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Health-Related Quality of Life and Suicidal Behaviors in Primary Care Patients: Conditional
Indirect Effects via Interpersonal Needs and Depressive Symptoms

A thesis

presented to

the faculty of the Department of Psychology

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Master of Arts in Psychology

by

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August 2014

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Behavior

ABSTRACT

Health-Related Quality of Life and Suicidal Behaviors in Primary Care Patients: Conditional Indirect Effects via Interpersonal Needs and Depressive Symptoms

by

Catherine Allyse Rowe

Suicide is a public health problem and complex relationships exist between intrapersonal suicide risk factors and interpersonal risk factors. Health-related quality of life (HRQL) may interact with difficulties with interpersonal relationships and psychopathology. We examined thwarted interpersonal needs and depressive symptoms as potential mediators on the association between HRQL and suicidal behaviors. It was hypothesized that thwarted interpersonal needs would mediate the association between HRQL and suicidal behavior, and that this mediating effect would be dependent on the moderating effect of depressive symptoms. It was hypothesized that thwarted interpersonal needs and then depressive symptoms would sequentially mediate the association between HRQL and suicidal behavior. The mediating roles of thwarted belongingness and perceived burdensomeness on the association between HRQL and suicidal behaviors were supported. Moderated-mediation results were not significant. Serial mediations analyses were partially supported. Our findings suggest the importance of considering both inter- and intrapersonal factors on suicidal behavior.

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CHAPTER 1

INTRODUCTION

Suicide is a significant, worldwide public health problem (World Health Organization [WHO], 2009). In the United States rates of suicide have risen consistently over the past decade, with over 38,000 individuals dying by suicide annually, making it the 10th leading cause of death (American Foundation of Suicide Prevention [AFSP], 2013). Further, there is an estimated 25:1 ratio for attempts versus deaths by suicide in the United States, amounting to over 950,000 suicide attempts annually (Substance Abuse and Mental Health Services Administration [SAMSHA], 2010). The continuum of suicide also includes suicide ideation, or thoughts of suicide; 3.7%, or 8.3 million individuals, of the US population reported suicide ideation in the past year of available data (Crosby, Han, Ortega, Park, & Gfroerer, 2011).

Complex relationships exist between intrapersonal and interpersonal risk and protective factors for such suicidal outcomes. For instance, interpersonal and psychological dysfunction and poor physical health, including pain and health-related role limitations, are often comorbid (Hatfield, Hirsch, & Lyness, 2013); further, poor health-related quality of life is a robust predictor of psychopathology, including suicide risk (Cicirelli, 1997). Little research, however, has focused on possible interrelationships between, or mechanisms of action for, these associations.

One potential linkage between health-related quality of life and suicidal behavior is psychological dysfunction, such as depression, which is one of the most commonly occurring psychological disorders in the U.S., affecting over 13% of the adult population across the lifespan (Hasin, Goodwin, Stinson, & Grant, 2005). Importantly, depression may be both a consequence of and contributor to poor physical health and social difficulties (Harris &

Barraclough, 1998; Kilbourne, Daugherty, & Pincus, 2007). Quality of social relationships and the satisfaction of interpersonal needs may also be potential mechanisms of action, as both are strongly related to physical and mental health (Kitetele, Lusiana, & Behets, 2012; Newman, Edmonds; Van Orden, Merrill, & Joiner, 2005). According to the Interpersonal-Psychological Theory of Suicide, two such factors, perceived burdensomeness, or the view that one's existence is a burden on others, and thwarted belongingness, or a sense of alienation from others and a lack of valued relationships, may contribute to suicide risk (Van Orden et al., 2005) and may be exacerbated by poor health related quality of life (Turvey et al., 2002).

No current published data has examined a biopsychosocial model of risk for suicidal behaviors that considers the interrelationships between health-related quality of life, depressive symptoms, interpersonal needs, and suicidal behavior. Addressing this gap in the literature may be particularly important for work in primary care settings; there is preliminary data that suggests over 45% of individuals who die by suicide made contact with their primary care provider in the month preceding death and often present with both physical and psychological concerns (Luoma, Martin, & Pearson, 2002). As such, for the current study I used the literature on these potential contributing factors to risk and protection from suicidal behavior and used data collected from a sample of working, uninsured primary care patients to test my hypotheses.

Suicidal Behavior

Suicide, which is conceptualized as the self-intended act of ending one's life, affects millions of individuals annually worldwide either directly via death by suicide or indirectly, as a survivor, operationalized as those left behind when someone dies by suicide. Yet, no definitive answer has arisen as to why individuals choose to die by suicide (Shneidman, 1981b, 1981c).

The extant literature, however, suggests that certain individuals may be at increased risk for suicidal behavior, perhaps due to sociocultural factors such as group membership; demographic factors such as sex and age; or, psychological and interpersonal factors such as poor mental health or lack of social support (Beck, Brown, Berchick, & Stewart, 1990; Chatard & Selimbegovic, 2011; Garnefski & Diekstra, 1995; Soonenberg et al., 2013). Such factors likely play a role in the manifestation and distribution of suicidal behavior in the general population. In the following section literature on the epidemiology and etiology of suicidal behavior is reviewed.

Epidemiology of Suicidal Behavior. Worldwide, almost one million individuals die by suicide each year, and global suicide rates have increased by more than 60% in the last 45 years (WHO, 2009). Further, suicide currently accounts for more annual deaths internationally than homicides and wars combined (WHO, 2009). In the United State an estimated 959,100 individuals attempted suicide in 2010, the latest year for which data are available, and more than 38,000 individuals died by suicide (American Association for Suicidology [AAS], 2010), making suicide the 10th leading cause of death nationally. However, due to the stigma associated with suicidal behavior, it is suspected that self-inflicted, intentional deaths may often be underreported, resulting in an underestimate of both national and global suicide rates (Center for Disease Control [CDC], 2009).

Risk for suicidal behavior may also vary based on factors such as sex, age, ethnicity or racial group, and individual psychopathology. In the U.S. suicide is the seventh leading cause of death for males and the 15th leading cause for females (AAS, 2010), and men are more likely to die by suicide than women, but women are more likely to attempt suicide (National Institute of Mental Health [NIMH], 2010; AFSP, 2013). Sex differences in suicide rates may be attributed,

in part, to lethality of means of suicide; men are more likely to use firearms, whereas women are more likely to engage in methods such as poisoning with an overdose or ingestion of poisonous material for which there may be time to intervene (AFSP, 2013). The predominant choice of suicide method is by firearm (males = 56%; females = 30%), followed by suffocation (males = 24%; females = 21%) and poisoning (males = 13%; females = 40%) (CDC, 2010).

Age differences in risk for suicide also exist. Although children ages 5-14 experience suicide at a low rate of .6 per 100,000 deaths, for adolescents and young adults ages 15 to 24 suicide is the third leading cause of death at 10.5 per 100,000 (Suicide Awareness Voices of Education [SAVE], 2013; SAMSHA, 2010). In 2010 individuals who were middle-aged, ages 45-54, had the highest rate of suicide (19.6 per 100,000), in comparison to all other age groups (SAMSHA, 2010). Older adult males, over the age of 65, also experience high rates of suicide, at 14.3 per 100,000 (SAVE, 2013; CDC, 2010), older males 75-84 have a rate of 15.7 per 100,000, and males over 85 years old have a rate of 17.6 per 100,000.

Sociocultural influences, including race and ethnicity, may also contribute risk for suicidal behavior. Native Americans and non-Hispanic Whites are the ethnic groups in the U.S. with the highest rates of death by suicide. In 2007 the suicide rate for Native Americans was 14.3 per 100,000, and was 13.5 per 100,000 for non-Hispanic Whites (CDC, 2010). Rates of death by suicide in the U. S. are typically lower in other ethnic and racial groups: 6 per 100,000 for Hispanics, 5.1 per 100,000 for non-Hispanic Blacks, and 6.2 per 100,000 for Asian and Pacific Islanders (CDC, 2013).

Etiology of Suicidal Behavior. To some extent suicide prevention depends on the identification and understanding of risk factors (Kraemer, Kazdin, Offord, & Kessler, 1997); as such, a large majority of previous research has focused on risk factors that increase the likelihood

of engaging in suicidal behavior (Chatard & Selimbegovic, 2011). The modern era of the study of suicide began around the 20th century with the work of Emile Durkheim and Sigmund Freud, who held distinctly different views on how suicidal behavior develops. In general, Durkheim focused on society's hostile and negative effects on the individual, whereas Freud believed that suicidal actions developed internally, away from societal influence, and belonged to one's unconscious (Shneidman, 1981a). Since that time most theories regarding the development of suicidal behavior agree that the origins of suicide stem from an individual's experience of internal, intolerable emotion in combination with exacerbating environmental factors (Shneidman, 1981a; Van Orden et al., 2005), with growing evidence of potential biological vulnerabilities (Bear, Connors, & Paradiso, 2007; Kok, Nolen, & Heeren, 2012). These broad areas of etiology – psychological, biological, and socioenvironmental – are discussed in the following sections.

Psychological Theories of Suicide. Many modern theories of suicide have focused on psychological factors; for example, Freud posited that suicide resulted from the psyche (Briggs, 2006; Lees & Stimpson, 2008), arising from unconscious hostility directed toward an introjected love object and manifesting as aggression toward the self. “Psychodynamically, suicide was seen as murder in the 180th degree” (Shneidman, 1981a, p.205). The work of Freud was later extended by Karl Menninger, who theorized that suicidal individuals must have the wish to kill, the wish to be killed, and the wish to die. In other words, a suicidal individual must have a strong unconscious hostility coupled with a lack of desire to love others (Briggs, 1996; Lees & Stimpson, 2008).

Considered the “Father” of American suicide prevention efforts, Edwin Shneidman more recently proposed that suicidal behavior arises from psychological pain, or “psychache,” which

he described as “hurt, anguish, soreness, aching, psychological pain in the psyche, the mind” (Shneidman, 1993, p. 145). According to Shneidman the development of suicidal behavior should not be attributed to genetic or biological factors that contribute to vulnerability but, rather, to the psychological pain or “psychache” that may include cognitive-emotional characteristics such as anguish, shame, humiliation, and guilt (Patterson & Holden, 2012; Troister & Holden, 2010). Shneidman proposed that psychache would be a more robust predictor of suicidal behavior than depression or hopelessness, which he considered secondary to psychache, an assertion that has been supported by recent research (DeLisle & Holden, 2009).

Yet, the existing literature on suicide strongly indicates that the psychological constructs of hopelessness and depression are two of the most robust predictors of suicidal behavior (Beck, et al., 1990; Beck, Brown, & Steer, 1989). For example, hopelessness differentiates between suicide attempters and nonattempters (Klonsky, Kotov, Bakst, Rabinowitz, & Bromet, 2012), and up to 90% of individuals who die by suicide meet the criteria for one or more psychiatric disorders at the time of their death (Cavanagh, Carson, Sharpe, & Lawrie, 2003). Specifically, greater than 60% of individuals who die by suicide are experiencing a depressive episode at the time of their death (AFSP, 2013). Given its prominent role in suicidal behavior, I discuss depression in detail in the following section.

Depression. Depression is one of the most commonly occurring psychological disorders in the world, often referred to as the “common cold” of psychopathology (Hasin et al., 2005). As an example, more American adults suffer from depression than coronary heart disease, cancer, and AIDS combined (AFSP, 2013). Major depressive disorder (MDD) is characterized by the experience of one or more major depressive episodes lasting at least 2 weeks with either a depressed mood or a loss of interest or pleasure in most activities (American Psychiatric

Association [APA], 2000). According to the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, (Text Revision) (DSM-IV-TR), vegetative or somatic symptoms of MDD include changes in weight, sleep, and sexual and psychomotor activity (APA, 2000), whereas cognitive-emotional symptoms may include feelings of worthlessness and hopelessness, thoughts of death or suicide, and negative affect (APA, 2000; Flett, Vredenburg, & Krames, 1997). In order to meet DSM-IV-TR diagnostic criteria for MDD, at least five symptoms must be present for at least 2 weeks (APA, 2000).

