, as well as outreach recruitment in community agencies and other public places (i.e. libraries, parks, etc.). Once participants were identified, a 90 to 120 minute interview took place at a location and time of the participant's choosing. Although it was difficult to secure a private location at all times, every effort was made to ensure privacy, and the participant could change locations, reschedule interviews, or decline to answer at any time. The quantitative instruments comprising the interview are listed below:

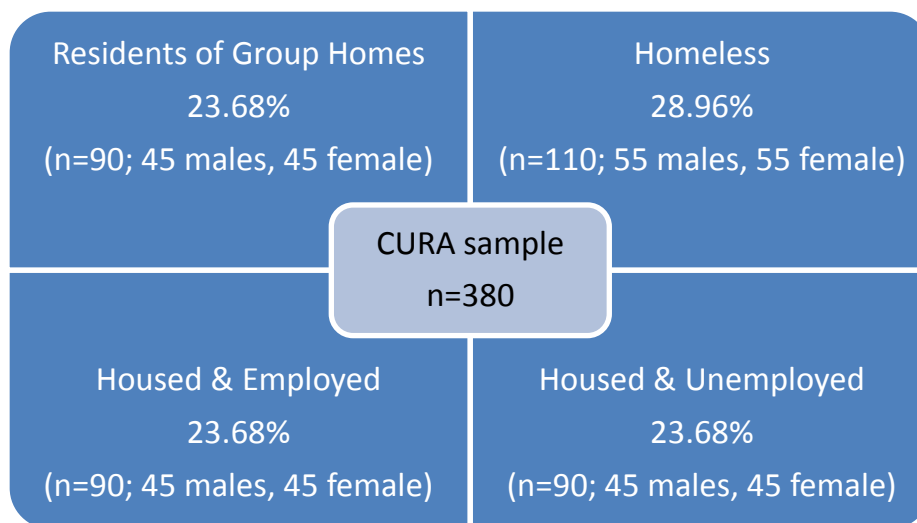
- Demographics form
- Community Integration Questionnaire
- Consumer Housing Preference Survey
- Employment History Survey
- EQ-5D health questionnaire
- Health, Social, Justice Service Use questionnaire
- Housing History Survey
- Lehman Quality of Life Interview
- Modified National Population Health Survey (NPHS). CURA did not administer the whole NPHS survey, rather a shorter version was used that included the following topics:
  - General health
  - Sleep
  - Height and weight
  - Health care utilization
  - Home care
  - Restriction of activities
  - General stress
  - Work stress
  - Mastery
  - Coping
  - Medication use
  - Smoking

- Alcohol
- Mental health
- Personal and family history of depression
- Social support
- Language
- Income
- Personal Resource Questionnaire
- SF-36 Health Survey
- Socially Valued Role Classification Scale
- The Stigma Scale

### 4.1.3 Study Population

CURA collected data from a convenience sample of 380 participants residing within 100 kilometres of London, Ontario, Canada. Recruitment was greatly helped by various community agencies participating in this research program. The population of interest for this study was individuals with mental disorders, a highly heterogeneous group. As mentioned in Chapter 2, much previous research investigated mental health using individuals with specific diagnoses and no comorbidities, whereas relatively few studies have investigated mental health issues more broadly defined. The inclusion criteria for CURA were as follows: a diagnosis of any mental disorder at any age, with duration of at least one year at the time of sampling; age 18 or older; able to provide written consent; not residing in an institution. There were no exclusion criteria.

In addition to these criteria, sampling was stratified for the first year of data collection to ensure sufficient representation of key groups of interest in the study sample. Specifically, the CURA sample was stratified by employment, sex, and housing situation (see Figure 4.1). Homeless people were over-sampled for the first year, in order to account for potentially greater loss to follow-up in subsequent years of data collection.



**Figure 4.1.** Stratification of the CURA sample.

## 4.2 Study Design

Although CURA was a longitudinal study, data used for this thesis were collected during 2011, the first year of data collection. Therefore, the current study is cross-sectional in its design.

CURA represents a unique opportunity to assess how the stress process model applies to a population of community-dwelling adults with mental disorders. Because CURA was conducted in a community setting, it also represents an opportunity to study the stress process model outside of a clinical setting and in a real-world context. Because questions pertaining to stress, coping, general psychological distress (GPD), social support, and mastery were part of the modified NPHS administered to the CURA sample, this instrument, along with the demographics form, was used for the present analysis on the CURA sample. The scales used to assess the objectives of this thesis are discussed in detail below.

## 4.3 Measures

The analysis for this thesis used a subset of the quantitative measures listed in Section 4.1.2: general stress, coping, social support, mastery, and GPD scales. Each of



these measures are discussed below, with specific items and scoring instructions detailed in Appendix A.

### 4.3.1 Stress

General stress and work stress scales were administered to the CURA sample using a shortened version of measures from the NPHS. Although social stress is generally thought to include two aspects, life events and chronic strains, the present general stress scale assessed the latter. Despite the fact that stress, stressors, and strains are slightly different concepts, the terms are used interchangeably here, as the exact nature of stress is not of primary interest for this research. Chronic or enduring stress (henceforth referred to as “general stress”) is intended to reflect current general stress as it relates to a participant’s physical, emotional, and mental health, and was measured using the chronic stress scale described by Wheaton (1994), and Turner, Wheaton, and Lloyd (1995). Although their scale included 51 items intended to measure chronic stress, the general stress scale administered to the CURA sample contained a simplified 18-item version. These 18 items assessed 6 aspects of general stress – financial, social life, relationship, parental, family health, and environment – which were combined to create an overall measure of general stress, after Turner et al. (1995). In the CURA sample, the Cronbach’s alpha for the general stress scale was 0.80, indicating high internal consistency. The amount of missing data was difficult to estimate for this scale, as not all items were asked to all CURA participants. As shown in Appendix A, there are sections of the general stress scale that specifically addressed stress resulting from children and marriage, which did not apply to all CURA participants. Nonetheless, of the questions that were asked of the whole CURA sample, 91.04% of participants (n=346) had complete data for the general stress scale.

The general stress scale used for the CURA sample is an indicator of the level of perceived general stress in individuals’ lives. Although this questionnaire is a subjective measure, it has been argued that general stress is subjective in nature, with different people experiencing different levels of stress stemming from the same roles (Turner et al., 1995). Therefore, it seems entirely reasonable to measure general stress using a subjective indicator.

### 4.3.2 Coping

There are numerous scales intended to measure an individual's ability to cope with stress. Statistics Canada created a coping scale by combining questions from three separate coping instruments: the Ways of Coping – Revisited (Folkman & Lazarus, 1985), the Coping Strategy Indicator (Amirkhan, 1990), and the COPE scale (Carver, Scheier, & Weintraub, 1989; Statistics Canada, 2002). This measure was created for the Canadian Community Health Survey cycle 1.2 on mental health and well-being (CCHS 1.2).

Of the various coping instruments in the literature, some are stressor-specific, whereas others elicit general coping styles without inquiring about the stressor for which the coping mechanism was used (Schwarzer & Schwarzer, 1996). There is no consensus on which type of coping instrument is best; at times coping questionnaires seem to show that coping is indeed dependent on the stressor in question, while at other times coping appears to remain consistent across different stressors (Penacoba-Puente et al., 2013). However, as the present analysis considered chronic role stress rather than major life events, it seems appropriate that the coping scale assesses coping without inquiring as to the specific stressors for which the coping strategy was used.

Before the coping scale was scored, the factor structure of the coping measure was determined (see Section 4.4.4 for a detailed description of factor analysis methods). The internal consistency and amount of missing data for these scales are reported in Chapter 5.

### 4.3.3 General Psychological Distress

There are numerous scales that measure various elements of psychological distress. However, many are too lengthy for use in large surveys (Kessler et al., 2002). As a result, Kessler et al. (2002) developed the Kessler 6 (K6; six-item measure) and Kessler 10 (K10; ten-item measure) psychological distress scales to screen for serious mental illness (SMI) in the National Household Survey on Drug Abuse conducted in the United States. Overall, the authors demonstrated that the K6 and K10 are reliable were valid when compared to the WHO Composite International Diagnostic Interview Short Form

(CIDI-SF) (sensitivity = 0.36, specificity = 0.96, accuracy = 0.92). Kessler et al. (2003) also found that the K6 is the best tool to screen for SMI in the general population, when compared to the CIDI-SF and the K10. As such, GPD in the CURA sample was assessed using the K6 scale. The internal consistency of the GPD scale was relatively high for the CURA sample (Cronbach's alpha = 0.87). With respect to missing data, 97.89% of the CURA sample (n=372) had complete data for the GPD scale.

Although the K6 measured GPD on a continuous scale, some studies investigating the association between coping and GPD dichotomized GPD into low and high groups, based on K6 score. Accordingly, logistic regression was sometimes used to assess this association (Reavley, Jorm, McCann, & Lubman, 2011). Of studies that assessed this association using a linear regression (Chan & Rhodes, 2013; Gunn, Kettler, Skaczkowski, & Turnbull, 2012; Moxey, McEvoy, Bowe, & Attia, 2011), coping was often dichotomized, and not measured in a continuous manner.

Whenever possible, keeping a scale continuous is preferred over dichotomizing it into low and high subgroups for two major reasons. First, keeping a scale continuous allows for all individual differences to be retained (MacCallum, Zhang, Preacher, & Rucker, 2002). Dichotomizing a continuous scale makes individuals with different scores seem identical, when their variation in scores may, in fact, reflect real and substantial differences. Second, the dichotomization of a continuous variable may affect statistical analysis and findings. For example, a review of literature on this topic found that loss of power and effect size, and spurious main effects and interactions, have all been associated with dichotomizing continuous variables in multivariable regression analysis (MacCallum et al., 2002). The present analysis assessed the stress process model using continuous scales.

#### 4.3.4 Mastery

Mastery, which reflects the level of control an individual perceives in his/her life, was assessed using a seven-item mastery scale described by Pearlin and Schooler (1978). There are no subscales for this measure. The mastery scale has strong psychometric properties and been shown to be useful in a variety of populations (Marshall & Lang,

1990; Pearlin & Schooler, 1978). Previous studies have found the mastery scale to have acceptable reliability (Cronbach's alpha of 0.64 to 0.75) (Pearlin et al., 1981; Scheier, Carver, & Bridges, 1994). Similarly, the internal consistency of the mastery scale was acceptable for the CURA sample (Cronbach's alpha = 0.70). The amount of missing data for the mastery scale was very low, as 96.32% of the CURA sample (n=366) provided complete data for the mastery scale.

#### 4.3.5 Social Support

Social support was assessed using the social support scale developed by Sherbourne and Stewart (1991) for the Medical Outcomes Study. Although this scale originally included 50 items, the CURA used a shortened 19-item version. This measure includes four subscales: emotional or informational support, tangible support, positive social interaction, and affection, which were combined to create an indicator of overall social support for this thesis. Statistics Canada has found the reliability of this social support scale to be very high (Cronbach's alpha over 0.90 for all subscales) (Robitaille, Orpana, & McIntosh, 2011). The internal consistency of the total social support scale was even higher in the CURA sample (internal consistency = 0.96). The social support scale had a small amount of missing data, as 90.79% of the CURA sample (n=345) had complete data for this scale.