Not all individuals experiencing depressive symptoms meet criteria for number of symptoms or of duration of symptoms, precluding diagnosis; however, it is increasingly recognized that such subclinical or subthreshold symptoms may exert similar deleterious effects on an individual's well-being and functioning (Judd et al., 1998). For instance, Lewinsohn and colleagues (2000) found that individuals who failed to meet full criteria for MDD were as likely as individuals diagnosed with MDD to report substance abuse, to have future incidents of major depression, and to need future mental health treatment. Such findings contribute to the debate regarding the appropriateness of an MDD-cutoff, as they suggest the existence of a depressive continuum (Lewinsohn, Solomon, Seeley, & Zeiss, 2000).

Epidemiology of Depression. The lifetime prevalence for MDD in community samples from the United States varies between 10% and 25% for women and between 5% and 12% for men (APA, 2000), and the point prevalence, or percent of the population that endorses a condition at a specific time, varies from 5% to 9% for women and 2% to 3% for men (APA, 2000).

Age may also influence the experience of depression. There is some evidence for a curvilinear relationship between age and depressive symptoms, such that young individuals and

older adults report the highest levels of depressive symptoms (Teachman, 2006). As an example, individuals aged 70-98 experience the greatest levels of depressive symptoms and the lowest levels of well-being compared to all other age groups (Gatz & Hurwicz, 1990). It is thought that this curvilinear relationship exists due to the unique transitional stressors that the young and old face, such as role transitions and changes in physical health (Teachman, 2006). However, in a study that assessed the date of onset, course, and recurrence of episodes of depression, individuals were most likely to experience a depressive episode during middle age (Eaton et al., 1997). Additionally, in a recent report, men and women aged 40-59 reported a higher rate of depressive symptoms (men=7%; females=12%), as compared to individuals over age 60 (men=5%; females=7%) (CDC, 2012); thus, there is continued debate about the association between age and depression risk.

There is also conflicting research regarding differences in rates of depressive symptoms based on ethnicity. Some studies suggest that when depressive symptoms are determined using a MDD cutoff, minorities are less likely to meet criteria for MDD but are more likely to endorse subclinical depressive symptoms (Hasin et al., 2005). Contrary research suggests that minorities are at increased risk for developing depressive symptoms, particularly if they live in an environment that is predominantly White, suggesting that it is important to consider sampling characteristics and sociocultural factors when assessing rates of depressive symptoms (Wight, Aneshensel, Botticello, & Sepúlveda, 2005). Previous research suggests that in the U. S. Asian (8.8%), Hispanic (9.8%), and Black (8.9%) individuals are at decreased risk of developing depressive symptoms in comparison to Whites (14.6%), whereas Native American / American Indian individuals are at greatest risk (19.2%) (Breslau, Javaras, Blacker, Murphy, & Normand, 2008; Hasin et al., 2005).

Etiology of Depression – Genetic and Cognitive Theories of Depression. There are numerous theories regarding the development and maintenance of depressive symptoms, the most prominent of which focus on biological, biochemical, cognitive, and learning and behavioral etiological factors (Paige, Mitchell, Krishnan, Kaddurah-Daouk, & Steffens, 2007). These are reviewed briefly in the following subsections.

A growing number of studies suggest that biological and neurohormonal influences, particularly neurotransmitters, may contribute to depressive symptoms (Wann et al., 2009; Watson et al., 2009). For example, the monoamine hypothesis, colloquially referred to as a “chemical imbalance,” suggests that low levels of serotonin (5-HT), norepinephrine (NE), and dopamine (DA) are, in part, responsible for depressive symptoms (Bear et al., 2007; Meyer & Quenzer, 2005). Reinforcement of the monoamine hypothesis has occurred since the 1950s as a result of research evidence suggesting that psychotropic drugs have a positive effect on psychological disorders (Baumeister, Hawkins, & Uzelac, 2003; Dunlop et al., 2012; France et al., 2007; Kok et al., 2012). Debate exists regarding the efficacy of psychotropic medications; however, for instance, in a meta-analysis conducted by Kirsch, Scoboria, and Moore (2002), antidepressant drugs showed no significant ameliorative effect on depression in comparison to a placebo. As a result of such conflicting findings, paired with the predominance of the chemical imbalance perspective, many experts are concerned that additional viable explanations are being ignored (Hollander, 2013).

One of the most prominent etiological theories of depression was proposed by Aaron Beck, who theorized that our thoughts about the self, the world, and the future - the cognitive triad - may often be distorted and based upon internal dysfunctional schemas that influence cognitive perception and processing of events and others (Beck, Rush, Shaw, & Emery, 1979).

Beck hypothesized that cognitive schemas, or the way that one views the world and self, develop early in life from important experiences such as parenting that influence how an individual encodes, interprets, and understands life events (Beck, Haigh, & Baber, 2012) and, therefore, how goals, expectations, memories, and perceptions of the self and others are formed and maintained (Beck et al., 1979). As an example of this theory, during the experience of stressors an individual may manifest automatic thoughts that are misleading, distorted, and self-derogatory spontaneous cognitions about the self and ones abilities; cyclically, such erroneous beliefs may lead to maladaptive engagement with the environment and others, furthering feelings of poor self-efficacy and continuing depressive symptoms (Beck et al., 2012; Clark, Beck, & Brown, 1989; Szentagotai, 2008).

Behavioral and Learning Theories of Depression. According to behavioral and learning theories of depression, environmental stimuli, particularly the loss of positive environmental reinforcers, influence the development and maintenance of depressive symptoms (Costello & Lazarus, 1972; Lazarus, 1968). Derived from an operant conditioning paradigm, this perspective posits that depression results from an individual's interaction with the environment in which the behavior fails to elicit consistent positive feedback and reinforcement from others and the environment and, rather, elicits inconsistent reinforcement (Nathan & Gorman, 2007; Street, Sheeran, & Orbell, 1999). Further, when a significant constructive or beneficial reinforcer is withdrawn, the resulting sense of loss and deprivation may consequently turn to grief if substitute environmental reinforcers are unavailable or inaccessible (Lazarus, 1968). In sum, when positive or negative reinforcement from the environment is lacking, "a chronic and/or acute non-reinforcing state of affairs can result in a condition where a person becomes relatively refractory to most stimuli and enters a state of depression" (Lazarus, 1968, p.85).

The learned helplessness model of depression, proposed by Martin Seligman, suggests that inescapable aversive stimuli such as extreme or prolonged stressors that contribute to a sense of loss of control may lead to feelings of helplessness and behavioral deactivation (Forgeard et al., 2011; Seligman & Weiss, 1980). Later revised by Abramson to incorporate the facet of learned hopelessness, this diathesis-stress model suggests that the manner in which individuals perceive and attribute events may predispose them to depressive symptoms (Abela et al., 2004; Abela & Seligman, 2000; Abramson, Metalsky, & Alloy, 1989). Specifically, depressive symptoms may emerge from a pervasive pattern of negative thinking that occurs as a consequence of perceived environmental ineffectiveness; individuals who develop learned hopelessness believe they are the cause of negative experiences, view negative events as confirmation of their deficits and inability to affect change in their environment, and tend to catastrophize the meaning of negative events (Abela, Brozina, & Seligman, 2004; Abela & Seligman, 2000).

Biological Theories of Suicide. In addition to psychological risk factors for suicide, there may also be important biological and anatomical abnormalities in the brain that contribute to suicide risk. For example, in a study of neurocognitive processes and brain structure in chronically suicidal patients, suicidal individuals had less volume of right and left orbitofrontal cortex gray matter as well as a larger amygdala in comparison to nonsuicidal participants (Monkul et al., 2007). It is thought that impairments in the orbitofrontal cortex and amygdala may impair decision-making and contribute to impulsivity, potentially increasing risk for suicidal behavior (Monkul et al., 2007).

Another area of the brain that appears to be associated with increased risk for suicidal behavior is the frontal lobe that is responsible for a variety of brain functions including

motivation, planning, and decision-making (Coppe, de Xivry, Yüksel, Ivanoiu, & Lefèvre, 2012). Further, individuals with frontal lobe impairment may be vulnerable to difficulties with behavioral modulation and emotion regulation, particularly in the context of stressors. Such poor cognitive-emotional and executive functioning may, in turn, lead to difficulties with problem-solving ability, thereby increasing risk for suicidal behavior (Phillips, 2003). Suicidal individuals also exhibit structural alterations in fronto-limbic areas, reduction in the subgenual cortex, and in an fMRI study abnormal levels of activation in the medial prefrontal cortex as compared to controls (Wagner et al., 2011). Such aberrations may involve an increase in neurons producing and receiving corticotropin-releasing hormone (CRH), contributing to greater stress responsiveness, decreased tolerance for distress, and elevated suicide risk (Monkul et al., 2007; Wagner et al., 2011).

Social and Environmental Theories of Suicide. In addition to biological characteristics, social and environmental factors - perhaps out of the direct control of an individual - may increase the risk of suicidal behavior. According to Durkheim suicidal behavior does not develop in a silo but rather is a result of the influence that society has over humankind. This idea was illustrated in Durkheim's best-known work, *Le Suicide*, that posited the theory that there are four types of socially and environmentally influenced suicide: altruistic, egoistic, anomic, and fatalistic suicide (Shneidman, 1981a; Tierney, 2010). Altruistic suicide occurs when suicide is required by society, such that the customs or rules of society demand that one must die (Shneidman, 1981a; Tierney, 2010); egoistic suicide occurs when an individual lacks ties to the community and meaningful interpersonal relationships, resulting in a loss of the demand to live; anomic suicide occurs when an individual loses a valued relationship with another person or society, which represents an immediate shock and loss; and, fatalistic suicide occurs when an

individual experiences persistent and overwhelming oppression, and the consequent belief that one is unable to change the surrounding environment (Shneidman, 1981a; Stack, 1979). In general this theory is well-supported empirically: isolation and loneliness, overregulation and lack of control, lack of social support, and interpersonal loss are all associated with suicidal behavior (Baumeister & Leary, 1995; Chang et al., 2010; Westfeld & Furr, 1987).

Environmental, external experiences of negative and potentially traumatic life events such as emotional, sexual, and physical abuse particularly during childhood are also a salient predictor of future suicidal behavior (Hadland et al., 2012). In a study conducted by Sarchiapone and colleagues with 1,117 prisoners inmates who reported a history of child abuse were more likely than nonabused peers to report suicidal behavior (Sarchiapone et al., 2009). Similarly, in a study assessing the impact of trauma experienced in childhood, family history of suicide and exposure to interpersonal violence were independent predictors of suicide attempts later in life (Rajalin, Hirvikoski, & Jokinen, 2012). In addition to childhood trauma, current negative life events contribute to suicide risk. As an example, individuals are more likely to engage in a suicide attempt if they have experienced a negative life event in the last 48 hours (Bagge, Glenn, & Lee, 2012; Linda, Marroquín, & Miranda, 2012). Among other stressful life events, role transitions, job loss, disruptions in interpersonal relationships, and the diagnosis or experience of chronic illness or functional impairment contribute risk (Baumeister & Leary, 1995; Chang, Sanna, Hirsch, & Jeglic, 2010); these latter events - interpersonal dysfunction and poor health-related quality of life - are focal points of the current study and are addressed in the following sections.

Health-Related Quality of Life. The study of health-related quality of life (HRQL) has been constrained to a narrow perspective, often focusing only on physical aspects of quality of

life rather than a more holistic view incorporating social and psychological well-being. Recently, in addition to the inclusion of nonphysical aspects of quality of life, greater emphasis has been placed on subjective patient-centered and patient-reported outcomes, rather than solely on objective measures of health (CDC, 2000; Mortimer & Peacock, 2012; Selby, Beal, & Frank, 2012; Ware & Sherbourne, 1992).

As such, the current understanding of health, according to the World Health Organization, is that well-being and quality of life are not simply the objectively-assessed absence of disease but rather also include self-perception of interpersonal and emotional functioning; such a definition allows for a more comprehensive view of health (WHO, 1997). Health-related quality of life, therefore, can be conceptualized as a multifaceted construct in which physical, mental, and social well-being is optimal and is reflected in an individual's ability to complete routine self-care, work-related requirements, and social activities (Hays & Morales, 2001).

Typically individuals reporting greater health-related quality of life also report experiencing good mood, high levels of energy, low levels of pain, and reduced risk for poor mental health outcomes (Cicirelli, 1997). Conversely, low HRQL is related to poor interpersonal and mental health functioning including feelings of hopelessness (Goldberg & Harrow, 2005; Yatham et al., 2004), depressive symptoms and suicidal behavior (Bharmal & Thomas, 2005; Cicirelli, 1997; de Abreu, 2012; Moor, Crowe, Luty, Carter, & Joyce, 2012), as well as greater functional impairment and higher mortality rates (Cicirelli, 1997; Idler & Benyamini, 2007; Kaplan et al., 2007).

A wide array of factors may exert an influence on health-related quality of life; for instance, older age, low income, lack of health insurance or loss of insurance, dysfunctional

mental health, and female sex are related to poor health-related quality of life (Cherepanov, Palta, Fryback, & Robert, 2010; Thunedborg, Black, & Bech 1995; Yatham et al., 2004). Health-related quality of life may also be affected by the experience of disease multimorbidity or the co-occurrence of at least two medical conditions including chronic illness and functional impairment within one person (Vogel et al., 2012). It must be noted that the associations between such psychological and physical health factors and quality of life may be bidirectional; for instance, those with better mental health report better physical health and vice-versa (Colby & Shifren, 2013).

Of importance to the conceptualization of suicide risk, poor health-related quality of life, and the functional impairment it often entails (Smitherman, McDermott, & Buchanan, 2011), may negatively affect interpersonal functioning. This effect may occur through a variety of mechanisms such as feeling like a burden to others (Romm, Melle, Thoresen, Andreassen, & Rossberg, 2012; Sudhir, Sharma, Mariamma, & Subbakrishna, 2012), decreased social connections, greater isolation and loneliness, and inadequate ability to integrate with desired social groups (Sudhir et al., 2012). All of the aforementioned types of interpersonal dysfunction are well-established risk factors for suicidal behavior (Baumeister & Leary, 1995; Gordon, Bresin, Dombek, Routledge, & Wonderlich, 2011; Westfeld & Furr, 1987).

More broadly, Baumeister and Leary proposed that human beings have an intrinsic desire and need to be connected with others, and with important and meaningful social groups (Baumeister & Leary, 1995). When connectedness is lacking, loneliness, anxiety, depression, and suicidal behavior, including suicide attempts (Baumeister & Leary, 1995; Chang et al., 2010; Daniel & Goldston, 2012), may occur. Indeed, over 47% of adults endorsing suicide ideation report feelings of loneliness as one of the most frequent reasons for their thoughts of suicide

(Westfeld & Furr, 1987); on the other hand, sense of social connectedness may mitigate suicide risk (Baumeister & Leary, 1995).

Interpersonal-Psychological Theory of Suicide. One modern theory that addresses such interpersonal concerns is the Interpersonal-Psychological Theory of Suicide (IPTS) that proposes the socially-based constructs of thwarted belongingness and perceived burdensomeness are the primary contributors of suicide risk (Joiner, 2005; Joiner et al., 2009). To illustrate, themes of thwarted belongingness were found in 29.6% of suicide notes written by United States Air Force members who died by suicide (Cox et al., 2011); 31.6% of the notes referenced perceived burdensomeness (Cox et al., 2011).

Conceptually, thwarted belongingness is a multifaceted construct consisting of the interplay between cognitions and social relationships (Van Orden et al., 2010) and that is similar to psychological characteristics such as loneliness, social isolation, and the need to belong (Van Orden et al., 2010). However, thwarted belongingness is more complex in that it encompasses both feelings of isolation from an important social group and cognitions about ability to form and maintain important social connections (Van Orden et al., 2010).

Also contributing to suicide vulnerability, perceived burdensomeness is the sense that one is ineffective and unable to contribute to the well-being of others around them, perpetuated by the cognition that one is not competent in meeting the social demands of the environment (Van Orden et al., 2010). As a result perceived burdensomeness may manifest from and be maintained by negative self-cognitions such as shame, self-hatred, self-blame, and the belief that one is flawed (Van Orden et al., 2010). Burdensomeness may be environmentally triggered via health-related or other life stressors wherein an individual feels at fault or, perhaps, dependent on others. In general, feeling like a burden is associated with poor social, psychological, and health

outcomes including exacerbation of illness, marital distress, and vocational dysfunction (Van Orden et al., 2010) and was a significant predictor of future suicidal behavior in a nonclinical adult sample (Joiner et al., 2009; Van Orden et al., 2008).

The Interpersonal-Psychological Theory of Suicide suggests that thwarted belongingness acts in tandem with perceived burdensomeness to contribute to risk for suicidal behavior (Van Orden et al., 2008). Although both characteristics are deleterious and associated with suicide risk, including in rural primary care patients (Nsamenang, Webb, Cukrowicz, & Hirsch, 2013), predictive differences may exist; for instance, perceived burdensomeness may be more robustly associated with suicidal behavior than thwarted belongingness (Joiner et al., 2009; Van Orden et al., 2010). In at least one study thwarted belongingness was not a significant predictor of suicidal behavior independent of perceived burdensomeness (Van Orden et al., 2008), yet their interaction contributed to increased suicidal risk (Van Orden et al., 2008; Van Orden, Lynam, Hollar, & Joiner, 2006).

Statement of the Problem

In sum, when examined across disparate studies, there appears to be interrelationships between the suicide risk factors of health-related quality of life, thwarted belongingness and perceived burdensomeness, and mental health functioning (Newman, Edmonds, Kitetele, Lusiana, & Behets, 2012; Van Orden et al., 2008; Vogel et al., 2012). However, the linkages between these characteristics have not been previously examined in a single, comprehensive model.

Poor health-related quality of life including chronic illness, functional limitations, and pain may directly influence suicide risk (Newman et al., 2012) but may also do so indirectly via their effect on the ability to function independently of others or to achieve successful social

cohesion, which are, themselves, independent contributors to suicide risk (Van Orden et al., 2010). This deleterious relationship may be further complicated by intrapersonal psychological dysfunction such as depressive symptoms. Of note, one of the most prominent features of depression is a negative change in cognitive-emotional functioning as it relates to sense of self-efficacy, self-worth, and well-being (APA, 2000; Flett et al., 1997); as a result, feelings of depression may influence the aforementioned linkages – that is, whether health deleteriously impacts social functioning or whether difficulties in social functioning manifest as suicidal behavior.

As such, in the current study we examined depressive symptoms as a potential moderator of the mediating effects of thwarted interpersonal needs on the association between health-related quality of life and suicidal behavior.

Hypotheses

In the current study mental and physical HRQL composite scores were used as predictor (independent) variables, interpersonal needs as mediators, depressive symptoms as a moderator of the potential mediation relations, and suicidal behavior as the dependent variable (see Figure 1).

1. At the bivariate level of analysis, we hypothesized that poor mental and physical HRQL composite scores would be positively related to thwarted belongingness and perceived burdensomeness, depressive symptoms, and suicidal behavior, and that depressive symptoms would be positively related to thwarted belongingness and perceived burdensomeness, and suicidal behavior. We also hypothesized that perceived burdensomeness and thwarted belongingness would be positively related to suicidal behavior and to one another.

2. In multivariable analyses, we hypothesized that thwarted belongingness and perceived burdensomeness would mediate the relations between mental and physical HRQL and suicidal behavior such that poorer mental and physical HRQL would be associated with higher levels of perceived burdensomeness and thwarted belongingness and, in turn, with greater suicidal behavior.
3. Further, we hypothesized that the mediating effect of thwarted interpersonal needs on the relationship between mental and physical HRQL and suicidal behavior will be conditionally dependent on the moderating effect of depressive symptoms such that depressive symptoms will exacerbate these associations. We expected this moderated-mediation to occur in both paths: a) between mental and physical HRQL and thwarted interpersonal needs; and, b) between thwarted interpersonal needs and suicidal behavior.
4. Finally, we hypothesized that thwarted belongingness and perceived burdensomeness, as well as depressive symptoms, would sequentially mediate the association between mental and physical HRQL and suicidal outcomes such that poor mental and physical HRQL will be associated with greater thwarted interpersonal needs and sequentially to higher levels of depressive symptoms and suicidal behavior.

CHAPTER 2

METHODS

Procedures

Data were collected as a part of a larger, IRB-approved, study conducted by the Laboratory of Rural Physical and Psychological Health in the Department of Psychology at East Tennessee State University. All participants (N=100) were recruited from a rural primary care clinic serving working and uninsured patients, over a 1-year period of time using online and in-person methods of survey administration. Participants provided informed consent, and those who completed the survey received \$15 in compensation.

Participants

Our sample was primarily female (n=71; 71%), ranged in age from 18 to 64 years old (Mean Age = 42.18; SD = 12.83), and were largely of White ethnicity (n=94; 94%), followed by Black (n=3; 3%) and Asian (n=1; 1%). The majority of respondents maintained either full or part time employment (n=73; 73%), with 25.8 % (n=26) retired or unemployed. Respondents reported marital status as follows: married (n=36; 36%), single (n=28; 28%), and divorced (n=25; 25%). The majority of participants reported an income under \$20,000 (n=73; 73%), followed by income under \$30,000 (n=19; 19%), then under \$40,000 (n=5; 5%).

Rationale for sample. Use of a sample of middle-aged, working and uninsured patients requires justification of suitability for our study. First, in general, lack of insurance predicts poorer access to health care, decreased health-related quality of life (Hirsch, 2006), and greater likelihood of physical and mental health disorders including suicidal behavior (Lieberman, 2011; Tondo, Albert, & Baldessarini, 2006). Second, only 3%-5% of the population seeks out specialty mental health services, but over 80% of individuals treated by primary care providers

are suffering from a mental health issue (Bryan & Rudd, 2010; Goodheart, 2010; Narrow et al., 1993; Ray-Sannerud et al., 2012). This may be particularly relevant in rural areas where individuals are less likely to access specialty mental health services due to stigma and reduced access to, or knowledge of, mental health resources (Nsamenang et al., 2013). Further, previous research suggests that over half of individuals who die by suicide see a primary care doctor in the month preceding their death (Luoma et al., 2002), making primary care settings an important catchment site for the detection and prevention of suicide. Specific to Tennessee, the fastest growing rate of suicide is for middle-aged adults, who account for 42% of the overall number of suicide deaths in Tennessee (Tennessee Suicide Prevention Network [TSPN], 2012). Rates of suicide for individuals in Tennessee aged 35-64 rose from 20.6 per 100,000 in 1999 to 21.8 in 2010 (CDC, 2013).

Measures

A basic demographic survey assessing age, sex, race, marital status, income, employment, and education was administered. These data were used for characterization of the sample and to serve as covariates as necessary.

Health-Related Quality of Life. Health-related quality of life was assessed using the second version of the Short-Form-36 Health Survey (SF-36v2) (Ware, 2004), a 36-item scale assessing eight dimensions of health-related quality of life (HRQL). Subscales are physical functioning (HRQL-PF), role limitations due to physical functioning (HRQL-RP), bodily pain (HRQL-BP), social functioning (HRQL-SF), mental health (HRQL-MH), role limitations due to emotional health (HRQL-RE), vitality (HRQL-VT), and general health (HRQL-GH).

The HRQL-PF subscale consists of 10 items assessing whether or not a participant experiences “a lot,” “a little,” or “no” physical limitation in several domains of life. The HRQL-RP subscale

consists of four items on a 5-point Likert scale assessing limitations experienced in work-related activities due to physical problems in the past month. The HRQL-BP subscale contains two items asking participants to rate pain intensity for the last past 4 weeks. The HRQL-SF subscale is comprised of two items assessing the degree to which health problems interfered with social activities. The HRQL-MH subscale consists of five items assessing mood in the previous month, while the HRQL-RE subscale comprises three items assessing emotional problems that have affected functioning in the past month. The HRQL-VT subscale comprises four items asking about vitality levels in the past 4 weeks. Finally, the HRQL-GH subscale includes five items asking participants to rate perceptions of their general perception of their health in the last 4 weeks (Ware, Kosinski, & Dewey, 2000).