### 4.4 Statistical Analysis

The analysis for this study involved four major components. First, descriptive statistics were calculated for the CURA sample, including demographic data and the quantitative measures in Section 4.3. Second, bivariate analyses were conducted between study variables of interest. Third, an exploratory factor analysis (EFA) was performed to assess Objective 2. Finally, linear regression models were built to assess Objective 1. For all analyses, a p-value of 0.05 was considered statistically significant. All analyses were run using SAS 9.3 software (The SAS system for Windows computer program, 2011).

#### 4.4.1 Descriptive Statistics

Categorical variables were assessed using frequencies and percentages, and continuous variables were assessed using means and standard deviations. First, descriptive statistics were generated for various demographic indicators, such as age, sex, family characteristics, employment status, and living situation. Additionally, various mental and physical health indicators were reported, including psychiatric diagnoses and chronic physical illnesses, of which individuals could have reported more than one psychiatric diagnosis and any number of chronic physical illnesses either diagnosed or not; mental health medication use; past psychiatric hospitalization; past head injuries; and past homelessness. Further, descriptive statistics were generated for continuous variables to be used to assess the thesis objectives, namely general stress, mastery, social support, GPD, and coping styles from Objective 2.

#### 4.4.2 Bivariate Analyses

Bivariate analyses were conducted for three main purposes: to explore how continuous variables are related, to test for multicollinearity, and to assess whether individuals with missing data differ from individuals with complete data. In order to accomplish this, Pearson's correlations were first calculated between each of the explanatory variables: general stress, mastery, social support, and coping styles. In the event of correlations higher than 0.70, variables were not considered together in any regression models, as correlations above this level may indicate multicollinearity, which may cause model instability. Finally, it was necessary to determine whether individuals with complete data – that is, individuals with complete data for general stress, coping, mastery, social support, and GPD – differed significantly from those with missing data. To assess this, the descriptive indicators for the missing data and complete data subgroups were compared. For categorical variables such as sex, whether the participants had children, psychiatric diagnosis, living arrangement, marital status, employment, chronic physical illness, current addictions, psychiatric medication use, past psychiatric hospitalization, past head injury, and past homelessness, samples were compared using chi-square tests. For continuous variables such as age, number of children over and under age 18, age of first head injury, number of head injuries, age of first homelessness, and

number of times homeless, t-tests were used to compare normally distributed variables, and Mann-Whitney U tests were used to compare non-normally distributed variables. Normality was assessed by visual inspection of a histogram.

#### 4.4.3 Objective 1

Objective 1 for this thesis was to explore how the stress process model applies to individuals with mental disorders. As described earlier, the stress process model involves three key aspects: causes of stress, mediators and moderators of stress, and manifestations of stress. As this thesis did not have the data necessary to investigate the causes of stress, it focused primarily on the mediators, moderators, and manifestations of stress. Although manifestations of stress vary greatly, this thesis focused on GPD, a mental health indicator shown to be associated with stress and coping for individuals with mental disorders (see Section 2.3). An assessment of the variables thought to mediate or moderate the association between general stress and GPD was conducted.

As discussed in Section 2.4, a wide variety of psychological resources have been suggested to mediate or moderate the association between general stress and GPD for individuals with mental disorders within the stress process model. Due to data limitations, only mastery, social support, and coping were considered as potentially mediating or moderating psychological resources for the present analysis. This analysis began by estimating the association between general stress and GPD using simple linear regression, independent of any psychological resources. Then, potential mediation or moderation by psychological resources was assessed, after Turner, Taylor, and Van Gundy (2004).

##### 4.4.3.1 Mediation Analysis

After the association between general stress and GPD was estimated using simple linear regression, each psychological resource was added to the model, one at a time, to determine its effect on the association. That is, each style of coping from Objective 2, social support, and mastery was added to the regression of GPD on general stress; psychological resources were said to mediate the association in the event that their addition to the model changed the general stress regression coefficient by more than ten percent. After each psychological resource was assessed independently for its potential

mediating effects, the coping styles from Objective 2 were added together, to determine the mediating effect of coping overall. Finally, all psychological resources were added together to determine their total mediation effect. The proportion of variance accounted for by the model was estimated using the adjusted  $R^2$ . As mentioned, mediation was determined by assessing the change in general stress coefficient, not statistical significance of the psychological resource itself.

#### 4.4.3.2 Moderation Analysis

In contrast to the mediation assessment, moderation was evaluated using statistical testing. GPD was regressed on an interaction term between general stress and each psychological resource, and the main effects of each term comprising the interaction term. For example, to test the moderation effect of mastery, GPD was regressed on general stress, mastery, and an interaction term between general stress and mastery. If the interaction term was statistically significant, the psychological resource was termed a moderator, and not a mediator.

#### 4.4.4 Objective 2

Objective 2 for this thesis is to determine whether coping styles used by individuals with mental disorders differ from those used by the general population. In order to accomplish this, the factor structure of coping was determined for individuals with mental disorders, which was then compared to the factor structure for the Canadian population at large.

Because Objective 2 aimed to make a comparison of factor structures, it was necessary to use the same methods to determine the factor structure of coping in the CURA sample in order to make a fair comparison to an existing factor structure determined for the Canadian population at large. Wang et al. (2009) conducted an EFA, using principal components analysis (PCA), on the CCHS 1.2 sample, a representative sample of the Canadian population. Although their specific extraction method and rotation strategy were not stated, they noted that a simple EFA was performed (Wang, personal communication, October 12, 2013). Therefore, the present analysis was an EFA on the CURA sample using PCA, and extracting Eigenvalues greater than one, as this is

the default EFA in SAS, the statistical analysis package used by Wang et al. (2009). A varimax rotation strategy was used (Abdi, 2003). The resulting factor structure was compared to that of Wang et al. (2009), to explore whether the factor structure of the coping measure differs between individuals with mental disorders and the general Canadian population. Factors were only considered a distinct coping style if they included more than two items. The resulting factors were assessed for internal consistency by examining the Cronbach's alpha if each item in each factor was deleted. Items were removed from the factor if the Cronbach's alpha of the factor improved with its removal. The resulting factors were used as psychological resources in Objective 1.



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## Chapter 5 <sup>1</sup>

### 5 Coping and the Stress Process Model for Individuals with Mental Disorders

Individuals with mental disorders face considerable burden in their daily lives. First, accessing care in a complicated health care system can be a stressful experience. Furthermore, individuals with mental disorders often face additional stressors stemming from stigma (Corrigan & Watson, 2002). Finally, financial stress may ensue, as psychiatric symptoms may interfere with employment (Drake, Bond, Thornicroft, Knapp, & Goldman, 2012), and disability payments are often too low to ensure financial comfort (Wilton, 2004). Because of all the stressors experienced by individuals with mental disorders, the effects of stress, and the mechanisms by which such effects occur, are increasingly important.

#### 5.1 Background

Health problems are not distributed equally in the population. Both physical and mental disorders are disproportionately experienced by those in more marginalized social statuses (Kondro, 2012). Specifically, health statuses differ by age, gender, race, ethnicity, and socio-economic status (Commission on Social Determinants of Health, 2008). The stress process model suggests that individuals with lower social statuses may experience worse health outcomes due to differential exposure to stress (Avison & Thomas, 2010; Pearlin, 1989; Pearlin et al., 1981).

The stress process model incorporates three components: sources of stress, mediators or moderators of stress, and manifestations of stress. Sources of stress arise from differences in social status (Pearlin et al., 1981). Specifically, stress is suggested to be a result of two factors: major life events and chronic role strains (Pearlin et al., 1981). Mediators and moderators of stress include psychological resources such as coping,

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<sup>1</sup> A version of this chapter will be submitted to a suitable peer-reviewed journal.

social support, and mastery, or a sense of control over an individual's life. These psychological resources are thought to intervene between the onset of stress and the manifestations of stress, causing indirect effects of stress in the case of mediators, or altering the effect of stress altogether in the case of moderators (Avison & Thomas, 2010). Finally, manifestations of stress can be extremely diverse, ranging from microbiological to emotional outcomes (Pearlin, 1989). However, mental health manifestations of stress are of particular interest for individuals with mental disorders.

Although there are numerous psychological resources that may affect the association between stress and mental health, coping strategies have been shown to have particularly large effects (Taylor & Stanton, 2007). Coping is a multi-faceted phenomenon that merits further attention for individuals with mental disorders. As such, the current study focuses on various psychological resources, but pays particular attention to specific styles of coping, and the way that such coping styles may impact the association between stress and mental health.

Three types of coping have been suggested for the general population. Problem-oriented coping alters the source of stress itself, and is the most direct and adaptive type of coping. Emotion-oriented coping alters the emotional response to stress, rather than the source of stress itself, and is thought to be maladaptive when compared to problem-oriented coping. Finally, avoidance involves social diversion or distraction (Billings & Moos, 1984; Folkman & Lazarus, 1980; Folkman et al., 1986; Roybyrne et al., 1992). Avoidance is not as well supported in the literature, as it has at times been suggested to be beneficial, and at other times not (Kohn et al., 1994). Additionally, different studies have shown that specific coping responses that comprise avoidance, such as religious coping, seem to align with problem-oriented or emotion-oriented coping depending on the sample (Taylor & Stanton, 2007). Nonetheless, these three types of coping have been suggested to be associated with mental health outcomes such as psychological distress for the general population (Taylor & Stanton, 2007). However, whether individuals with mental disorders use the same three styles of coping remains somewhat unclear.

A considerable body of research has focused on the association between coping and mental health. Taylor and Stanton (2007) found that coping as a psychological resource both mediates and moderates the relationship between stress and psychological outcomes. With respect to the three coping domains discussed earlier, they reported that problem-oriented coping was associated with fewer depressive symptoms, while emotion-oriented and avoidance were associated with increased depressive symptoms. These authors did not focus on the effect of coping on mental disorders specifically.

Much coping research assesses the mental health manifestations of stress by exploring whether stress and coping lead to mental disorders (e.g. Avison, 2001; Turner et al., 1995). However, such an approach does not apply to individuals already diagnosed with mental disorders; much less research exists on the relationship between coping and psychological outcomes for individuals with diagnosed mental disorders.

Much of the research on the association between coping and psychological outcomes focuses on psychological distress of some kind. For simplicity, this paper refers only to general psychological distress (GPD), understanding that this term encompasses other types of psychological distress. Some studies have found associations between coping and GPD for individuals with a variety of mental disorders. Most of the research in this area has focused on individuals with schizophrenia, and has demonstrated that coping was associated with GPD (Ritsner et al., 2012; Rudnick, 2001; Velligan et al., 2009). Engeman (2013) reported an association between coping and GPD for a population of individuals with multiple types of mental disorders. Two studies found no association, one in individuals with bipolar disorder (Havermans et al., 2007), and the other in people with schizophrenia (Minato & Zemke, 2004). Taken together, these studies suggest an association between coping and GPD; however, there seems to be a lack of research assessing the association between coping and GPD and the stress process model as a whole for a community-dwelling group of individuals with a variety of mental disorders.

In light of the research on the stress process model, this study aimed to answer the following research questions: First, what coping styles do individuals with mental

disorders use, and do they differ from those used by the general population? Second, how well does the stress process model apply to individuals with mental disorders?

## 5.2 Methods

Data for the current study, a secondary analysis, were obtained from the Community-University Research Alliance: Poverty and Social Inclusion program (CURA), a study which was conducted in London, Ontario, Canada. CURA had a convenience sample of 380 adults who were diagnosed with any mental disorder for at least one year at the time of sampling, were 18 years of age or older, were not institutionalized, and were able to provide written informed consent. Ethics approval was obtained from Western University in April, 2011. Various instruments were used, collecting information including, but not limited to, general stress, coping, mastery, social support, and GPD.

General stress, the primary exposure variable, was assessed using the chronic stress scale described by Wheaton (1994) and Turner, Wheaton, and Lloyd (1995). The chronic stress scale is intended to measure current levels of general stress, including aspects of stress related to an individual's mental, physical, and emotional health. The current study did not assess the impact of major life events as stressors. Although the original general stress scale consisted of 51 items, the current version was shortened to include only 18 items, the subscales of which were combined to create an overall index of general stress. Within the current sample, the internal consistency of this scale was high (Cronbach's  $\alpha=0.80$ ).

Coping, mastery, and social support were assessed for potential mediating or moderating effects on the relationship between general stress and GPD. The coping questionnaire used for the current study was originally developed for the Canadian Community Health Survey Cycle 1.2 on mental health and well-being (CCHS 1.2), and includes items from three coping instruments: the Ways of Coping – Revisited (Folkman & Lazarus, 1985), the Coping Strategy Indicator (Amirkhan, 1990), and the COPE scale (Carver et al., 1989; Statistics Canada, 2002). In order to determine the styles of coping used by individuals with mental disorders, an exploratory factor analysis (EFA) was

conducted using principal components analysis. Extracting eigenvalues greater than one, and using a varimax rotation method, three coping styles were found in the CURA sample, accounting for 41.13% of the survey variance. Problem-oriented coping included the following items: problem-solving, talking to others, exercising, seeking spiritual help, relaxing, and looking on the bright side (Cronbach's alpha = 0.59). Avoidance consisted of avoiding people, self-blame, and wishful thinking (Cronbach's alpha = 0.45). Finally, substance coping included smoking cigarettes, drinking alcohol, or using drugs or medication to cope with stress (Cronbach's alpha = 0.31). Low internal consistency estimates for these coping scales could be due to the low number of items in each factor (Wang et al., 2009).

Mastery was assessed using a seven-item mastery scale, described by Pearlin and Schooler (1978), which is intended to measure the level of control an individual perceives in his/her life. The internal consistency of the mastery scale was found to be acceptable for the current sample (Cronbach's alpha = 0.70).

The social support scale used for the current study has been described in detail by Sherbourne and Stewart (1991). This 19-item scale is a shortened version of the original 50-item scale, intended to measure total perceived social support. The internal consistency of this scale was very high for the current sample (Cronbach's alpha = 0.96)

GPD, the mental health outcome measure, was assessed using the Kessler 6 (K6) distress scale (Kessler et al., 2002). The K6 is intended to measure multiple aspects of mental health, including depression anxiety, and general psychological well-being (Veit & Ware, 1983). This six-item measure had a high internal consistency in the current sample (Cronbach's alpha=0.87).

The statistical analysis for the current study was completed in four steps, using SAS 9.3<sup>®</sup> (The SAS system for Windows computer program, 2011). First, demographic, explanatory, and outcome variables were described in terms of frequencies and percentages, for categorical variables, and means and standard deviations, for continuous variables. As GPD was used as an outcome for linear regression, its normality was assessed by a visual inspection of a histogram. Second, bivariate analyses were



examined, using Pearson's correlations, in order to test the multicollinearity assumption of linear regression, and to explore the basic relationships between explanatory variables. Multicollinearity was said to be present if the correlation between two explanatory variables exceeded  $r=0.70$ . Third, linear regression was used in order to assess how the stress process model applies to individuals with mental disorders.

First, GPD was regressed on only general stress as a starting point. Next, problem-oriented coping, avoidance, substance coping, social support, and mastery were added to the model – one at a time – to assess their mediating effects. Problem-oriented coping, avoidance, and substance coping were then entered simultaneously into the regression equation to assess the potential mediating effect of all coping styles together. Finally, all psychological resources were added to the model together to estimate the overall mediating effects of psychological resources. Psychological resources were said to mediate the association between general stress and GPD if their addition changed the regression coefficient by at least ten percent. Fourth and finally, moderation was assessed by adding interaction terms between general stress and each of the psychological resources. Psychological resources were said to be moderators of the association between general stress and GPD if their interaction term was statistically significant ( $p<0.05$ ). Model fit was assessed using the adjusted  $R^2$ .

### 5.3 Results

Out of a total of 380 participants, 282 (74.21%) had complete data for all measures. Demographic characteristics for the sample with complete data are summarized in Table 5.1. The sample with complete data was significantly younger, less likely to have a chronic physical illness, and more likely to be addicted to cocaine or crack than individuals with missing data.

**Table 5.1.** Demographic, explanatory, and outcomes variables.

<b>Variable</b>	<b>Frequency (%)</b>	<b>Mean (SD)</b>
Age		39.79 (14.00)
Sex		
Male	137 (48.58)	
Female	145 (51.42)	
Any Children	133 (47.16)	
Psychiatric Diagnosis		
Mood Disorder	177 (62.77)	
Anxiety Disorder	110 (39.01)	
Substance-Related Disorder	83 (29.43)	
Schizophrenia	65 (23.05)	
Disorder of Childhood	57 (20.21)	
Other/Unknown	48 (17.02)	
Current Living Arrangement		
Lives with Unrelated Person	168 (59.57)	
Lives Alone	56 (19.86)	
Lives with Family	58 (20.57)	
Marital Status		
Single/Never Married	179 (63.48)	
Separated/Divorced	62 (21.99)	
Married/Common Law	32 (11.35)	
Widowed	9 (3.19)	
Currently Employed	73 (25.89)	
Chronic Physical Illnesses	165 (58.51)	
Current Addiction(s)	218 (77.30)	
Tobacco	183 (64.89)	
Caffeine	83 (29.43)	
Marijuana	85 (30.14)	
Alcohol	61 (21.63)	
Prescription Drugs	39 (13.83)	
Cocaine/Crack	39 (13.83)	
Other	25 (8.87)	
Currently on Mental Health Medication	176 (62.41)	
Ever Had a Psychiatric Hospitalization	165 (58.51)	
Ever Had a Head Injury	132 (46.81)	
Age of First Head Injury (n=132)		17.52 (13.66)
Number of Head Injuries (n=132)		6.36 (18.73)
Ever Been Homeless	183 (64.89)	
Age of First Homelessness (n=183)		25.76 (11.96)
Number of Times Homeless (n=180)		4.72 (7.13)
General Psychological Distress		9.52 (6.10)
General Stress		6.20 (3.37)
Coping		
Problem-oriented Coping		10.74 (3.57)
Avoidance		6.30 (2.10)
Substance Coping		3.85 (2.76)
Social Support		43.79 (19.44)
Mastery		15.91 (4.90)

n=282

Descriptive statistics for the variables of interest for the mediation and moderation analysis – general stress; problem-oriented coping, avoidance, and substance coping; mastery; and social support – are summarized in Table 5.1. GPD was determined to be normally distributed. Correlations between the explanatory variables are listed in Table 5.2. No correlations exceeded 0.70, so all explanatory variables were retained in the regression models.

**Table 5.2.** Pearson’s correlations between explanatory and outcome variables.

	GPD	General Stress	Problem-oriented Coping	Avoidance	Substance Coping	Mastery	Social Support
GPD		0.54	-0.33	0.45	0.31	-0.55	-0.25
General Stress			-0.19	0.36	0.35	-0.43	-0.25
Problem-oriented Coping				-0.12	-0.18	0.23	0.14
Avoidance					0.29	-0.33	-0.09
Substance Coping						-0.13	-0.17
Mastery							0.21

n=282

Table 5.3 shows the association between general stress and GPD, and the mediating effects of psychological resources. In the first model, without any psychological resources included, there was a strong, positive association between general stress and GPD ( $b=0.98$ ;  $p<0.0001$ ), an association which persisted throughout all models, regardless of which psychological resources were considered. All psychological resources were significantly associated with GPD ( $p<0.05$ ). When considered independently, problem-oriented coping, substance coping, and mastery each mediated the association between general stress and GPD (changed stress regression coefficient by 20.41%, 10.20%, and 31.63%, respectively). Considered together, problem-oriented coping, avoidance, and substance coping mediated the association between general stress and GPD, changing the general stress regression coefficient by 29.59%. Finally, all psychological resources considered together also mediated the association between general stress and GPD, as they changed the general stress regression coefficient by

53.06%. Model 8, including all psychological resources, accounted for almost half of the variance in GPD (Adjusted  $R^2 = 0.48$ ).

Table 5.4 summarizes the moderation effects of psychological resources on the association between general stress and GPD. Since no interaction terms were statistically significant, it was concluded that none of the psychological resources moderated the association between general stress and GPD.

**Table 5.3.** Mediation analysis of psychological resources on the relationship between general stress and GPD.

	<b>Model 1</b> b(β)	<b>Model 2</b> b(β)	<b>Model 3</b> b(β)	<b>Model 4</b> b(β)	<b>Model 5</b> b(β)	<b>Model 6</b> b(β)	<b>Model 7</b> b(β)	<b>Model 8</b> b(β)
General Stress	0.98(0.54) <sup>d</sup>	0.90(0.50) <sup>d</sup>	0.78(0.43) <sup>d</sup>	0.88(0.49) <sup>d</sup>	0.92(0.51) <sup>d</sup>	0.67(0.37) <sup>d</sup>	0.69(0.38) <sup>d</sup>	0.46(0.26) <sup>d</sup>
Problem-oriented Coping		-0.40(-0.24) <sup>d</sup>					-0.37(-0.21) <sup>d</sup>	-0.27(-0.16) <sup>c</sup>
Avoidance			0.84(0.29) <sup>d</sup>				0.76(0.26) <sup>d</sup>	0.59(0.20) <sup>d</sup>
Substance Coping				0.31(0.14) <sup>b</sup>			0.14(0.06)	0.19(0.08)
Social Support					-0.04(-0.13) <sup>a</sup>			-0.02(-0.07)
Mastery						-0.48(-0.38) <sup>d</sup>		-0.38(-0.31) <sup>d</sup>
Constant	3.47 <sup>d</sup>	8.32 <sup>d</sup>	-0.63	2.84 <sup>d</sup>	5.55 <sup>d</sup>	12.96 <sup>d</sup>	3.82 <sup>b</sup>	12.34 <sup>d</sup>
Adjusted R <sup>2</sup>	0.29	0.34	0.36	0.31	0.30	0.41	0.41	0.48
Change in general stress effect (%)	---	8.16(7.41)	20.41(20.37)	10.20(9.26)	6.12(5.56)	31.63(31.48)	29.59(29.63)	53.06(51.85)

n=282; <sup>a</sup>p<0.05; <sup>b</sup>p<0.01; <sup>c</sup>p<0.001; <sup>d</sup>p<0.0001

**Table 5.4.** Moderation analysis of psychological resources on the relationship between general stress and GPD.

	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>	<b>Model 4</b>	<b>Model 5</b>
	b(β)	b(β)	b(β)	b(β)	b(β)
General Stress	1.32(0.73) <sup>d</sup>	0.48(0.26)	0.90(0.50) <sup>d</sup>	1.13(0.63) <sup>d</sup>	0.76(0.42) <sup>b</sup>
Problem-oriented Coping	-0.15 (-0.09)				
Avoidance		0.57(0.20) <sup>a</sup>			
Substance Coping			0.34(0.16)		
Social Support				-0.01 (-0.02)	
Mastery					-0.45 (-0.36) <sup>c</sup>
General Stress*Problem-oriented Coping	-0.04 (-0.27)				
General Stress*Avoidance		0.05(0.23)			
General Stress*Substance Coping			-0.00 (-0.02)		
General Stress*Social Support				-0.01 (-0.15)	
General Stress*Mastery					-0.01 (-0.05)
Constant	5.56 <sup>b</sup>	0.96	2.74 <sup>b</sup>	4.07 <sup>a</sup>	12.40 <sup>d</sup>
Adjusted R <sup>2</sup>	0.35	0.36	0.30	0.30	0.41

n=282; <sup>a</sup>p<0.05; <sup>b</sup>p<0.01; <sup>c</sup>p<0.001; <sup>d</sup>p<0.0001

## 5.4 Discussion

The results presented above are situated within current literature on the stress process model, paying particular attention to manifestations of stress, and mediators and moderators of stress. First, stress levels are compared to that of the general population. Second, the coping styles used by individuals with mental disorders are compared to those used by the general population. Then, the association between stress and GPD are situated within current knowledge. Finally, mediators and moderators of the stress-GPD relationship are discussed. Each of these pieces helps paint a picture of how well the stress process model applies to individuals with mental disorders.