The SF-36 also provides two composite scores: Physical Components Summary (HRQL-PCS) and Mental Components Summary (HRQL-MCS). The HRQL-PCS composite score is comprised of HRQL-PF, HRQL-RP, and HRQL-BP. The HRQL-MCS composite score is composed of the HRQL-MH, HRQL-RE, HRQL-SF, and HRQL-VT. Use of these two composite scores has been supported in several studies, including with low income, rural, and primary care samples (Bharmal, & Thomas, 2005; Ware, 2004; Ware & Kosinski, 2001; Weeks et al., 2004;). In primary care the SF-36v2 exhibited acceptable internal consistency (Cronbach's alpha) ranging from .70 to .80 for individual subscales (Hann & Reeves, 2008). In addition, excellent internal consistency (.90) has been shown for both the HRQL-PCS and the HRQL-MCS in primary care samples (Hann & Reeves, 2008).

Interpersonal Needs. Lack of satisfaction of interpersonal needs was assessed with the Interpersonal Needs Questionnaire (INQ), which has 18 items and evaluates thwarted belongingness (INQ-TB; 9 items) and perceived burdensomeness (INQ-PB; 9 items) on a 7-point

Likert scale, ranging from 1 (not at all true for me) to 7 (very true for me) (Van Orden, Cukrowicz, Witte, & Joiner, 2012). An example of an item assessing perceived burdensomeness is “These days, the people in my life would be better off if I were gone.” In previous research with college students, the INQ-PB subscale had excellent internal consistency ($\alpha=.92$) (Davidson, Wingate, Grant, Judah, & Mills, 2011). In the current sample internal consistency for the INQ-PB subscale was excellent ($\alpha = .91$). Convergent validity for the INQ-PB is supported by the scale’s relations with greater depressive symptoms ($r = .52 - .56$) and suicide ideation ($r = .31$) and less optimism ($r = -.51$) in college student samples (Davidson, Wingate, Slis, & Rasmus, 2010; Freedenthal, Lamis, Osman, Kahlo, & Gutierrez, 2011). The INQ-TB scale includes items such as “These days, I rarely interact with people who care about me.” In a college sample the INQ-TB displayed excellent internal consistency ($\alpha=.90$) and appropriate convergent validity through its associations with greater depressive symptoms ($r=.56$) and suicide ideation ($r=.31$) (Davidson et al., 2011). Factor analytic and strong psychometric support for both the INQ-TB and INQ-PB subscales was also exhibited in an older adult sample and an outpatient mental health sample (Van Orden et al., 2012).

Suicidal Behavior. The Suicide Behaviors Questionnaire - Revised (SBQ-R) (Osman et al., 2001) is comprised of four questions that assess suicidal behaviors, including: likelihood of future attempts (“How likely is that you will attempt suicide someday”); communication of intent (“Have you ever told someone that you were going to commit suicide, or that you might do it”); suicide ideation in the past year (“How often have you thought about killing yourself in the past year”); and, lifetime history of suicidal ideation and attempts (“Have you ever thought about or attempted to kill yourself”). Each question on the SBQ-R is scored on a variable Likert-type scale, ranging from 5-7 “points” indicating frequency or severity; items are summed for a

total score, with higher total scores indicative of greater levels of suicidal behavior. The SBQ-R has demonstrated high internal consistency ($\alpha = .97$) in a university sample and good internal consistency (.87) in a psychiatric inpatient adult sample. The SBQ-R has also demonstrated good convergent validity with the Adult Suicidal Ideation Questionnaire ($r=.40, p< .01$) (Osman et al., 2001). In the current study the SBQ-R demonstrated acceptable internal consistency ($\alpha = .78$).

Depressive Symptoms. Depressive symptoms were assessed using the Center for Epidemiological Studies – Depression Scale (CESD) (Radloff, 1977), a 20-item, self-report questionnaire that can be administered via interview or in a pencil-paper format, as in the current study. The CESD is designed to assess affective, cognitive, and behavioral symptoms commonly associated with depressive disorder as defined by the *Diagnostic and Statistical Manual of Mental Disorders - Fourth Edition (Text Revision) (DSM-IV-TR)* (Radloff, 1977). The CESD employs a Likert-scale ranging from 0 (“rarely to none of the time”) to 3 (“most or all of the time”). Scores on the CESD can range from 0-60, with higher scores indicating more severe depressive symptoms (Radloff, 1977). The CESD has been successfully used with diverse ethnic samples, adults with special needs, middle-aged adults, and college students (Knight, Williams, McGee, & Olama, 1977; Ruiz-Grosso et al., 2012; Zhang, Sun, Kong, Wang, & Cuntong, 2012) and exhibits concurrent validity with the Beck Depression Inventory (BDI) ($r = 0.81$) (Knight et al., 1977) and the Zung Self-Rating Depression Scales ($r= 0.86$) (Ruiz-Grosso et al., 2012). The CESD has also demonstrated good internal reliability in middle-aged women ($\alpha = .88$) (Knight et al., 1977; Radloff, 1977). In the current study the CESD demonstrated excellent internal consistency ($\alpha = .93$).

Statistical Analyses

Before analyses were conducted, a preliminary statistical and visual examination of the data was conducted to determine the presence of any outliers or missing data. For missing data, person-mean imputation was used if no more than 20% of a measure was missing (Bono, Ried, Kimberlin, & Vogel, 2007).

Bivariate Analyses. Pearson's product-moment correlation coefficients (r) were used to determine the associations between, and independence of, study variables, including covariates. A coefficient of $r \geq .80$ was used to determine multicollinearity (Field, 2005).

Mediation. Mediation analyses, consistent with Preacher and Hayes (2008), was conducted. According to these techniques, which differ from those of Baron and Kenny (1986), indirect effects were assessed without the assumption of normally distributed data, a statistically significant relationship between independent and dependent variables is not necessary, and the analyses employ bootstrapping, a resampling technique that contributes to power and is effective for small samples. A set of 95% bias-corrected and accelerated bootstrap confidence intervals (CIs) of the indirect effect of each predictor on the outcome, through the potential mediators, was assessed using 5,000 bootstrap resamples.

Moderated Mediation (Conditional Indirect Effects Model). In addition to describing *how* an effect occurs, models of conditional indirect effects also describe *when* an effect occurs (i.e., moderation). To assess the potential moderating effect of depressive symptoms on the mediation-based associations between HRQL and thwarted interpersonal needs (A Paths) and between thwarted interpersonal needs and suicidal behavior (B Paths), Model 5 developed by Preacher, Rucker, and Hayes (2007) was used (See Figure 1). Model 5 tests the possibility that a single moderator affects the relation between an independent variable and the mediator and

between the mediator and the dependent variable. These moderated mediation analyses, which identify significant interactions using ordinary least squares regression methods of moderation, were conducted using the “PROCESS” syntax file (www.afhayes.com) (Aiken, West, & Reno, 1991; Hayes, 2013). Model 5 also uses bootstrap resampling to estimate confidence intervals (CIs) of conditional indirect effects.

Significant moderation was noted to occur if values set to ± 1 standard deviation from the mean were reached. When regression analyses indicated a statistically significant interaction exists for the moderator, the bootstrapping results test for indirect effects at particular values of the moderator was interpreted. Confidence intervals that did not contain 0 (zero) indicated that the indirect effect at the predetermined cutoff score of the moderator was statistically significant (Preacher et al., 2007). In other words, the mediating effect of thwarted interpersonal needs on the association between HRQL and suicidal behaviors may depend on level of depressive symptoms, and this may occur in the path between the independent variable and mediator, as well as in the path between the mediator and dependent variable.

Serial Multivariable Mediation Analyses. Multivariable mediation analyses consistent with techniques by Hayes (2012) were conducted to test a serial multiple mediation model with thwarted belongingness, perceived burdensomeness, and depressive symptoms as mediators. Mediators are assumed to have a direct effect on one another in serial mediation analyses. As such, in our model the independent variables of mental and physical HRQL were proposed to influence our mediators in a sequential fashion and, in turn, the dependent variable. For instance, in our model levels of mental and physical HRQL were proposed to affect levels of thwarted belongingness and perceived burdensomeness and, in turn, depressive symptoms, and suicidal behaviors. In serial mediation there are several indirect and direct effects that can be noted. In

our model the following indirect effects were possible: a_1b_1 = specific indirect effect (HRQL affects suicidal behavior through thwarted interpersonal needs); $a_1a_3b_2$ = specific indirect effect (HRQL affects suicidal behavior through thwarted interpersonal needs and depressive symptoms); a_2b_2 = specific indirect effect (HRQL affect suicidal behavior through depressive symptoms). Confidence intervals that did not contain 0 (zero) indicated that the indirect effect at the predetermined cutoff score of the mediator was statistically significant (Hayes, 2012).

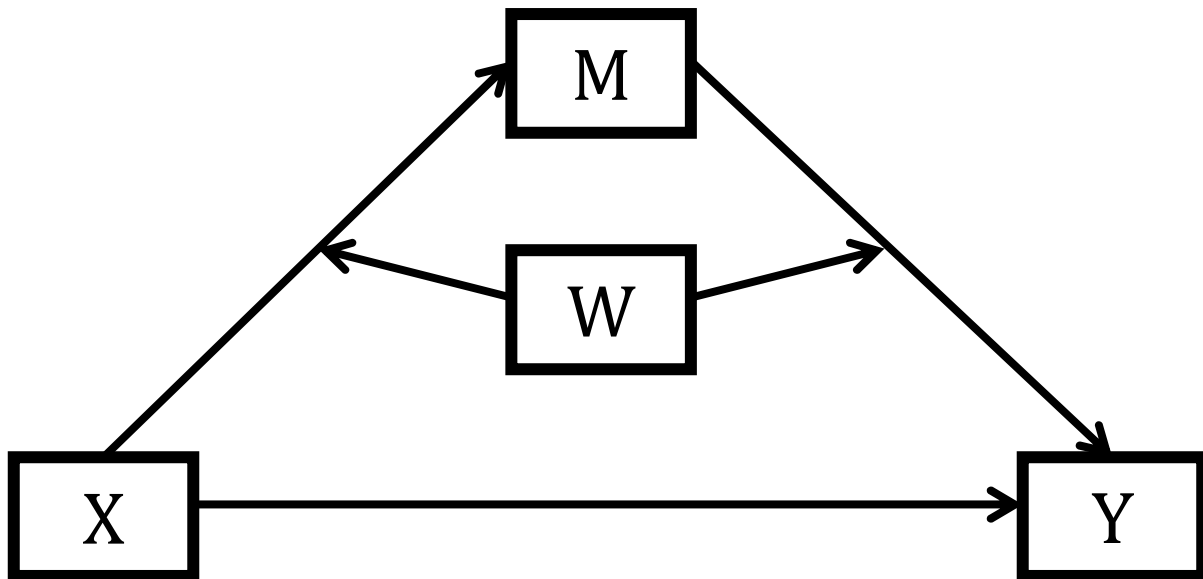


Figure 1. Graphical Illustration of a “Model 5” Conditional Indirect Effects Model

The model is described in Preacher, Rucker, and Hayes, (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, 42(1), 185-227.

Note: X = independent variable, Y = dependent variable, M = mediator, and W = moderator.

CHAPTER 3

RESULTS

Descriptive Results

Demographics

Our sample of 100 primary care patients was primarily female ($n=71$; 71%), with the remainder identifying as male ($n = 29$; 29%). Our sample ranged in age from 18 to 64 (Mean Age = 42.18; SD = 12.83) and were largely of White ethnicity ($n=94$; 94%), followed by Black ($n=3$; 3%) and Asian ($n=1$; 1%). The majority of respondents maintained either full-or part-time employment ($n=73$; 73%), 24 (24%) participants reported being unemployed and 2 (2%) reported being retired or receiving disability. Marital status included: married ($n=36$; 36%), single ($n=28$; 28%), and divorced ($n=25$; 25%). The majority of participants reported an annual income under \$20,000 ($n=73$; 73%), followed by income under \$30,000 ($n=19$; 19%) and under \$40,000 ($n=5$; 5%). Descriptive statistics for each variable and scale in the study are displayed in Table 1.