The mean level of stress for the current sample was 6.20 (SD=3.37; range=0-14). By comparison, in the 1994-1995 National Population Health Survey, the mean level of stress was estimated to be 2.73 (SD=2.39; range=0-14) in a nationally representative sample of Canadians (Statistics Canada, 1994). Although this comparative data is considerably older than the CURA data, the stress scale was calculated in the exact same way, so the comparison remains valuable. The considerably higher levels of chronic stress found among individuals with mental disorders echoes other research. For example, the World Health Organization points out that individuals with depression may experience greater levels of stress (2012). Such differences in stress exposure beg the question as to whether individuals with mental disorders cope differently than the population at large.

As mentioned, three broad types of coping – problem-oriented, emotion-oriented, and avoidance – have been identified. An assessment of whether individuals with mental disorders use different coping styles than the general population required a direct comparison, using the same coping instrument and the same methods. The current coping instrument was also used by Wang et al. (2009), who performed an EFA on the CCHS 1.2 sample, a nationally representative sample. They found three coping styles. Avoidance included avoiding people, sleeping more, changing eating habits, self-blame, and wishful thinking. Problem-solving coping consisted of solving the problem, talking to others, relaxing by doing something enjoyable, and seeing the bright side. Finally, behavioural coping included smoking cigarettes, drinking alcohol, and using drugs or medication. The factors found for the CURA sample were different. The avoidance domain in individuals with mental disorders differed from that seen in the Canadian population, and included avoiding people, self-blame, and wishful thinking. Problem-oriented coping included problem-solving, talking to others, exercising, seeking spiritual help, relaxing, and looking on the bright side. Finally, substance coping included smoking cigarettes, drinking alcohol, or using drugs or medication. Although the substance coping style contained the same specific coping items found in the behavioural coping domain found in the general population, the other coping styles differed.

Both populations seem to use avoidance and problem-oriented coping. However, sleeping more and changing eating habits are not used as avoidance strategies by individuals with mental disorders, as these items did not load on this factor in the CURA sample. The absence of these two strategies is interesting in that they are both somatic forms of coping. Particularly, as 62.41% of this population was taking mental health medications, it is possible that sleeping and eating more did not emerge as avoidance forms of coping because this population already has altered eating and sleeping patterns because of their mental disorder, use of mental health medications, or both. Similarly, problem-oriented coping among individuals with mental disorders differed from that found in the general population, as it included exercising and seeking spiritual help. It seems that these two coping responses are more beneficial and consistent with positive coping for individuals with mental disorders. Although coping looks slightly different for individuals with mental disorders, the association between stress and GPD looks similar.

The positive association between general stress and GPD was strong for individuals with mental disorders, regardless of which mediators are considered (regression coefficient=0.98 for unadjusted model;  $p < 0.0001$  for all models), echoing results found by other studies. For example, Turner et al. (1995) showed an association between chronic stress and distress symptoms among Canadian adults. Later, Brown (2002) demonstrated that stressful situations led to psychological symptoms that did not culminate in the diagnosis of a mental disorder. Also, Serido, Almeida, and Wethington (2004) found that chronic stress was associated with psychological distress for a representative sample of American adults. Based on the present results, it seems as though the strong association between chronic stress and distress seen in the general population persists for individuals with mental disorders.

Aside from the manifestations of stress, the stress process model postulates that coping, mastery, and social support may mediate or moderate this association. In the present study, avoidance, substance coping, and mastery mediated the stress-GPD association when considered independently, as did the three coping styles considered together, and all psychological resources considered together. From these results, it appears as though mastery is the strongest independent mediator.



Mastery has been well-established as a mediator of the stress process, with both theoretical and empirical support (Aneshensel, 1992; Schieman, 2010). The dramatic mediation effect of mastery demonstrated by the present results is suggested in other stress process literature. Schieman (2010) points out that “Pearlin...helped make...mastery one of the most prominent...features of the stress process model” (p. 55). In light of this importance, mastery seems to have as large an effect for individuals with mental disorders as it does for the general population. In fact, mastery had a larger impact on the stress-GPD relationship than coping for the current sample.

Problem-oriented coping has been demonstrated to mediate the relationship between stress and distress (Garland, Gaylord, & Fredrickson, 2011; Garland, Gaylord, & Park, 2009). However, the present data do not support these findings, indicating that problem-oriented forms of coping may not play the same role for individuals with mental disorders. Conversely, avoidance and substance coping mediated the association between stress and GPD, and were positively associated with both stress and GPD such that individuals with higher levels of stress also had higher levels of avoidance and substance coping, and higher levels of GPD (see Table 5.2 for correlations). It seems, then, that avoidance and substance coping exacerbated the effects of stress on GPD, a finding which agrees with previous literature; avoidance has been shown to worsen the effects of stress on psychological outcomes (Holahan, Moos, Holahan, Brennan, & Schutte, 2005; Taylor & Stanton, 2007), and coping with stress using substances – particularly drinking alcohol – has been linked to depressive symptoms (Holahan, Moos, Holahan, Cronkite, & Randall, 2003). Although avoidance and substance coping mediated the stress-GPD association in expected ways, the contradictory findings with respect to the mediation effects of problem-oriented coping suggest that problem-oriented coping may play a different role for individuals with mental disorders than for the general population.

The lack of mediation support for social support was also striking. Various reviews indicate the social support plays a crucial role in the stress process for the general population (DeLongis & Holtzman, 2005; Turner & Turner, 1999). Therefore, it seems as though social support plays a more minor role in the stress process for individuals with mental disorders than it does for the general population. However, social support is a very

complex phenomenon, with different types of social support and satisfaction with social support playing a role in the effectiveness of such support (DeLongis & Holtzman, 2005), so more information about social support may be needed in order to fully understand the effect of social support on the stress process for individuals with mental disorders.

Coping styles considered together, and all psychological resources considered together were found to mediate the stress-GPD relationship. However, these findings are difficult to interpret as some of the psychological resources are positive in nature, while others are negative. Moreover, the large proportion of variance explained by models seven and eight suggests that while psychological resources may play a unique role for individuals with mental disorders compared to the general population, together they are still important factors that play a large role in the stress process model.

Finally, no moderation effects of any of the psychological resources considered in the current analysis were demonstrated. In essence, this means that the current study does not support the “buffering hypothesis” of stress, where the effect of stress on psychological outcomes is thought to have a different magnitude, depending on one’s levels of psychological resources (Avison & Thomas, 2010). While some studies suggest support for such a buffering hypothesis (Turner et al., 2004), others show unclear results (Moskowitz, Vittinghoff, & Schmidt, 2013). In light of this, the literature seems to support mediation by psychological resources more than moderation, or buffering; the findings here support this. Overall, however, the current results suggest that the stress process model indeed applies to individuals with mental disorders, with coping and mastery playing the largest roles. Furthermore, it seems that the structure of coping differs for those with mental disorders.

Although these results are suggestive, this work is certainly not without limitations. First, this study was cross-sectional in nature. As such, no directionality should be inferred. All that can be said is that an association was found between stress and GPD, and that some psychological resources affected this association; it cannot be claimed that one variable caused an effect in the other. Furthermore, the current sample was a convenience sample of individuals with mental disorders, and excluded

institutionalized individuals. Such a sampling strategy may mean that the current sample is not entirely representative of individuals with mental disorders. Also, the recruitment of participants from community agencies could have led to selection bias. Nonetheless, the importance for generalizability of a sample of community-dwelling individuals with a variety of mental disorders cannot be overstated, as many studies on this topic use clinical samples of individuals with very specific inclusion and exclusion criteria.

## 5.5 Conclusion

Despite the limitations of this work, the results are indeed promising. As the prevalence of mental disorders grows in Canada, so too does interest in possible ways to alleviate distress in such an already burdened population. The current research suggests that efforts to improve mastery and coping for individuals with mental disorders may provide a pathway to decreasing distress for individuals with mental disorders.

## 5.6 References

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## Chapter 6

### 6 Discussion and Conclusions

The primary objective of this thesis was to apply the stress process model to an understudied population – those living in the community with a diagnosed mental disorder. In terms of bivariate relationships, it was found that stress and GPD were strongly positively related. Avoidance, substance coping, and mastery independently mediated the stress-GPD relationship, as did all styles of coping considered together, and all psychological resources considered together. There was no evidence for moderation of the stress-GPD relationship by any psychological resource. With respect to coping, the structure of coping was similar to that found in a representative Canadian sample, with the exception that changing eating habits and sleeping more were not part of any coping styles for the Community-University Research Alliance: Poverty and Social Inclusion program (CURA) sample, whereas seeking spiritual help and exercising were. However, it appears as though individuals with mental disorders may use these coping styles to different degrees than the Canadian population at large. Overall, then, it seems as though the stress process model applies to individuals with mental disorders, with some slight variations.

#### 6.1 Findings Consistent with Previous Literature

Overall, the findings from the present study agreed with previous literature on the stress process model for individuals with mental disorders. Descriptive statistics were largely similar to those found in studies of other samples of individuals with mental disorders, while these descriptors differed from the general Canadian population. Additionally, the strong association between stress and GPD has been found elsewhere, using a wide variety of populations. Previous literature echoes the finding that mastery, avoidance, and substance coping mediate the stress-GPD relationship, and generally speaking, moderation of the stress-GPD relationship by psychological resources is not well-supported in the literature. Finally, the structure of coping was similar to a study investigating the coping structure for the general Canadian population.

In applying a theory to a novel or understudied population, there are two major possible explanations for deviations from results obtained in the general population. One is a fundamental lack of theoretical applicability, the other relates to key methodological factors such as differences in sampling, measurement, or statistical analysis. Descriptive statistics can help address questions of sampling differences.

### 6.1.1 Descriptive Statistics

Generally speaking, this thesis found that the descriptive statistics of the CURA sample approximated other samples of individuals with mental disorders, and differed from the Canadian population at large. See Table B3 for a comparison of stress process indicators (i.e. general stress, coping, social support, mastery, and general psychological distress (GPD)) between the CURA sample and the Canadian population.

#### 6.1.1.1 Demographics

Table 5.1 summarized demographic and stress process indicators for the CURA sample. Sampling was stratified by sex, living situation, and employment, so any differences found in these variables exist by design. In the CURA sample, all participants had a diagnosis of a mental disorder, and the most common diagnoses seen for the current sample agree with the most common mental disorders found in the Canadian population, although schizophrenia was more common in the CURA sample (Health Canada, 2002). Additionally, Table 5.1 showed that many individuals reported having been diagnosed with more than one mental disorder in the past, as the percentages of individuals diagnosed with at least one mental disorder adds up to over 100%. It is likely that comorbidity was high in the current sample, as mental disorders are chronic in nature. Among individuals with mental disorders in the United States, approximately 45% have been estimated to have more than one disorder (Kessler, Chiu, Demler, & Walters, 2005). Although precise estimates are lacking in Canada, comorbidity has been suggested to be high (Rush et al., 2008). In addition to comorbid mental disorders, comorbid chronic physical illnesses were also common in the CURA sample, findings which are in agreement with those found in a recent review (De Hert et al., 2011). The majority of CURA participants reported having an addiction, an estimate that is much higher than a

2008 estimate in which Rush et al. found that approximately 20% of Canadians with a diagnosed mental disorder had a co-occurring substance use issue. Addictions could be higher in the CURA sample for two primary reasons. First, substance-related disorders were considered mental disorders for this study, and are often excluded from other estimates of mental disorders. Second, the CURA questionnaire includes caffeine within current addictions, whereas caffeine was typically not included in other estimates of addictions, such as that by Rush et al. (2008).

Table 5.1 indicated that past homelessness was an issue for this sample, although the history of homelessness in this sample is difficult to interpret because the sample was stratified by current living situation (see Figure 3.1). Additionally, Canadian literature indicates that homeless individuals, especially those with mental disorders, often disproportionately experience assault or abuse (Everett, 2012). Likely, such abuse associated with homelessness at least partially explains the high prevalence of past head injuries in this sample, although other studies have noted high levels of head injuries for individuals with mental disorders (Schwarzbold et al., 2008).

Finally, health service utilization variables were summarized in Table 5.1. Most of the CURA sample was taking mental health medications. This estimate seems quite high, given that a 2005 study on the Canadian Community Health Survey Cycle 1.2 on mental health and well-being (CCHS 1.2) sample found that only 19.3% of individuals with a past Composite International Diagnostic Interview diagnosis of a mental disorder used psychotropic medications (Beck et al.). However, over-the-counter pain medication was included in the estimate of mental health medication use for the CURA sample, which could explain the high estimates seen here as these medications are not included in other estimates. Also, the CURA sample tended to include individuals with diagnoses indicative of serious and persistent mental disorders, which may make them more likely to take medications. In addition to medication use, over half of the CURA sample reported a past psychiatric hospitalization. Although Canadian comparative data are sparse, this estimate seems high. However, it could be high because the CURA sample was stratified to ensure that over a quarter were homeless individuals, who have been

demonstrated to use more hospital services than non-homeless individuals (Shepherd, 2013).

Generally, the CURA sample appears to be comparable to other samples of individuals with mental disorders. For example, the most common diagnoses were similar to Canadian estimates, as were levels of mental and physical comorbidities. In some respects the CURA sample seems different from Canadian norms; addiction was more prevalent, as was health care utilization. However, it is difficult to determine whether these are artifacts of the sampling strategy (see Figure 3.1).

#### 6.1.1.2 Stress Process Indicators

Table B3 summarizes the differences in stress process indicators between the CURA sample and the Canadian population. The CURA sample seemed to fare worse in terms of these indicators, with higher levels of general stress, avoidance and substance coping, and GPD, and lower levels of problem-oriented coping, social support, and mastery. These differences are not surprising, and fit with other literature. For example, Eklund, Erlandsson, and Hagell (2012) found that Swedish individuals with mental disorders have lower mastery levels than the healthy Swedish population. It is also expected that the CURA sample would have higher levels of GPD when compared to the Canadian population, as GPD includes mental health symptoms such as depression and anxiety, and a high proportions of the CURA sample reported mood and/or anxiety disorders. It is important to compare descriptive statistics of stress process indicators for the CURA sample to the larger Canadian population, as this adds another layer of understanding to how the stress process applies to individuals with mental disorders specifically.

#### 6.1.2 The Relationship between General Stress and General Psychological Distress

As Table 5.3 shows, the positive association between general stress and GPD was very strong for individuals with mental disorders, regardless of which mediators were considered. This result is consistent with general population samples, since the association between general stress and mental health has been well-documented

throughout the literature. It is worth noting that there is considerable debate within stress process research about whether psychological manifestations of stress should take the form of mental disorder diagnosis or more general distress symptoms (Horwitz, 2007). However, this debate does not apply to the current study, as mental disorders cannot be used as an outcome for individuals already diagnosed. Therefore, the association between stress and mental disorders will not be discussed.

There has been a wealth of literature investigating the association between stress and mental health outcomes other than mental health diagnoses. For example, Turner et al. (1995) reported an association between chronic stress and distress symptoms among Canadian adults. Later, Brown (2002) demonstrated that stressful situations can lead to psychological symptoms that may not culminate in the diagnosis of a mental disorder. Serido, Almeida, and Wethington (2004) demonstrated that chronic stress is associated with psychological distress for a representative sample of American adults. The present results suggest that the strong association between chronic stress and distress reported in the general population persists for individuals with mental disorders. Different organizations have also echoed this finding. For example, the National Institute of Mental Health in the United States noted that both chronic stress and stressful life events can lead to depressed mood, anger, and irritability (2013). In a Canadian context, the Canadian Mental Health Association warned that stress can affect mental health (2013). The present results closely align with what previous literature has shown. They also highlight the importance of finding effective ways to manage such stress; in other words, the mediators and moderators of the stress-mental health relationship are crucial.

### **6.1.3 Mediation of the General Stress-General Psychological Distress Relationship by Mastery**

Mastery was the most significant independent mediator of the association between general stress and GPD. This is a consistent finding, as mastery is well-supported throughout the literature as playing a vital role in the stress process, with both theoretical and empirical support (Aneshensel, 1992; Schieman, 2010). Additionally, Turner, Taylor, Van Gundy (2004) found that mastery was a significant mediator in the stress process. Schieman (2010) points out that “Pearlin...helped make...mastery one of the most

prominent... features of the stress process model” (p. 55). From the results seen here, it seems as though mastery has a very large impact on the stress process model for the population at large, as well as for individuals with mental disorders. In fact, mastery and general stress accounted for 41% of the variance in GPD, an increase of 12% over general stress alone. This was more variance than any other psychological resource examined independently, and the same amount of variance as the three coping styles together. Therefore, it seems as though mastery is as crucial for individuals with mental disorders as it is for other populations, and can have a large positive mediation effect on the general stress-GPD relationship.

#### 6.1.4 Mediation of the General Stress-General Psychological Distress Relationship by Avoidance and Substance Coping

Overall, avoidance and substance coping acted in expected ways, as both seem to increase with general stress and GPD. The present results demonstrated that the use of avoidance mediated the general stress-GPD relationship, and was positively correlated with both general stress and GPD. More specifically, it seems that avoidance coping was used more by individuals with higher levels of stress, which may, in turn, lead to higher levels of GPD. Such associations agree with results found in other literature. For example, a review by Taylor and Stanton (2007) found that avoidance exacerbated distress for a variety of populations. Similarly, Mausbach et al. (2006) reported that avoidance increased the relationship between caregiver stress and depression. The results reported here also similarly suggest that avoidance was a mediator in the stress process for individuals with mental disorders.

Substance coping also mediated the association between general stress and GPD for the CURA sample. Similar to avoidance, substance coping was positively correlated with both stress and GPD, such that individuals with higher levels of substance coping had higher levels of general stress and GPD. Previous research has echoed these findings, as coping with stress by using substances – particularly drinking alcohol – has been linked to depressive symptoms, which are a key component of GPD (Holahan et al., 2003). These similar findings suggest that avoidance and substance coping play similar roles for individuals with mental disorders as they do for the general population.

In addition to the independent mediation effects of avoidance and substance coping, the three styles of coping together were found to significantly mediate the relationship between general stress and GPD. The mechanisms by which these coping strategies together mediate the general stress-GPD relationship are difficult to interpret, as problem-oriented coping is conceptualized as being beneficial, while avoidance and substance coping are typically conceptualized as harmful. Indeed, the correlation between the coping styles, stress, and GPD indicate that individuals who used more problem-oriented coping had lower levels of general stress and GPD, while individuals who used more avoidance and substance coping had higher levels of general stress and GPD (see Table 5.2). What is also interesting here is that general stress and the three coping styles accounted for 41% of the variance in GPD, compared to 29% when only general stress was considered. Therefore, it seems as though coping as a whole plays a large role in GPD for individuals with mental disorders. As coping has been suggested to be a crucial psychological resource in previous literature on the stress process model, this result is not surprising.

### 6.1.5 Moderators of the General Stress-General Psychological Distress Relationship

Although there is some evidence of mediation in this analysis, there is no evidence of moderation. Moderation within the stress process is termed the “interactive buffering hypothesis”, or simply “buffering”, where the effect of stress on distress differs depending on an individual’s level of psychological resources (Avison & Thomas, 2010). Conceptually, Wheaton (1985) and Avison and Thomas (2010) distinguish between mediation and moderation within the stress process model. Pearlin (1999) points out that there is nothing about these resources that distinguishes them conceptually as either mediators or moderators; rather, the distinction between mediation and moderation reflects the idea that psychological resources are multi-faceted and play many roles within the stress process model, as well as being methodologically distinct. It is difficult to situate the moderation results here within the stress process literature, as there is far less research on stress buffering than mediation (Kiviruusu et al., 2013). However, Aneshensel (2009) found that two-way interaction terms between stress and



psychological resources were not statistically significant, suggesting that no stress buffering, as it is being conceptualized in this thesis, was occurring in their study. However, Turner, Taylor, and Van Gundy (2004) found evidence for stress buffering by each of the psychological resources they studied (mattering, emotional reliance, assertion of autonomy, mastery, and self-esteem). Overall, however, mediation seems to have more empirical support than moderation. The results presented in this thesis, suggesting no moderation by psychological resources for individuals with mental disorders, seem to be in agreement with much of the current research.

### 6.1.6 A Stress Process Model for Individuals with Mental Disorders

Historically, the interest in psychological resources for the stress process derived from various studies demonstrating that although stress is consistently related to distress, it accounts for relatively little variance, usually less than ten percent (Turner & Roszell, 1994). Blalock and Joiner (2000) suggest that the variance in mental health outcomes accounted for by stress may be slightly higher, at 15%. Interestingly, the present results told a different story, as general stress accounted for 29% of the variance in GPD, suggesting that general stress may play a larger role for individuals with mental disorders than for the population at large. When all psychological resources are considered together, 48% of the variance in GPD is accounted for. Most studies assess different psychological resources, so a direct comparison of the amount of variance accounted for is difficult. However, Turner, Taylor, and Van Gundy (2004) found that demographic factors, five psychological resources, socio-economic status, and stress accounted for 28% of the variance in depressive symptoms. Although these studies are methodologically distinct and measure slightly different concepts, the amount of variance accounted for in the current study is high for studies of this type, suggesting that general stress and psychological resources play a vital role in the mental well-being of individuals with mental disorders.