Table 1
Levels of Demographic, Predictor, and Criterion Variables by Total Sample

Variable	Total Sample	
	M	SD
Age	42.04	12.81
Income	2.08	1.02
Depressive Symptoms	15.71	11.75
Thwarted Belongingness	2.58	1.34
Perceived Burdensomeness	2.01	1.21
Physical HRQL	48.27	11.13
Mental HRQL	44.03	11.89
Suicidal Behavior	4.90	2.49

Note: Depressive symptoms = Center for Epidemiologic Studies-Depression Scale Total Score; Thwarted Belongingness and Perceived Burdensomeness = Interpersonal Needs Questionnaire; Physical and Mental HRQL = MOS Short-Form 36, Version 2; Suicidal Behavior = Suicidal Behaviors Questionnaire – Revised.

Note: Income is based on 1 = “\$0 - 9,999,” 2 = “\$10,000 – 19,999,” 3 = “\$20,000 – 29,999,” etc.

Bivariate Correlations Among Study Variables

Pearson’s product Moment correlation analyses were used to test our first hypothesis, which was supported (see Table 2). Greater mental health-related quality of life was significantly negatively associated with thwarted belongingness ($r = -.58, p < .001$), perceived burdensomeness ($r = -.46, p < .001$), depressive symptoms ($r = -.75, p < .001$), and suicidal behavior ($r = -.41, p < .001$). Similarly, greater physical health-related quality of life was significantly negatively related to thwarted belongingness ($r = -.26, p < .001$), perceived burdensomeness ($r = -.23,$

Table 2
Bivariate Correlations of Study Variables with Demographics Included

	Thwarted Belongingness	Perceived Burdensomeness	Depressive Symptoms	Physical HRQL	Mental HRQL	Suicidal Behavior	Sex	Age	Income
Thwarted Belongingness	-	.72**	.75**	-.26*	-.58**	.44**	-.02	-.18	-.26*
Perceived Burdensomeness	-	-	.63**	-.23*	-.46**	.44**	.01	-.27*	-.28**
Depressive Symptoms	-	-	-	-.43**	-.75**	.55**	.24*	-.11	-.27**
Physical HRQL	-	-	-	-	.68**	-.41**	-.21*	-.28**	.07
Mental HRQL	-	-	-	-	-	-.46**	-.28*	.04	.35**
Suicidal Behavior	-	-	-	-	-	-	.14	-.07	.13
Sex	-	-	-	-	-	-	-	.04	-.08
Age	-	-	-	-	-	-	-	-	.17

Note: Thwarted Belongingness and Perceived Burdensomeness = Interpersonal Needs Questionnaire; Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; Physical and Mental HRQL = MOS Short Form – 36, Version 2; Suicidal Behavior = Suicidal Behaviors Questionnaire – Revised. * $p < .05$, ** $p < .01$.

$p < .001$), depressive symptoms ($r = -.43, p < .001$), and suicidal behavior ($r = -.41, p < .001$).

Depressive symptoms were significantly positively related to thwarted belongingness ($r = .75, p < .001$), perceived burdensomeness ($r = .63, p < .001$), and suicidal behavior ($r = .55, p < .001$).

Thwarted belongingness ($r = .44, p < .001$) and perceived burdensomeness ($r = .44, p < .001$) were significantly associated with suicidal behavior as well as with one another ($r = .72, p < .001$).

Mediation Analyses

In support of Hypothesis 2 in a simple mediation model physical health related quality of life was significantly negatively related to higher levels of perceived burdensomeness ($a = -.020, SE = .006, p < .01$) as well as to greater suicidal behavior ($c = -.038, SE = .013, p < .01$).

Additionally, perceived burdensomeness was significantly positively associated with suicidal behavior ($b = .837, SE = .205, p < .001$). However, the direct effect of physical health related quality of life on suicidal behavior was no longer significant after accounting for the mediating effect of perceived burdensomeness ($c' = -.02, SE = .013, p = .112$), indicating full mediation. In order to determine the presence of a true significant indirect effect, the biased confidence intervals must not contain a true zero, which was supported in our finding (BCa 95% CIs [-.035, -.003]) (See Table 3).

Similarly, in a separate simple mediation model, thwarted belongingness also fully mediated the association between poor physical HRQL and suicidal behavior such that physical HRQL was related to higher levels of thwarted belongingness ($a = -.023, SE = .007, p < .01$) and, in turn, to greater suicidal behavior ($b = .743, SE = .185, p < .001$). The direct effect of poor physical HRQL was no longer significant after the inclusion of thwarted belongingness ($c' = -.02, SE = .013, p = .116$) with CIs not including a true zero, (BCa 95% CIs [-.037, -.005]) (See Table 3).

In a simple mediation model assessing the effects on mental health quality of life on suicidal behavior, no effect was found for thwarted belongingness. Mental HRQL was significantly negatively associated with thwarted belongingness ($a = -.042$, $SE = .006$, $p < .001$) and, in turn, thwarted belongingness was significantly positively related to suicidal behaviors ($b = .484$, $SE = .217$, $p < .05$). The direct effect of mental HRQL on suicidal behavior was reduced but remained significant after the inclusion of thwarted belongingness ($c' = -.039$, $SE = .015$, $p = .009$), and the upper and lower confidence intervals did include a true zero, (BCa 95% CIs [- .046, .002]) (See Table 3).

Finally, perceived burdensomeness partially mediated the association between poor mental HRQL and suicidal behavior. Mental health HRQL was significantly negatively associated with perceived burdensomeness ($a = -.028$, $SE = .006$, $p < .001$) and, in turn, perceived burdensomeness was positively related to suicidal behaviors ($b = .626$, $SE = .210$, $p < .05$). The direct effect of poor mental HRQL on suicidal behavior was reduced but remained significant after the inclusion of perceived burdensomeness ($c' = -.042$, $SE = .013$, $p = .001$), (BCa 95% CIs [- .039, -.003]) (See Table 3), indicating partial mediation.

Table 3

Direct and Indirect Associations between Physical HRQL, Thwarted Belongingness, Perceived Burdensomeness, and Suicidal Behavior

Path	Estimate (SE)	Bias corrected and accelerated 95% Confidence Interval
Suicidal Behavior		
<i>c</i> (Physical HRQL → Suicidal Behavior)	-.038 (.013)**	
<i>a</i> (Physical HRQL → Perceived Burden)	-.020 (.006)**	
<i>b</i> (Perceived Burden → Suicidal Behavior)	.837 (.205)***	
<i>c'</i>	-.021 (.013)	
<i>ab</i>	-.016 (.009)	[-.035, -.003]
Suicidal Behavior		
<i>c</i> (Physical HRQL → Suicidal Behavior)	-.03(.013)*	
<i>a</i> (Physical HRQL → Thwarted Belongingness)	-.023 (.007)*	
<i>b</i> (Thwarted Belongingness → Suicidal Behavior)	.743 (.186)**	
<i>c'</i>	-.021(.013)	
<i>ab</i>	-.017 (.007)	[-.036, -.005]
Suicidal Behavior		
<i>c</i> (Mental HRQL → Suicidal Behavior)	-.060 (.012)***	
<i>a</i> (Mental HRQL → Perceived Burden)	-.028(.005)***	
<i>b</i> (Perceived Burden → Suicidal Behavior)	.626 (.210)*	
<i>c'</i>	-.042 (.013)*	
<i>ab</i>	-.017(.009)	[-.039, -.003]
Suicidal Behavior		
<i>c</i> (Mental HRQL → Suicidal Behavior)	-.060 (.012)***	
<i>a</i> (Mental HRQL → Thwarted Belongingness)	-.41 (.005)***	
<i>b</i> (Thwarted Belongingness → Suicidal Behavior)	.484 (.217)*	
<i>c'</i>	-.039 (.014)*	
<i>ab</i>	-.020 (.012)	[-.046, .002]

Note. Physical and Mental HRQL = Short-Form 36; Perceived Burden Thwarted Belongingness = Interpersonal Needs Questionnaire; Suicidal Behavior = Suicidal Behaviors Questionnaire – Revised.

Note. Normal-theory results have no covariates.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Conditional Indirect Effect Analyses

To assess whether the mediating effect of thwarted interpersonal needs on the relationship between HRQL and suicidal behavior was contingent on level of depressive symptoms (Hypothesis 3), conditional indirect effects testing was conducted, as outlined by Preacher and Hayes (Hayes, 2012). Based on use of two separate predictors (mental and physical health-related quality of life) and mediators (thwarted belongingness and perceived

burdensomeness), four models were constructed that assessed the moderating effect of depressive symptoms on the mediational influence of thwarted interpersonal needs on the relation between health-related quality of life and suicidal behavior. Results of the indirect effects testing did not reveal significant interactions for any of the four proposed models; that is, depressive symptoms were not a significant moderator of any mediating effect of interpersonal needs on the relation between health-related quality of life and suicidal behavior. Because the moderating effects were not significant, the Johnson-Neyman (JN) technique, a post hoc test, was not conducted to determine specific effects; however, for review, the nonsignificant results are displayed in Tables 4-7.

Table 4

Direct and Indirect Associations Between Physical HRQL and Suicidal Behavior and Thwarted Belongingness

	Suicidal Behavior		
	B(SE)	t	95% BCa CI
Constant	2.23(.745)	2.99*	[.750, 3.710]
Physical HRQL	.001(.008)	0.084	[-.016, .017]
Depressive Symptoms	.083(.019)	4.208***	[.043, .121]
<i>Physical HRQL x Dep Symptoms</i>	.0002(.0004)	0.518	[-.001, .001]
Constant			
Physical HRQL	3.698(2.043)	1.809	[-.364, 7.761]
Depressive Symptoms	.052(.064)	0.811	[-.076, .179]
Thwarted Belongingness	.035(.365)	0.095	[-.692, .761]
<i>Depressive Symptoms x Thwarted Belongingness</i>	.016(.051)	0.758	[-.019, .041]

Note: Thwarted Belongingness = Interpersonal Needs Questionnaire; Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; Physical HRQL = MOS Short Form – 36, Version 2; Suicidal Behavior = Suicidal Behaviors Questionnaire – Revised.

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. BCa CI = Bias-corrected and accelerated confidence interval; CI values not containing 0 are considered significant.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 5

Direct and Indirect Associations Between Physical HRQL and Suicidal Behavior and Perceived Burdensomeness

	Suicidal Behavior		
	B(SE)	t	95% BCa CI
Constant	2.06(.801)	2.575*	[.470, 3.653]
Physical HRQL	.002(.009)	0.193	[-.016, .019]
Depressive Symptoms	.081(.021)	3.845***	[.039, .019]
<i>Physical HRQL x Dep symptoms</i>	-.0004(.0005)	-0.873	[-.001, .0005]
Constant	3.423(1.944)	1.761	[-.441, 7.288]
Physical HRQL	-.008(.014)	-.535	[-.036, .021]
Depressive Symptoms	.036(.045)	0.804	[-.053, .125]
Perceived Burden	-.003(.400)	-.007	[-.799, .793]
<i>Depressive Symptoms x Perceived Burdensomeness</i>	.020(.014)	0.1.401	[-.008, .048]

Note: Perceived Burdensomeness = Interpersonal Needs Questionnaire; Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; Physical HRQL = MOS Short Form – 36, Version 2; Suicidal Behavior = Suicidal Behaviors Questionnaire – Revised.

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. BCa CI = Bias-corrected and accelerated confidence interval. Note that CI values not containing 0 are considered to be significant.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 6

Direct and Indirect Associations Between Mental HRQL and Suicidal Behavior and Thwarted Belongingness

	B(SE)	t	95% BCa CI
Constant	2.911(.774)	3.758***	[1.372, 4.452]
Mental HRQL	-.008(.009)	-0.891	[-.026, .010]
Depressive Symptoms	.075(.017)	4.478***	[.041, .107]
<i>Mental HRQL x Dep Symptoms</i>	.0003(.0004)	0.835	[-.001, .001]
Constant	4.477(2.196)	2.038*	[.111, 8.842]
Mental HRQL	-.021(.019)	-1.073	[-.059, .018]
Depressive Symptoms	.034(.068)	0.500	[-.101, .168]
Thwarted Belongingness	-.006(.367)	-.017	[-.736, .724]
<i>Depressive Symptoms x Thwarted Belongingness</i>	.012(.015)	0.809	[-.018, .042]

Note: Thwarted Belongingness = Interpersonal Needs Questionnaire; Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; Physical HRQL = MOS Short Form – 36, Version 2; Suicidal Behavior = Suicidal Behaviors Questionnaire – Revised.