In addition to the large amount of variance in GPD accounted for by psychological resources, such resources seem to have a mediating, rather than moderating role within the stress process model. While this does not provide any information about

the nature of these resources on their own, Pearlin (1999) points out that distinguishing mediating from moderating resources may provide some insight into the mechanism by which such resources may affect the stress-GPD relationship. Mediation implies that psychological resources are factors that intervene between the onset of stress and the onset of GPD, while moderation implies that individuals with different levels of psychological resources experience a different effect of stress on GPD (Avison & Thomas, 2010; Wheaton, 1985). While the cross-sectional nature of this design precludes confirmation of these mechanisms, they are an interesting hypothesis to be tested in longitudinal samples.

Overall these results conform to many aspects of the stress process model. There was a strong association between general stress and GPD, and psychological resources are suggested to play a major role. Despite the fact that this thesis was not equipped to assess the third aspect of the stress process model – causes of stress – the results here suggest that the stress process model indeed applies to individuals with mental disorders. The present results, particularly the presence of mediation but lack of moderation, seem to align with other literature studying the stress process model for individuals with mental disorders (Huang et al., 2008; Reavley et al., 2011; Rudnick, 2001).

### 6.1.7 The Structure of Coping

Coping was a central focus of this thesis, as coping has been suggested to play a particularly important role within the stress process and has received much attention (Avison & Thomas, 2010; Folkman & Lazarus, 1980). The structure of coping has been well-established for the general population, and a long history of research has found three broad coping styles. Briefly, problem-oriented coping is the most constructive style, where individuals cope by addressing the source of stress in an attempt to eliminate the stressor altogether. By contrast, emotion-oriented coping is a less constructive style, where individuals cope by trying to improve their emotional state, rather than altering the stressor itself. The third style is avoidance, where individuals cope by attempting to distract themselves altogether (Billings & Moos, 1984; Folkman & Lazarus, 1980; Folkman et al., 1986; Kohn et al., 1994; Roybyrne et al., 1992). However, the structure of coping among respondents from the CURA sample indicated that individuals with mental

disorders may employ different coping styles than the general population. The coping styles found for the CURA sample will be situated within these three broad types, and compared to an exploratory factor analysis done on the same coping instrument (Wang et al., 2009). These two comparisons helped to determine whether individuals with mental disorders use different coping styles than the general population.

Here, three different coping styles were found – problem-oriented coping, avoidance, and substance coping. Problem-oriented coping appears to be similar to the problem-oriented coping style found in previous literature. It included the specific coping responses of problem-solving, talking to others, exercising, seeking spiritual help, relaxing, and looking on the bright side. While all of these coping responses may be beneficial, not all of them directly address the source of stress (i.e. exercising, seeking spiritual help, relaxing, and looking on the bright side). This implies that among individuals with mental disorders, those that engage in problem-solving and communication as a means of coping are also more likely to engage in exercising, seeking spiritual help, relaxing, and looking on the bright side. Therefore, although these four responses may not directly address the source of stress, they are used by the same individuals who do attempt to directly alter the source of their stress (i.e. who cope by trying to solve the problem). Wang et al. (2009) found a form of coping that they called problem-solving, which included solving the problem, talking to others, relaxing, and seeing the bright side. The presence of exercising and seeking spiritual help in the problem-oriented coping style for the CURA sample, and not for the problem-solving style found by Wang et al. (2009) for a sample of the general Canadian population implies that these two specific coping responses may be more beneficial for individuals with mental disorders than for the population at large.

The avoidance coping style observed among the CURA sample included the specific coping responses of avoiding people, self-blame, and wishful thinking. This style seems to be akin to the emotion-oriented coping style found for the general population, as the specific coping responses may be attempts to alter the emotional response to stress, rather than the source of stress. However, a key aspect of the avoidance domain is social diversion, which was not asked in the current coping instrument (for a list of coping

items, see Appendix A Section II). Therefore, the avoidance domain found in the CURA sample and the traditional avoidance domain cannot be directly compared. The Wang et al. (2009) factor analysis did allow for a direct comparison, where they also found an avoidance domain, including the specific coping responses of avoiding people, sleeping more, changing eating habits, self-blame, and wishful thinking. The key difference here was that sleeping more and changing eating habits were not present in the avoidance coping style for the CURA sample. This absence implies that when people in the general population use avoidance coping strategies, they also change their eating habits and sleep more, whereas individuals with mental disorders that use avoidance coping strategies do not. It is very interesting that both of these absent coping responses represent somatic forms of coping, in that they are physical, rather than mental, coping efforts. One possible reason for their absence from the coping styles found for the CURA sample is that all individuals in the CURA sample had a mental disorder, many had a comorbid physical illness, and reported taking mental health medications. With such high levels of physical illnesses and mental health medication use, it is possible that changing eating habits and sleeping more did not load on a coping factor because altered eating and sleeping patterns were not coping responses, but may be a result of their mental disorder, medication use, or physical illness.

Finally, substance coping seems to be a distinct coping style for the CURA sample, but is not mentioned in the three predominant coping styles described in the literature. However, this is likely a result of the questionnaire that was used for the CURA sample. Appendix A Section II lists the specific items found in the coping questionnaire used for CURA, and smoking cigarettes, drinking alcohol, and taking drugs or medication are three items asked consecutively (items six through eight). Throughout the literature, these specific coping styles seem to be examined independently of other types of coping, as they are particularly interesting for health and addictions researchers (Aneshensel, Rutter, & Lachenbruch, 1991; Holahan et al., 2003; Reavley et al., 2011). In the analysis by Wang et al. (2009), the same coping style emerged, containing the same items, which the authors referred to as “behaviours”. However, it should be pointed out that many CURA participants reported having a diagnosed substance-related disorder, and the majority reported an addiction. Therefore, although the same substance-oriented

coping style was found in both the general population and individuals with mental disorders specifically, it seems that this is not a distinct coping style, but rather one that is used more often by individuals with mental disorders (see Table B3 for a comparison of substance coping scores). Finally, it should be noted that one item in this coping style asks about coping using “drugs or medication”. It does not distinguish between coping using illicit drugs or prescribed mental health medications, which is especially problematic given the high proportion of the CURA sample that reported an addiction and the high proportion reporting the use of mental health medications. It seems as though coping using tobacco, alcohol, or other illegal drugs may be distinct from coping using prescribed medications. For example, using anti-anxiety medications intended to manage stress to cope seems conceptually different than coping using illicit drugs. In this sense, this particular coping item is confusing, and may be leading to puzzling results here. This points to the need to for further research in the area of substance coping among those with mental disorders.

Generally speaking, the coping styles used by individuals with mental disorders appear to differ from the three broad types found in the literature. However, it is difficult to compare the CURA coping styles to those found in the coping literature, because different coping instruments are used. Rather, it is more appropriate to compare the coping styles found for the CURA sample to those found by Wang et al. (2009) in the CCHS 1.2 sample. When the coping styles used by these two samples are compared, they seem similar, but with some crucial differences. The problem-oriented coping style is different, as exercising and seeking spiritual help seem to be more constructive for individuals with mental disorders than for the general Canadian population. The avoidance coping style is also different, as changing eating habits and sleeping more do not seem to be coping responses at all for individuals with mental disorders, while they were part of the avoidance coping style for the general Canadian population. Finally, while the substance coping style is identical for both samples, it seems to be used more often among individuals with mental disorders when compared to the Canadian population. Therefore, while the coping styles used by individuals with mental disorders may seem similar to those used by the general population, there are key differences to keep in mind before examining how coping impacts the stress process model for

individuals with mental disorders. Overall, these differences in coping structure imply that coping is slightly different among individuals with mental disorders compared to the general population, which is not a surprising result.

## 6.2 Findings Inconsistent with Previous Literature

Although many of the current results align with previous research, there are some results that are surprising. Specifically, the lack of mediation by problem-oriented coping and social support was surprising. It is likely that these seemingly contradictory results reflect limitations in the design of the current study.

### 6.2.1 Mediation of the General Stress-General Psychological Distress Relationship by Problem-Oriented Coping

Although problem-oriented coping slightly decreased the association between general stress and GPD, problem-oriented coping was determined not to be a substantial mediator. This finding stands in contrast to other research demonstrating that problem-oriented processes of coping may mediate the stress-GPD relationship (Garland et al., 2011; Garland et al., 2009). Longitudinally, Holahan, Moos, Holahan, and Brennan (1997) found that approach-oriented coping, akin to problem-oriented coping, mediated the relationship between social context and depressive symptoms. More recently, Brissette, Scheier, and Carver (2002) found that positive reappraisal as a problem-oriented form of coping acted as a positive mediator. It seems that problem-oriented coping may not play the same role for individuals with mental disorders as it does for other populations.

### 6.2.2 Mediation of the General Stress-General Psychological Distress Relationship by Social Support

Social support did not emerge as a significant mediator of the general stress-GPD relationship. This is an interesting result given that social support has previously been demonstrated to be very influential in the stress process model. In fact, various review articles have found that social support plays a vital role within the stress process for the general population (DeLongis & Holtzman, 2005; Turner & Turner, 1999). Based on the results from the CURA sample, social support may play a more minor role within the

stress process for individuals with mental disorders than for the population at large. However, there are other considerations that merit attention here. For example, social support is multifaceted, and may play multiple roles within the stress process (Avison & Thomas, 2010). In the current social support instrument, for example, there are four social support subscales: emotional or informational support, tangible support, positive social interaction, and affection. However, as social support was not of primary interest here, these subscales were summed to obtain an indicator of total social support. Assessing the mediation effects of different types of social support may yield different results. Additionally, satisfaction with social support is a key factor in the effectiveness of social support for managing stress (DeLongis & Holtzman, 2005). In light of these considerations, further research may be needed to specifically examine the role that different aspects of social support may play in the stress process model for individuals with mental disorders.

### 6.3 Study Limitations

This work is certainly not without limitations. First, this work is cross-sectional and, therefore, no directionality should be inferred. Second, it is possible that selection bias may have affected these results and the associations observed, if people with mental disorders who agreed to the study differ systematically in important ways from those who declined. Third, all data are self-reported, which could affect validity particularly in a sample of individuals diagnosed with mental disorders. Also, it is possible that the mediation observed here is due to the cut-off point chosen. Finally, as this thesis is a secondary analysis, the instruments used may not be the optimal ones to assess the stress process indicators of interest. These limitations could call some of the observed results into question.

The most important limitation for this research is directionality. For this thesis, general stress was conceptualized as the independent variable, psychological resources as mediators or moderators, and GPD as the dependent variable, as Figure 3.1 shows. However, because the design is cross-sectional, it is certainly possible that psychological resources affect the level of general stress in an individual's life, or that GPD can lead to stress. In fact, Hammen (2005) shows that the stress-manifestation research can operate

in both directions; stress certainly leads to illness, but illness can lead to new stress as well. Therefore, although this research suggests that the stress process model applies to individuals with mental disorders, all that can be confirmed is that general stress and GPD are related, and this relationship is affected by some psychological resources.

In addition to the cross-sectional nature of this research, a further limitation is possible selection bias resulting from sample stratification and sample recruitment. Much of the CURA sample was recruited with the assistance of various community agencies. Such a recruitment strategy, while helpful in retaining a sample over time, probably affected the homeless group most, because homeless individuals who make use of these community agencies likely differ systematically from more hidden homeless populations who do not access community services for a variety of reasons. Finally, by sampling approximately one quarter of the sample from group homes, this sample may be biased toward individuals who cannot live on their own and may have more serious mental disorders. However, CURA also recruited individuals using public posters and newspaper advertisements, which may have yielded a sample that more closely represents the population of individuals with mental disorders. Many of the descriptive statistics observed here align with other samples, making it seem as though this sampling did not largely bias the sample. Additionally, assuming this potential sampling bias affected all measures of the stress process in a uniform manner, the association between such variables – the primary focus of this research – should not change.