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. BCa CI = Bias-corrected and accelerated confidence interval. Note that CI values not containing 0 are considered to be significant.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Table 7

Direct and Indirect Associations Between Mental HRQL and Suicidal Behavior and Perceived Burdensomeness

	Suicidal Behavior		
	B(SE)	t	95% BCa CI
Constant	1.51(.828)	1.824	[-.135, 3.157]
Mental HRQL	.009(.009)	0.992	[-.009, .029]
Depressive Symptoms	.087(.018)	4.921	[.052, .123]
<i>Mental HRQL x Dep Symptoms</i>	-.0006(.0004)	-1.567	[-.001, .0002]
Constant			
Mental HRQL	4.023(1.956)	2.056	[.134, 7.911]
Depressive Symptoms	.022(.047)	0.461	[-.073, .117]
Perceived Burdensomeness	.045(1.956)	.114	[-.739, .829]
<i>Depressive Symptoms x Perceived Burdensomeness</i>	.018(.014)	1.301	[-.402, .468]

Note: Perceived Burdensomeness = Interpersonal Needs Questionnaire; Depressive Symptoms = Center for Epidemiologic Studies Depression Scale; Physical HRQL = MOS Short Form – 36, Version 2; Suicidal Behavior = Suicidal Behaviors Questionnaire – Revised.

Note. Unstandardized regression coefficients are reported. Bootstrap sample size = 5,000. BCa CI = Bias-corrected and accelerated confidence interval. Note that CI values not containing 0 are considered to be significant.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Serial Multivariable Mediation Analyses

In order to test our fourth hypothesis, which was partially supported, we used a serial mediation model using physical HRQL as the predictor and thwarted belongingness as a mediator (MV1), a significant total effect of physical HRQL on suicidal behavior was observed ($c = -.039$, $SE = .014$, $p = .006$, $CI = -.068$ to $-.011$) but not a significant direct effect ($c' = -.007$, $SE = .014$, $p = .598$, $CI = -.036$ to $.021$). A specific indirect pathway was observed through depressive symptoms ($a_2b_2 = -.014$, $CI = -.036$ to $-.003$); that is, poor physical HRQL was related to greater levels of depressive symptoms, and, in turn, to suicidal behavior. The second indirect pathway that was observed was through thwarted belongingness and depressive symptoms ($a_1a_3b_2 = -.013$, $CI = -.032$ to $-.002$).

In another serial model, again using physical HRQL as the predictor but with perceived burdensomeness as a mediator (MV1), several specific indirect pathways were observed. A significant total effect of physical HRQL on suicidal behavior was observed ($c = -.039$, $SE = .014$, $p = .006$, $CI = -.068$ to $-.011$) but not a significant direct effect ($c' = -.004$, $SE = .014$, $p = .730$, $CI = -.033$ to $.023$). A significant indirect pathway was observed through depressive symptoms ($a_2b_2 = -.014$, $CI = -.038$ to $-.003$). A second specific indirect effect was observed through perceived burdensomeness and depressive symptoms ($a_1a_3b_2 = -.014$, $CI = -.026$ to $-.002$).

Several specific indirect effects were observed in models using mental HRQL as the predictor variable and perceived burdensomeness (MV1) and depressive symptoms (MV2) as mediators. A significant total effect of mental HRQL on suicidal behavior was observed ($c = -.062$, $SE = .012$, $p = .000$, $CI = -.087$ to $-.036$) but not a significant direct effect ($c' = -.018$, $SE = .018$, $p = .314$, $CI = -.056$ to $.018$). A significant indirect pathway was observed through depressive symptoms ($a_2b_2 = -.023$, $CI = -.059$ to $-.001$). A second specific indirect effect was also observed

through perceived burdensomeness and depressive symptoms ($a_1a_3b_2=-.001$, $CI = -.022$ to $-.001$).

In models examining mental HRQL as the predictor variable and thwarted belongingness (MV1) and depressive symptoms (MV2) as the mediators, no significant indirect effects were observed. A significant total effect of mental HRQL on suicidal behavior was observed ($c=-.062$, $SE=.012$, $p=.000$, $CI = -.087$ to $-.038$).

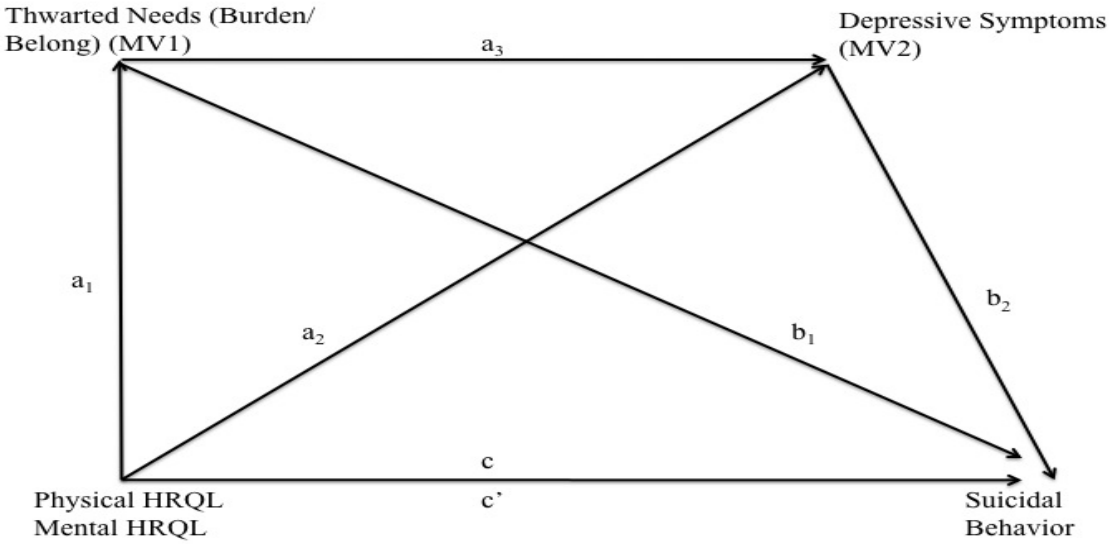


Figure 2: Illustration of an indirect effects model for serial multivariable mediation

Note: *MV* = mediator variable. a_1 = direct effect of HRQL on thwarted interpersonal needs (perceived burdensomeness and thwarted belongingness); a_2 = direct effect of HRQL on depressive symptoms; a_3 = direct effect of thwarted interpersonal needs on depressive symptoms; b_1 = direct effect of thwarted interpersonal needs on depressive symptoms; b_2 = direct effect of depressive symptoms on suicidal behavior; c = total effect (HRQL affects suicidal behavior without the inclusion of mediators); c' = direct effect of HRQL when accounting for mediators; total indirect effect = $a_1b_1 + a_1a_3b_2 + a_2b_2$ (HRQL affects suicidal behavior through specific effects); a_1b_1 = specific indirect effect (HRQL affects suicidal behavior through thwarted interpersonal needs); $a_1a_3b_2$ = specific indirect effect (HRQL affects suicidal behavior through thwarted interpersonal needs and depressive symptoms); a_2b_2 = specific indirect effect (HRQL affect suicidal behavior through depressive symptoms).

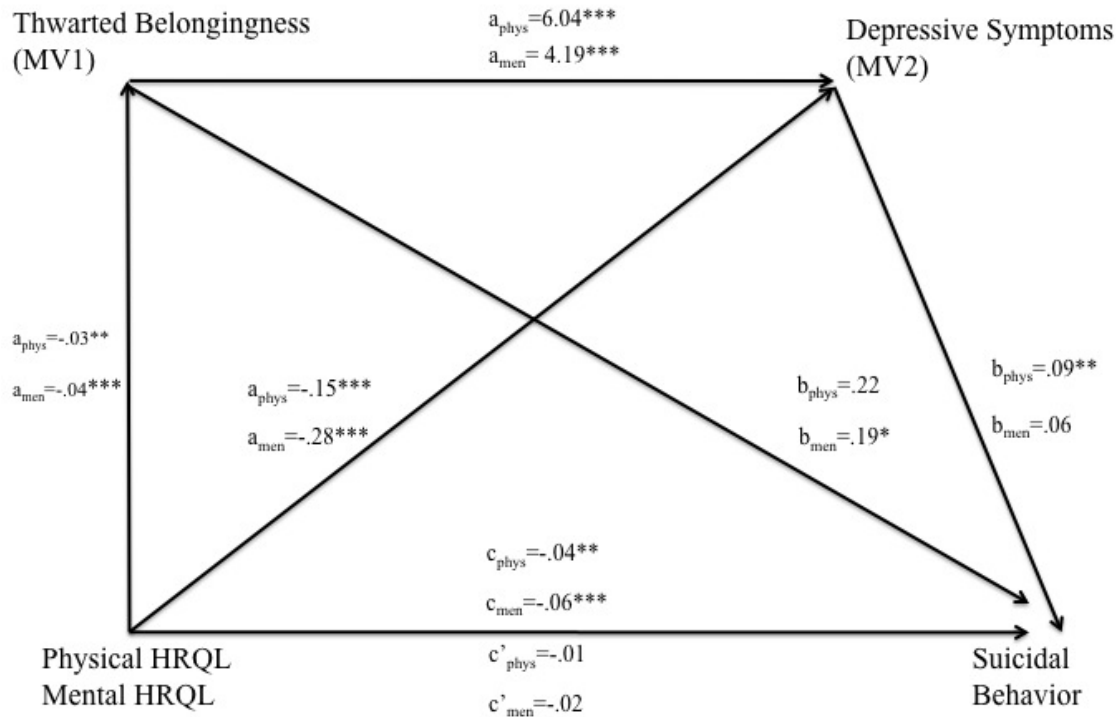


Figure 3. Serial indirect effects model for physical and mental HRQL and suicidal behavior.

Note. $p \leq .05$, $** p \leq .01$, $*** p \leq .001$.

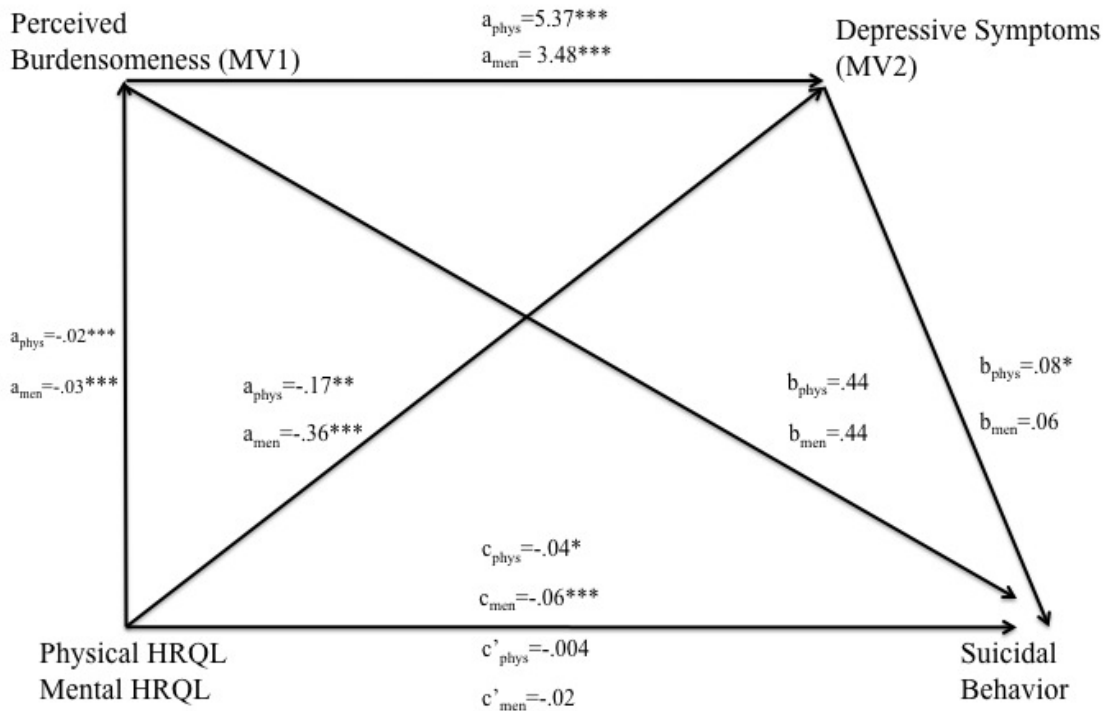


Figure 4. Serial indirect effects model for physical and mental HRQL and suicidal behavior.