Another bias which could affect this study stems from the self-reported nature of the data. Particularly, as some of the stress process items are sensitive in nature (i.e. stress from unhappy children, feeling worthless, etc.), it is possible that participants may answer these questions untruthfully. However, this analysis primarily assesses the relationships between variables. Assuming that the bias is consistent across measures for each individual, the self-report bias should not affect these results substantially.

The choice of ten percent as a cut-off for mediation certainly affected the results observed. Although the choice of ten percent is arbitrary, it was necessary to choose a cut-off *a priori*, and use it consistently throughout all mediation analyses. However, it is



entirely possible that some psychological resources play an important role, but happened to change the general stress coefficient by less than ten percent. Therefore, the mediation analyses should be interpreted with the choice of cut-off in mind.

Finally, the present study is a secondary analysis. As such, the instruments used here may not be the optimal instruments to measure stress process indicators. For example, the current general stress scale is limited in that it does not include stressful life events. Additionally, there are other aspects of the stress process model that could not be assessed using the current instruments, including causes of stress and other psychological resources. Having instruments that more fully capture various aspects of the stress process model would strengthen this work.

Although this work is limited by cross-sectional design, possible sampling bias, self-report bias, cut-off for mediation, and the fact that it is a secondary analysis, the results here still provide valuable insight into how stress affects individuals with mental disorders.

## 6.4 Study Strengths

The strengths of this research include the use of continuous, rather than dichotomous indicators, the multitude of diagnoses within the sample, and the non-clinical nature of this sample. These positive aspects highlight the strengths of this research, and enhance the generalizability of this research.

As mentioned earlier, keeping scales continuous is often preferred over dichotomizing them into high and low levels based on somewhat arbitrary cut-offs. This is especially relevant when talking about mental health outcomes. Much stress process research has focused on the effect of stress on the likelihood of an individual having high levels of distress or some other mental health metric. Dichotomizing measures is problematic because it ignores variation that may exist within the high and low groups. For example, two individuals may have very similar scores, and hence little true difference in their mental health based on that metric, but one may be considered high and low despite such similarities. The current research overcomes this in the sense that

the outcome measure is continuous and therefore retains as much variation in GPD as possible. The same is true of the exposure variable, general stress, and the psychological resources. Much of the literature dichotomizes these measures into high and low levels, masking true differences that may exist. In the current study, each measure is kept continuous, so much of the unique variation from each individual is retained for use in linear regression analysis, rendering the analysis more powerful.

Just as variation in the measures is important, so too is variation in the sample. As mentioned in Section 2.3, much of the existing research on individuals with mental disorders was conducted on samples of individuals with specific mental disorders, particularly schizophrenia. Additionally, many studies have strict exclusion criteria, such as an organic disorder, comorbid physical illness, or head injury. These exclusion criteria likely result in healthier individuals being selected for these studies, so they may not reflect the true population of individuals with mental disorders. Further, many health and social services are organized such that they provide services to individuals with a variety of mental disorders, rather than a single type. Therefore, it makes sense to do research with potential intervention possibilities on heterogeneous samples of individuals with a variety of mental disorders. Also, the benefit of relaxing exclusion criteria cannot be overstated, as this brings the sample closer to what individuals with mental disorders truly look like within the population, improving upon the generalizability of this research.

Another aspect that improves the external validity of this work is that the current sample was not recruited from a clinical setting. Much of the current literature was conducted on individuals with mental disorders recruited samples from hospitals, clinics, or other medical establishments. However, not all individuals with mental disorders are currently in treatment. It is reasonable to assume that everyone with a diagnosed mental disorder would have been in some form of medical treatment at some point, in order to obtain their diagnosis from a health professional. However, just because an individual was in care at one time does not mean that they are currently receiving any mental health treatment, so recruiting from clinical settings may introduce substantial selection bias into the sample. The CURA sample overcomes this, as the sample was recruited from the wider community. The fact that all individuals in the CURA sample are community-

dwelling, may or may not be seeking medical care, and have a variety of mental disorders make the current results much more generalizable to other populations of individuals with mental disorders.

## 6.5 Future Research

In order to address the limitations of the present study, numerous steps could be taken to assess whether the stress process model applies to individuals with mental disorders as a primary research objective. First, measuring other aspects of stress, psychological resources, or psychological manifestations of stress would create a more comprehensive understanding of the stress process model. For example, measuring stressful life events in addition to chronic general stress would allow for a more complete measurement of the stress universe. Additionally, measuring other psychological resources that have been suggested to affect the stress process, such as self-esteem or autonomy, may help to determine whether these factors similarly impact individuals with mental disorders. Finally, utilizing a design that establishes temporality would help to address the cross-sectional limitation of the current study. Each of these enhancements would address the limitations of the current work, and result in a more complete understanding of how the stress process model applies to individuals with mental disorders.

## 6.6 Implications for Policy

Overall, this research suggests that there is a strong association between general stress and GPD, that mastery most significantly mediates this association, and that no moderation exists between general stress and psychological resources. Research of this nature could contribute to the development of interventions to improve the mental health of individuals with mental disorders. It seems, from these results, that the best way to reduce the effect of general stress on GPD for individuals with mental disorders may be to affect mastery, as mastery independently mediated the general stress-GPD relationship to the greater degree than any other psychological resource.

The concept of mastery may relate to the concept of empowerment, as the Public Health Agency of Canada (PHAC) states that “empowerment in mental health promotion also involves a sense of personal control” (Public Health Agency of Canada, 2012). Not only is empowerment a key mental health promotion strategy for PHAC, but the Centre for Addiction and Mental Health and the World Health Organization also advocate for the importance of empowerment in community mental health promotion strategies (Centre for Addiction and Mental Health, 2012; World Health Organization, 2010). The present study supplements these organizations’ findings, as mastery seems to be the most important independent mediator of the general stress-GPD relationship here. Therefore, it is possible that interventions to improve mastery, or empowerment, may also improve the mental health of individuals with mental disorders.

The current research suggests that the stress process model indeed applies to community-dwelling adults with mental disorders. Further, it seems as though coping strategies and mastery play the most significant roles in reducing the effect of general stress on GPD. Having a more in-depth knowledge of how this process applies may justify the development of improved coping and mastery interventions aimed at reducing distress for individuals with mental health, and thereby improving their overall mental health. Achieving the goal of reducing distress for individuals with mental health may provide a much-needed avenue by which to reduce the burden that individuals with mental disorders face on a daily basis.

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## Appendix A: Measures, Scales and Detailed Question Wording

### I. General Stress

The 17 items listed below form a multi-item index of general chronic stress. Responses were coded (false = 0; true = 1) and summed such that the scale has a range of 0 to 17, with higher scores indicating higher levels of general stress. Individuals with a missing value for any item were set to missing for the scored scale.

The next part of the questionnaire deals with different kinds of stress. Although the questions may seem repetitive, they are related to various aspects of a person's physical, emotional and mental health.

I'll start by describing situations that sometimes come up in people's lives. As there are no right or wrong answers, the idea is to choose the answer best suited to your personal situation. I'd like you to tell me if these statements are true for you at this time by answering 'true' if it applies to you now or 'false' if it does not.

1. You are trying to take on too many things at once.
2. There is too much pressure on you to be like other people.
3. Too much is expected of you by others.
4. You don't have enough money to buy the things you need.
5. Your partner doesn't understand you.
6. Your partner doesn't show enough affection.
7. Your partner is not committed enough to your relationship.
8. You find it very difficult to find someone compatible with you.
9. At least one of your children seems very unhappy.
10. At least one child's behaviour is a source of serious concern to you.
11. Your work around the home is not appreciated.

12. Your friends are a bad influence.
13. You would like to move but you cannot.
14. Your neighbourhood or community is too noisy or too polluted.
15. You have a parent, a child or a partner who is in very bad health and may die.
16. Someone in your family has an alcohol or drug problem.
17. People are too critical of you or what you do.

## II. Coping

The 14 items listed below form multi-item indices of coping. Responses were coded (never = 0; rarely = 1; sometimes = 2; often = 3), and items that comprised the factors in the exploratory factor analysis were summed to create coping scales for each coping style (i.e. each factor), with higher scores indicating increased use of each coping style. Individuals with a missing value for any item were set to missing for the scored scale.

People have different ways of dealing with stress. Thinking about the ways you deal with stress, please tell me how often you do each of the following:

1. How often do you try to solve the problem?
2. To deal with stress, how often do you talk to others?
3. When dealing with stress, how often do you avoid being with people?
4. How often do you sleep more than usual to deal with stress?
5. When dealing with stress, how often do you try to feel better by eating more, or less, than usual?
6. When dealing with stress, how often do you try to feel better by smoking more cigarettes than usual?
7. When dealing with stress, how often do you try to feel better by drinking alcohol?
8. When dealing with stress, how often do you try to feel better by using drugs or medication?
9. How often do you jog or exercise to deal with stress?
10. How often do you pray or seek spiritual help to deal with stress?

11. To deal with stress, how often do you try to relax by doing something enjoyable?
12. To deal with stress, how often do you try to look on the bright side of things?
13. How often do you blame yourself?
14. To deal with stress, how often do you wish the situation would go away or somehow be finished?

### III. Social Support

The 19 items listed below form a multi-item index of social support. Responses were coded (none of the time = 0; a little of the time = 1; some of the time = 2; most of the time = 3; all of the time = 4), and summed such that the scale has a range of 0 – 76, with higher scores indicating increased social support. Individuals with a missing value for any item, or declined to answer an earlier item about how many close friends and family they had, were set to missing for the scored scale.

People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?

1. Someone to help you if you were confined to a bed?
2. Someone you can count on to listen to you when you need to talk?
3. Someone to give you advice about a crisis?
4. Someone to take you to the doctor if you need it?
5. Someone who shows you love and affection?
6. Someone to have a good time with?
7. Someone to give you information in order to help you understand a situation?
8. Someone to confide in or talk to about yourself or your problems?
9. Someone who hugs you?
10. Someone to get together with for relaxation?
11. Someone to prepare your meals if you were unable to do it yourself?

12. Someone whose advice you really want?
13. Someone to do things with to help you get your mind off things?
14. Someone to help with daily chores if you were sick?
15. Someone to share your most private worries and fears with?
16. Someone to turn to for suggestions about how to deal with a personal problem?
17. Someone to do something enjoyable with?
18. Someone who understands your problems?
19. Someone to love you and make you feel wanted?

#### IV. Mastery

The seven items listed below form a multi-item index of mastery.

Responses were coded (strongly agree = 0; agree = 1; neither = 2; disagree = 3; strongly disagree = 4), and summed such that the scale has a range of 0 – 28, with higher scores indicating increased mastery. Items six and seven were reverse coded (strongly agree = 4; agree = 3; neither = 2; disagree = 1; strongly disagree = 0), to reflect their positive nature. Individuals with a missing value for any item were set to missing for the scored scale.

Now I'm going to read you a series of statements that people might use to describe themselves. Please let me know if you strongly agree, agree, neither agree nor disagree, disagree, or strongly disagree.