Note. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

CHAPTER 4

DISCUSSION

Previous research suggests that better health-related quality of life, a multifaceted construct comprised of lack of illness as well as positive self-perceptions of emotional, social, and physical well-being (Hays & Morales, 2001), is related to greater energy and life satisfaction, whereas poor HRQL contributes risk for increased psychopathology, including suicidal outcomes (Bharmal & Thomas, 2005; Goldberg & Harrow, 2005; Yatham et al., 2004). However, our understanding of the potential underlying factors affecting the relationship between HRQL and outcomes such as suicidal behavior is limited; as such, we examined the potential mediating impact of the interpersonal constructs of thwarted belongingness and perceived burdensomeness on the association between health-related quality of life and suicidal behavior as well as the moderating role of depressive symptoms, an intrapersonal characteristic, on this mediated relationship.

Overview of Main Findings

In our sample of working and uninsured primary care patients, in support of our bivariate hypotheses, we found that better mental and physical HRQL were significantly negatively associated with thwarted belongingness, perceived burdensomeness, depressive symptoms, and suicidal behavior. Additionally, depressive symptoms were significantly positively related to thwarted belongingness and perceived burdensomeness, consistent with limited previous findings (e.g., Nsamenang et al., 2013) as well as with suicidal behavior. Thwarted belongingness and perceived burdensomeness were positively associated with suicidal behavior as well as with one another, as in past research (Joiner et al., 2009; Van Orden et al., 2010).

This pattern of findings supports existing literature regarding the deleterious relationship between poor mental and physical HRQL and psychopathology such as depressive symptoms and suicidal behavior (Barnow & Linden, 2000; Bharmal & Thomas, 2005; Cicirelli, 1997; de Abreu, 2012; Moor et al., 2012). Our findings also support the literature asserting that poor HRQL negatively impacts ability to engage in meaningful social activities, perhaps contributing to perceptions of thwarted belongingness and perceived burdensomeness (Cicirelli, 1997; Idler & Benyamini, 2007; Kaplan et al., 2007).

In simple mediation analyses, thwarted belongingness and perceived burdensomeness independently mediated the association between mental and physical HRQL and suicidal behaviors, in support of our second hypothesis. Specifically, poor physical HRQL was related to greater levels of perceived burdensomeness as a full mediator and to greater thwarted belongingness as a full mediator and, in turn, to greater suicidal behavior. We also found that perceived burdensomeness partially mediated the association between mental HRQL and suicidal behavior; however, no effect was observed in the model examining mental HRQL, thwarted belongingness, and suicidal behaviors.

Our third hypothesis, which examined the potential moderating effect of depressive symptoms on the HRQL-suicidal behavior association mediated by interpersonal needs, was not supported. Depressive symptoms failed to significantly moderate the associations between HRQL and thwarted interpersonal needs nor the associations between thwarted interpersonal needs and suicidal behavior.

In our fourth hypothesis, which involved serial mediation models, physical HRQL was directly related to suicidal behavior and also via its serial effects on thwarted belongingness and depressive symptoms; a similar pattern of effects was found via perceived burdensomeness and

depressive symptoms. No effects were noted solely via thwarted interpersonal needs. In further serial models examining mental HRQL as the predictor no specific, direct, or total effects were observed in models examining thwarted belongingness and depressive symptoms as sequential mediators. In additional serial mediator models using mental HRQL as the predictor and perceived burdensomeness as the first mediator and then depressive symptoms, a significant total effect of mental HRQL on suicidal behavior was observed as well as a specific indirect effect through depressive symptoms, and sequentially through perceived burdensomeness and depressive symptoms. No specific or direct effects were observed with inclusion of thwarted belongingness as a potential serial mediator.

These findings support, as well as contribute to, the existing body of literature on the associations between health-related quality of life thwarted interpersonal needs and suicidal behaviors (Cicirelli, 1997; Harris & Barraclough, 1998; Hatfield et al., 2013; Joiner et al., 2009; Kilbourne et al., 2007; Van Orden et al., 2010); specifically, our findings extend the understanding of these associations to include consideration of depressive symptoms. Of note, our findings suggest that both inter- and intra-personal factors contribute to the linkage between HRQL and suicidal behaviors (Flett et al., 1997; Nsamenang et al., 2013; Van Orden et al., 2010), which is a premise that has been understudied within the context of the Interpersonal Psychological Theory of Suicide.

Hypothesis 1: Bivariate Associations Among Variables Of Study

Previous research has documented the robust relationship between poor health-related quality of life and suicide risk, which was replicated in our study (Cicirelli, 1997; Goodwin & Marusic, 2011; Romm et al., 2012; Smitherman et al., 2011; Sudhir et al., 2012). Our hypothesis that poor mental and physical HRQL would be significantly positively associated with

depressive symptoms was also supported, consistent with previous literature (Cicirelli, 1997; de Abreu, 2012; Moor et al., 2012). Mental HRQL as a concept is intended to capture an individual's self-perception of interpersonal and emotional functioning (WHO, 1997), and individuals reporting poor mental HRQL may espouse the negative, maladaptive emotions, and self-critical cognitions that comprise the phenomena of depression (Beck et al., 2012; Beck et al., 1979). Poor physical HRQL may also enhance somatic symptoms that are commonly associated with depression, such as pain and fatigue (APA, 2000).

Poor mental and physical HRQL were both significantly associated with greater thwarted belongingness and perceived burdensomeness. These findings may be explained, in part, by the potential limitations that individuals with poor HRQL perceive in their daily functioning. In past research individuals that report poor HRQL also often experience greater levels of isolation and difficulty integrating into important social groups, perhaps as a result of less physical autonomy due to illness or impairment, or as a result of emotional distress that precludes successful interpersonal interactions (Abela et al., 2004; Choi & McDougall, 2007; Street et al., 1999). For example, previous research comparing ambulatory versus nonambulatory older adults, individuals that were physically limited in their ability to access and use social support and resources, were more likely to endorse higher levels of depressive symptoms even when controlling for sociodemographics, health problems, and other life stressors (Choi & McDougall, 2007). Thus, whether emotionally or physically-based, the experience of poor quality of life appears to contribute to interpersonal dysfunction and consequent psychological dysfunction (Cicirelli, 1997; Goldberg & Harrow, 2005; Idler & Benyamini, 2007; Kaplan et al., 2007; Yatham et al., 2004).

Our findings demonstrated that both thwarted belongingness and perceived burdensomeness were significantly associated with one another, depressive symptoms, and suicidal behavior. The significant association between thwarted belongingness and perceived burdensomeness has been documented in varied samples including rural primary care patients (Joiner, 2005; Nsamenang et al., 2013; Van Orden et al., 2008; Van Orden et al., 2012), consistent with the Interpersonal Psychological Theory of Suicide (IPTTS) that suggests these two constructs occur in tandem with one another (Van Orden et al., 2010). For instance, it is possible that individuals who feel ineffective and unable to contribute to the well-being of others may, consequently, become isolative in an attempt to alleviate sense of burdensomeness, thereby increasing sense of thwarted belongingness. On the other hand, perceived burdensomeness, which is comprised of internal negative schemas that include feelings of self-hatred and worthlessness (Van Orden et al., 2010, Van Orden et al., 2012), may contribute to withdrawal and isolation from others thereby increasing feelings of thwarted belongingness.

Finally, our results support the limited literature suggesting that frustrated interpersonal needs may be an important factor to consider in the conceptualization of depressive symptoms (Davidson, Wingate, Grant, Judah, & Mills, 2011; Nsamenang et al., 2013) and vice versa. For example, much like depression, frustrated interpersonal needs are characterized by feelings of self-criticalness, worthlessness, self-hatred, loneliness, and negative perceptions of the self (Joiner et al., 2005; Van Orden et al., 2010; Van Orden et al., 2008). It appears, perhaps, that the interpersonal, environmental experience of frustrated interpersonal needs may mirror, somewhat, the intrapersonal, cognitive-emotional experience of depression (APA, 2000; Flett, Vredenburg, & Krames, 1997).

Hypothesis 2: Simple Mediation Models Among Variables Of Study

In separate, simple mediation models perceived burdensomeness and thwarted belongingness fully mediated the association between physical HRQL and suicidal behavior, suggesting that the deleterious impact of poor HRQL on suicidal behavior may be explained, in part, by feelings of thwarted belongingness and perceived burdensomeness. Although our sample was largely ambulatory, our novel findings support previous research; for example, stroke recovery patients reporting greater physical limitations also endorsed feeling like a burden to caregivers and, as well, their caregivers endorsed greater sense of being burdened (Hinojosa et al., 2011). Similar findings have been replicated in a sample of individuals with chronic asthma who, although relatively ambulatory, reported that their chronic illness negatively impacted their perceived physical HRQL and increased their perceptions of feelings like a burden on others (Sullivan, Smith, Ghushchyan, Globe, Lin, & Globe, 2013). In our sample poor physical HRQL was also associated with greater feelings of thwarted belongingness and, in turn, greater suicidal behavior. Perhaps, individuals who perceive poor physical HRQL may feel limited in their opportunities to engage in social relationships and activities that promote feelings of connectedness and interpersonal well-being, thereby increasing feelings of thwarted belongingness and suicide risk (Kate, Grover, Kulhara, & Nehra, 2013).

In models exploring the mediating effect of frustrated interpersonal needs on the association between mental HRQL and suicidal behaviors, perceived burdensomeness was a partial mediator of this relation, whereas thwarted belongingness did not exert an effect. Our findings follow a pattern in the existing literature, which suggests that perceived burdensomeness may be a more salient predictor of suicidal behavior than thwarted belongingness (Joiner et al., 2009; Van Orden et al., 2010), notably because of the impact it has on ones sense of self-

preservation (Conwell et al., 2000; Van Orden et al., 2012). For those in our sample with poor mental HRQL, it may be that perceptions of burden are particularly relevant due to the interplay between daily hassles and stressors and psychological factors that are thought to give rise to perceived burdensomeness (Van Orden et al., 2010). For instance, individuals with poor mental HRQL may be more likely to have preexisting negative thoughts about self-worth and efficacy, potentially exacerbating the experience of perceived burdensomeness and risk for suicidal behavior. Perceived burdensomeness may be particularly relevant for patients reporting poor mental HRQL, in the form of perceived stress and symptoms of depression and anxiety, which are characteristics often associated with poor sense of self-efficacy and competence, and perceptions of inadequate social ability (Joiner et al., 2010; Van Orden et al., 2012; Ware & Sherbourne, 1992; WHO, 2007), all of which are proposed to give rise to perceived burdensomeness.

Finally, we did not find significance for our model assessing the potential mediating effect of thwarted belongingness on the association between mental HRQL and suicidal behavior. This insignificant finding may be explained, in part, by the fact that poor mental HRQL may not always be associated with greater levels of thwarted belongingness; for instance, although one may have a decreased sense of mental wellbeing, perhaps as a result of stress or trauma, one may also have a preexisting support network that one can access despite perceived deficits in mental health-related quality of life (Chung, Moser, Lennie, & Frazier, 2013; Nazik et al., 2013).

Hypothesis 3: Moderated Mediation Models Among Variables of Study

In an attempt to understand the role of depressive symptoms on linkages between HRQL, frustrated interpersonal needs, and suicidal behavior, we assessed whether there was a conditional effect of depressive symptoms. However, contrary to our proposed hypotheses, depressive symptoms did not moderate the mediating effects of frustrated interpersonal needs on the association between HRQL and suicidal behavior.