1. You have little control over the things that happen to you.
2. There is no way you can solve some of the problems you have.
3. There is little you can do to change many of the important things in your life.
4. You often feel helpless in dealing with problems of life.
5. Sometimes you feel that you are being pushed around in life.
6. What happens to you in the future mostly depends on you.
7. You can do just about anything you really set your mind to.

#### V. GPD

The six items listed below form a multi-item index of GPD. Responses were coded (none of the time = 0; a little of the time = 1; some of the time = 2; most of the time = 3; all of the time = 4), and summed such that the scale has a range of 0 – 24, with higher scores indicating increased GPD. Individuals with a missing value for any item were set to missing for the scored scale.

Now some questions about mental and emotional well-being. During the past month, about how often did you feel:

1. So sad that nothing could cheer you up?
2. Nervous?
3. Restless or fidgety?
4. Hopeless?
5. Worthless?
6. That everything was an effort?

## Appendix B: Supplementary Tables and Figures

**Table B1.** Comparison of people included in models vs. people not included in models.

Variable	Sample with Missing Data (n=98)		Sample with Complete Data (n=282)		X <sup>2</sup> /Z* (p-value)
	Freq (%)	Mean (SD)	Freq (%)	Mean (SD)	
Age		43.12 (13.90)		39.79 (13.96)	Z=2.10 (0.04)
Sex					
Male	53 (54.08)		137 (48.58)		X <sup>2</sup> =0.88 (0.35)
Female	45 (45.92)		145 (51.42)		
Any Children (n=379)	52 (53.06)		133 (47.16)		X <sup>2</sup> =1.20 (0.27)
Number of Children Over 18		0.96 (1.19)		0.98 (1.07)	Z=-0.05 (0.64)
Number of Children Under 18		1.10 (1.14)		1.02 (1.03)	Z=0.19 (0.85)
Psychiatric Diagnosis					
Mood Disorder	70 (71.43)		177 (62.77)		X <sup>2</sup> =2.40 (0.12)
Anxiety Disorder	34 (34.69)		110 (39.01)		X <sup>2</sup> =0.57 (0.45)
Substance-Related Disorder	27 (27.55)		83 (29.43)		X <sup>2</sup> =0.13 (0.72)
Schizophrenia	23 (23.47)		65 (23.05)		X <sup>2</sup> =0.01 (0.93)
Disorder of Childhood	16 (16.33)		57 (20.21)		X <sup>2</sup> =0.71 (0.40)
Other/Unknown	22 (22.45)		48 (17.02)		X <sup>2</sup> =1.43 (0.23)
Current Living Arrangement					
Lives with Unrelated Person	54 (55.10)		162 (57.54)		X <sup>2</sup> =3.33 (0.65)
Lives Alone	20 (20.41)		56 (19.86)		
Lives with Family	21 (21.43)		58 (20.57)		
Other (homeless/couch surfing)	3 (3.06)		6 (2.13)		
Marital Status					
Single/Never Married	58 (59.18)		176 (62.41)		X <sup>2</sup> =3.28 (0.51)
Separated/Divorced	20 (20.41)		62 (21.99)		
Married/Common Law	17 (17.35)		32 (11.35)		
Widowed	3 (3.06)		9 (3.19)		



Other (dating/in a relationship)	0 (0.00)	3 (1.06)	
Currently Employed	21 (21.43)	73 (25.89)	$X^2=0.78$ (0.38)
Chronic Physical Illnesses	71 (72.45)	165 (58.51)	$X^2=6.00$ (0.01)
Current Addiction(s)	76 (77.55)	218 (77.30)	$X^2=0.00$ (0.96)
Tobacco	70 (71.43)	183 (64.89)	$X^2=1.40$ (0.24)
Caffeine	34 (34.69)	83 (29.43)	$X^2=0.94$ (0.33)
Marijuana	23 (23.47)	85 (30.14)	$X^2=1.59$ (0.21)
Alcohol	18 (18.37)	61 (21.63)	$X^2=0.47$ (0.49)
Prescription Drugs	16 (16.33)	39 (13.83)	$X^2=0.37$ (0.55)
Cocaine/Crack	4 (4.08)	39 (13.83)	$X^2=6.89$ (0.01 )
Other	8 (8.16)	25 (8.87)	$X^2=0.05$ (0.83)
Currently on Mental Health Medication	71 (72.45)	176 (62.41)	$X^2=3.22$ (0.07)
Ever Had a Psychiatric Hospitalization	62 (63.27)	165 (58.51)	$X^2=0.68$ (0.41)
Ever Had a Head Injury	53 (54.08)	132 (46.81)	$X^2=1.54$ (0.22)
Age of First Head Injury	15.02 (12.37)	17.52 (13.66)	$Z=-1.19$ (0.23)
Number of Head Injuries	6.06 (14.38)	6.36 (18.73)	$Z=0.68$ (0.50)
Ever Been Homeless	71 (72.45)	183 (64.89)	$X^2=1.87$ (0.17)
Age of First Homelessness	26.59 (12.91)	25.76 (11.96)	$Z=0.30$ (0.77)
Number of Times Homeless	6.31 (14.14)	4.72 (7.12)	$Z=-0.35$ (0.72)

\*Mann Whitney U Test was run in place of a t-test, because all continuous variables were non-normal, assessed by visual inspection of a histogram.

**Table B2.** Varimax rotated component loadings for 14 coping survey items.

<b>Survey Item</b>	<b>Factor 1</b>	<b>Factor 2</b>	<b>Factor 3</b>	<b>Factor 4</b>
Problem solving	0.53	0.25	-0.10	-0.45
Talk to others	0.50	0.33	-0.34	-0.14
Avoid people	-0.14	0.59	0.08	0.13
Sleep more	0.01	0.25	0.06	0.66
Change eating habits	0.15	0.15	-0.10	0.70
Smoke more	0.10	0.22	0.64	-0.09
Drink alcohol	-0.08	-0.04	0.68	0.10
Use drugs/medication	-0.13	0.23	0.72	-0.06
Exercise	0.59	-0.11	0.18	0.14
Pray	0.64	0.03	0.06	0.23
Relax	0.65	-0.15	-0.12	-0.01
Look on bright side	0.60	-0.17	-0.14	-0.09
Self-blame	-0.11	0.71	0.05	0.21
Wishful thinking	0.03	0.66	0.23	0.04
Eigenvalue	2.49	1.92	1.34	1.10
Percentage of Total Variance	17.79	13.74	9.60	7.85
Number of Items	6	3	3	2
Standardized Alpha	0.64	0.54	0.55	*
Unstandardized Alpha	0.63	0.54	0.55	*

\*Not computed because of low number of items. This factor was not used.

**Table B3.** Comparison of stress process indicators between the CURA sample and the Canadian population.

<b>Variable</b>	<b>CURA Sample</b>	<b>Canadian Population</b>
	<b>(n=262)</b>	<b>(n=34118 unless otherwise indicated)*</b>
	<b>Mean (SD)</b>	<b>Mean (SD)</b>
General Stress	6.20 (3.37)	2.73 (2.39)**
Problem-oriented Coping	10.74 (3.57)	12.20 (2.96)
Avoidance	6.30 (2.10)	4.45 (2.09)
Substance Coping	3.85 (2.76)	2.37 (1.95)
Social Support	43.79 (19.44)	63.38 (14.62)
Mastery	15.91 (4.90)	19.45 (4.24)**
GPD	9.52 (6.10)	2.98 (3.48)

\*2002 CCHS 1.2 Sample

\*\*1994-1995 NPHS Sample (n=15573)

## Appendix C: Research Ethics Board Approval



Use of Human Participants - Ethics Approval Notice

Principal Investigator: Dr. Cheryl Forchuk  
 Review Number: 17815  
 Review Level: Full Board  
 Approved Local Adult Participants: 700  
 Approved Local Minor Participants: 0  
 Protocol Title: Poverty & Social Inclusion  
 Department & Institution: Nursing, University of Western Ontario  
 Sponsor: Social Sciences and Humanities Research Council

Ethics Approval Date: April 21, 2011

Expiry Date: May 31, 2016

Documents Reviewed & Approved & Documents Received for Information:

Document Name	Comments	Version Date
UWO Protocol		
Letter of Information & Consent	Psychiatric Survivor Interview Version 2	2011/03/29
Letter of Information & Consent	Staff Version 2	2011/03/29
Letter of Information & Consent	Psychiatric Survivor Focus group Version 2	2011/03/29
Letter of Information & Consent	Family - Version 2	2011/03/29
Advertisement	Version 2	2011/03/29
Advertisement	Version 1	2010/05/31
Advertisement	Version 1	2010/03/30
Other	Information for Lanyard and Key chains Version 1	2010/05/31

This is to notify you that the University of Western Ontario Health Sciences Research Ethics Board (HSREB) which is organized and operates according to the Tri-Council Policy Statement: Ethical Conduct of Research Involving Humans and the Health Canada/ICH Good Clinical Practice Practices: Consolidated Guidelines; and the applicable laws and regulations of Ontario has reviewed and granted approval to the above referenced study on the approval date noted above. The membership of this HSREB also complies with the membership requirements for REB's as defined in Division 5 of the Food and Drug Regulations.

The ethics approval for this study shall remain valid until the expiry date noted above assuming timely and acceptable responses to the HSREB's periodic requests for surveillance and monitoring information. If you require an updated approval notice prior to that time you must request it using the UWO Updated Approval Request form.

Member of the HSREB that are named as investigators in research studies, or declare a conflict of interest, do not participate in discussions related to, nor vote on, such studies when they are presented to the HSREB.

The Chair of the HSREB is Dr. Joseph Gilbert. The UWO HSREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000940.

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 Signature

Ethics Officer to Contact for Further Information

Janice Sutherland	Elizabeth Wambolt	Grace Kelly
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*This is an official document. Please retain the original in your files.*

**The University of Western Ontario**

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## Curriculum Vitae

**Name:** Samantha Davie

**Post-secondary Education and Degrees:** The University of Western Ontario  
London, Ontario, Canada  
2012-2014 MSc

The University of Western Ontario  
London, Ontario, Canada  
2006-2010 BHSc

**Honours and Awards:** Carol Buck Graduate Scholarship in Epidemiology  
2013

**Related Work Experience**

Graduate Research Assistant  
The University of Western Ontario  
2012-2014

Heart & Stroke Foundation of Canada  
Program & Evaluation Assistant  
2010-2011

**Conferences**

Poverty and Social Inclusion Conference  
London, Ontario  
2012 & 2013

Society for Epidemiologic Research 46<sup>th</sup> Annual Meeting  
Boston, Massachusetts  
2013

### Publications:

Davie, S., Speechley, M., Forchuk, C., and Avison, W.R. (2014, June). Coping and the stress process model for individuals with mental disorders. Submitted to *Social Psychiatry and Psychiatric Epidemiology*.

Forchuk, C., Hall, P.V., Perry, S.E., and Davie, S. (2014, June). Evaluating partners' participation in action research. Submitted to *Evaluation and Program Planning*.

Hall, P.V., Montgomery, P., Davie, S., Dickins, K., Forchuk, C., Jeng, M.S., Kersey, M., ... and Warner, L. (2014, April). Seeking and securing work: Individual-level predictors of employment outcomes of psychiatric survivors. Accepted for publication in *WORK: A Journal of Prevention, Assessment, and Rehabilitation*.