Our lack of significant findings may be explained, in part, by the potential variance shared between the variables of study. Although there are different cutoff scores suggested in the literature, it may be possible that our use of a .8 cutoff score to determine the independence of our variables, as outlined by Field (2009), may have been too lenient (Aiken & West, 1991; Field, 2009). Previous work by Field (2005) has suggested a .7 cutoff score as a conservative estimate of independence of variables; however, a .8 cut-off has been widely used in the current literature (Field, 2009). Although none of our variables of study met this cut-off criterion, depressive symptoms neared multicollinearity with thwarted belongingness and mental HRQL (.75 for both), perhaps resulting in an inability to detect significant effects (Chatterjee, Hadi, Price, 2000). Although the presence of multicollinearity does not reduce or affect the predictive power or reliability of a model as a whole, it does impact calculations regarding individual predictors if they are highly correlated with other variables, such that calculations using highly correlated variables are less likely to have an accurate inversion of the matrix, which is required in regression models, and which increases the chance of a type 1 error (Chatterjee et al., 2000). However, potential multicollinearity does not explain why models using perceived burdensomeness did not reach significance, suggesting another explanation for our lack of findings, which is that depressive symptoms may function as a proximal, rather than distal, risk

factor. In the context of poor HRQL and poor dysfunctional interpersonal relationships, depressive symptoms may not be extraneous but, rather, may be an integral and more-proximal component of the linkage between health, interpersonal function, and suicidal behavior. Given this reasoning, we examined depressive symptoms as an integrated element of the effects of health on interpersonal needs and suicidal behavior rather than as a potentially confounding or moderating influence.

Hypothesis 4: Serial mediation Models Among Variables Of Study

To assess the proximal, and potentially sequential, influence of depressive symptoms on the relation between HRQL, frustrated interpersonal needs, and suicidal behavior, serial mediation analyses were conducted. In a serial mediation analysis assessing physical HRQL as the predictor with thwarted belongingness as the first mediator followed by depressive symptoms as the second sequential mediator, there were several notable effects. Specific indirect effects on suicidal behavior were observed through thwarted belongingness and depressive symptoms sequentially and through depressive symptoms alone. Similar results were found in the model using physical HRQL as the predictor, with perceived burdensomeness as the first mediator followed sequentially by depressive symptoms as well as through depressive symptoms alone. In both models perceived burdensomeness and thwarted belongingness failed to exert a specific indirect effect in the context of the association between physical HRQL and suicidal behavior. Although inconsistent with the extant literature indicating that it is the sole presence of frustrated interpersonal needs that gives rise to the development of suicidal behavior (Joiner et al., 2005), our results suggest that in the context of poor physical HRQL the presence of depressive symptoms may be a more salient predictor of suicidal behavior than thwarted interpersonal needs. Further, our findings suggest that it is only through the experience of depressive

symptoms that frustrated interpersonal needs exert an influence on the association between physical HRQL and suicidal behaviors.

In a serial mediation analysis assessing mental HRQL as the predictor with perceived burdensomeness as the first mediator followed by depressive symptoms as the second sequential mediator, similar effects were observed. A specific indirect effect was observed through depressive symptoms alone as well as sequentially through perceived burdensomeness and depressive symptoms. Although there is a plethora of literature that documents the deleterious impact of depressive symptoms on the development of suicidal behavior, no research has examined the potential intrapersonal result of experiencing frustrated interpersonal needs (APA, 2000; Flett, Vredenburg, & Krames, 1997; Lyness, Chapman, McGriff, Drayer, & Duberstein, 2009). Individuals reporting poor mental HRQL may also be concurrently experiencing limitations in their ability to make autonomous and self-determined decisions or to interact effectively with the environment in the context of their mental health difficulties, which are also risk factors for suicidal behavior (Britton et al., 2008). Poor mental HRQL may also limit the ability to which individuals can fully engage in activities that they derive pleasure from and that are necessary for daily functioning. Such limitations in self-efficacy may increase ones feelings of perceived burdensomeness and, in turn, depressive symptoms and suicide risk (DeLisle & Holden, 2009; Forgeard et al., 2011; Seligman & Weiss, 1980). An additional indirect effect was observed through depressive symptoms alone. This finding supports previous literature that suggests that limitations experienced in mental HRQL such as feelings of limited vitality and connectedness may be salient predictors of depressive symptoms and, consequently, suicidal risk (Abela et al., 2004). These findings are consistent with those of models examining the role of physical HRQL as a predictor such that both perceived burdensomeness and thwarted

belongingness failed to exert a specific indirect effect on the association between HRQL and suicidal behaviors independently, again suggesting that depressive symptoms may play a more salient role on the association between health and suicidal risk.

Finally, no specific effects were observed in the model examining thwarted belongingness and depressive symptoms as sequential mediators of the relation between mental HRQL and suicidal behavior. It is possible that shared variance resulting from the strong association between depressive symptoms and poor mental HRQL may have precluded our ability to detect significant findings (Field, 2009). It is important to note, however, that although mental HRQL as assessed in our study may contain some elements of mood dysfunction, mental HRQL is also comprised of elements such as perceptions of the future, self-esteem and self-image, feelings of connectedness, and vitality, suggesting that there may be other possible explanations for the lack of significance (Hays & Morales, 2001; Ware & Sherbourne, 1992; WHO, 1997). As previously noted, individuals with pre-existing social networks may be able to use them for support during times of distress, thereby reducing the risk for consequent depressive symptoms and suicidal behavior.

It is also possible that poor HRQL may not contribute to thwarted belongingness as deleteriously in some individuals, perhaps those who are able to reconceptualize their health limitations and goals into a future-oriented, ego-syntonic view of their self. There are likely many additional intra- and interpersonal as well as sociocultural and environmental factors that contribute to thwarted interpersonal needs, which should be addressed in future research (Proctor, Maltby, & Linley 2011).

Limitations and Future Research

Despite our study's many strengths, the results should be viewed in the context of minor limitations. Our cross-sectional design prevents the examination of causal relationships, and bidirectionality may be an issue of concern. For instance, it is suggested in the literature that depressive symptoms are a salient predictor of frustrated interpersonal needs, yet little research has examined this assumption or the bidirectionality of these constructs (Joiner et al., 2005; Van Orden et al., 2008; Van Orden et al., 2012). Health-related quality of life and depression may be similarly mutually related (Vancampfort et al., 2014); as an example, symptoms of depression are often found to be predictive of poor physical functioning and, conversely, physical illness and impairment are well-established predictors of psychopathology including depression and suicidal behavior (APA, 2000; Aversa et al., 2012; Bustamante, Wilbur, Marquez, Fogg, Staffileno, & Manning, 2013; van Uffelen et al., 2013). Additionally, future, prospective and longitudinal research is necessary in order to assess the potential bidirectional impact that HRQL and depressive symptoms may share in order to strengthen our hypotheses.

Generalizability is also a concern, as our sample was primarily White and female, and the age range of our sample was truncated. Previous research suggests that older adults, potentially not captured in our sample, are more likely to report increased depressive symptoms and suicidal behavior in relation to functional impairment and poor HRQL (CDC, 2010). Given that our sample was largely middle-aged and ambulatory, future research should include older adults; however, current epidemiological data indicate that middle-age persons experience the highest rate of suicidal behavior and psychopathology, warranting investigation of this population (SAMSHA, 2010). Further, use of a more heterogeneous sample may be particularly important as research suggests that persons from different age, sex, and ethnic groups may conceptualize,

experience, and report the experience of HRQL differently, potentially impacting the relative salience or likelihood of reporting concerns in the variables that we used (Connolly, Sampson, & Purandare, 2012; Moriarty & Butt, 2004). For instance, women and older persons are more likely to report decreased physical HRQL, whereas younger persons are more likely to report lower mental HRQL (CDC, 2013). Demographic characteristics including age, sex, and ethnicity are also related to differential rates of suicidal behavior and depressive symptoms (APA, 2000; CDC, 2010; Hasin et al., 2005; Sevillano, Basabe, Bobowik, & Aierdi, 2014; Teachman, 2006).

Finally, we used self-report measures to assess our variables of study, which may limit the accuracy of our measurement. Previous research has indicated that self-report measures are susceptible to a number of methodological issues ranging from socially desirable reporting styles, low external validity, and the potential confounding impact of the respondents current mood state (Huprich, Bornstein, & Schmitt, 2011). As such, more objective measures, such as physicians' ratings of health or DSM-V criteria, should be used to assess HRQL and depressive symptoms in conjunction with self-report measures to improve validity.

Implications

The results of our study may have important clinical implications for primary care patients for whom reports of poor mental and physical health-related quality of life are both frequent and salient yet are often treated in isolation (Bryan & Rudd, 2010; Luoma et al., 2010; Narrow et al., 1993). Our pattern of findings suggests, however, that mental and physical health functioning are interrelated and, further, that this association may contribute to suicidal behavior; as a result, it appears there are numerous points of intervention that could be simultaneously addressed by physicians and behavioral health consultants when patients present with such concerns.

To begin, many primary care patients present with concerns that are not amenable to change, such as chronic mental or physical disease or functional impairment (Ray-Sannerud et al., 2012), with accompanying poor perceptions of quality of life. Thus, a clinical approach that emphasizes increasing acceptance of the present moment and decreasing avoidance of thoughts and emotions about psychological or physical pain in the face of chronic or unchangeable stressors (McCracken & Vowles, 2014; Vowles, Witkiewitz, Sowden, & Ashworth, 2014), such as Acceptance and Commitment Therapy (ACT), may be an appropriate therapeutic strategy. ACT is a third wave cognitive behavior therapy, based on Relational Frame Theory, that broadly focuses on the six core processes of acceptance, cognitive defusion, committed action, present moment awareness, self as context, and values (Hayes, Strosahl, & Wilson, 2012; Strosahl, Robinson, & Gustavsson, 2012). ACT posits that the experience of pain and suffering is a normal part of the human experience, and that it is avoidance and attachment to unworkable strategies that creates further suffering. As a therapeutic approach, ACT aims to help patients make contact with the present moment as it exists, thus enabling them to engage in committed actions that are in the service of their values, despite the presence psychological or physical pain (Hayes et al., 2012; Strosahl, Robinson, & Gustavsson, 2012). In order to help patients develop psychological flexibility in the presence of poor mental or physical HRQL, ACT cognitive and behavioral strategies such as metaphors, cognitive defusion exercises, and behavioral activations techniques (Strosahl et al., 2012) might be used.

A review of interventions indicates that several ACT interventions have been developed specifically for primary care use. For instance, within an ACT framework, time is spent helping patients identify goals and values in life that are consistent with their self-concept. Interventions help patients create distance, or defusion, from the unworkable strategies that they have

previously used to cope with their psychological pain. Patients then develop small goals and are encouraged toward goal attainment and value achievement via brief ACT strategies such as the True North exercise and the Compass exercise (Hayes et al., 2012; Strosahl, Robinson, & Gustavsson, 2012). Focused Acceptance and Commitment Therapy (FACT), an abbreviated form of ACT, is another brief intervention for the primary care setting and is one of the most well-validated interventions to date (Hayes, & Strosahl, 2005; McCracken, Sato, & Taylor, 2013; Strosahl et al., 2012). For instance, for patients reporting poor mental and physical HRQL, FACT may promote a reframing of health-related dysfunction, with a focus on identifying and developing a meaningful and value-filled life despite the presence of health-related limitations.

Previous research suggests that other types of brief therapeutic approaches may also be useful. For instance, interventions using solution-focused strategies that encourage behavioral activation and promote social problem solving skills are effective in treating depressive symptoms, suicidal behavior, and HRQL concerns in a time-limited manner (Eskin, 2013; Gingerich, Kim, Stams, & Macdonald, 2012; Jakupcak, Wagner, Paulson, Varra, & McFall, 2010).

Conclusion

Despite burgeoning evidence suggesting the importance of frustrated interpersonal needs to the development of suicidal behavior, little research has examined contributors to frustrated interpersonal needs or potential mechanisms of action by which thwarted belongingness and perceived burdensomeness may lead to suicidal behaviors. Our novel findings suggest that intrapersonal characteristics such as depressive symptoms may be critical in understanding how interpersonal dysfunction contributes to suicide risk. Future research investigating the components of the Interpersonal Psychological Theory of Suicide should also include

intrapersonal as well as cultural and environmental factors that might influence the manifestation and maintenance of thwarted interpersonal needs and consequent suicidal behaviors. In the interim our study provides preliminary support for therapeutically addressing issues of social support and psychological distress in primary care patients with poor mental and physical health-related quality of life to reduce suicide risk.

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