

EFFECTS OF UNMET NEEDS

**AN EXAMINATION OF THE EFFECTS OF UNMET PSYCHOLOGICAL NEEDS  
ON MENTAL AND PHYSICAL HEALTH**

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### **Abstract**

The importance of psychological needs for optimal mental and physical well-being has been well documented within the literature. However, there remains little consensus on the definition of basic psychological needs, on which needs are most important or fundamental, and on how to best assess basic needs in individuals. The purpose of this dissertation was to develop and validate a comprehensive measure of fundamental psychological needs and to examine its predictive utility for both mental and physical health. To fulfil these objectives, measure construction and validation studies were conducted in 2 separate undergraduate student samples ( $N = 226$ ;  $N = 283$ ). Participants completed online self-report measures of emotional and psychological symptoms, negative life events, personality characteristics, and psychological needs. Factor Analyses of the Psychological Needs Questionnaire (PNQ) revealed that needs can be classified in a three-level multi-factorial confirmatory model and that self-worth and relationship types of psychological needs can be further divided into several, second-level factors. Results also indicated that the PNQ is reliable and possesses good construct validity as well as predictive utility for numerous psychological and physical problems. In addition, psychological needs moderated the relationship between depressive personality characteristics and mood. Future studies should examine the proposed needs-based model in a longitudinal fashion, both in community and clinical samples. In addition to functioning as a global introduction and providing an overview of the relevant literature, Chapter 1 proposes a new model of psychological needs. Chapter 2 describes in further detail the importance of each need identified by the new model, with a particular emphasis on the consequences associated with having each need unfulfilled. Chapter 3, 4, and 5 represent three academic journal articles resulting from the data collected in the current project. Finally, chapter 6 provides a global discussion of the entire dissertation.

**Statement of Co-Authorship**

The three manuscripts included in this dissertation were prepared in collaboration with my dissertation supervisor. I was the primary author and Dr. Darcy Santor was the secondary author. As the primary author on all manuscripts, I was responsible for conceptualization of the research question and methods, planning and execution of statistical analyses, and preparation of manuscripts. Dr. Santor provided guidance and assistance in all aspects of the project.

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## CHAPTER 1

### **An Examination of the Effects of Unmet Psychological Needs on Mental and Physical Health**

The examination of human needs has been a longstanding area of interest for philosophers, psychologists, as well as for researchers. Although the importance of having fulfilled psychological needs has been well established, there exist many inconsistencies with regard to their definition, their classification and organization, and their assessment.

The research on psychological needs described within this document has been influenced by a number of theoretical and empirical questions that overlap several different fields. Thus, the following global introduction will provide an overview of the research in these various fields and will review relevant theoretical and empirical information.

#### **Need Theories throughout History**

Several theories focusing on human needs have been proposed over the course of the last hundred years. Although similar in many respects, each theory provides a unique perspective on needs and will therefore be described below. In order to identify theoretical and empirical gaps in the current literature, the challenges and limitations of each theory will also be highlighted and discussed.

**Drive theories.** Several early motivational theories such as the drive theories proposed by Freud (1920) and Hull (1943) made use of the concept of physiological needs to explain behaviour, goal directed behaviour, and motivation. Such theories claim that motivation depends upon the pleasure and reduction of tension experienced when basic drives are fulfilled. According to such theories, humans are passive beings and all human behaviours can be attributed to the pleasure obtained when the drive-induced tensions are reduced. Thus, the purpose of behaviour is need satisfaction. Needs are understood as

physiological deficits that disrupt human passivity and balance and motivate them to behave in ways to re-establish the balance (Deci & Ryan, 2000). However, such theories are limited in that they cannot account for behaviours that have no direct link to drive reduction or need satisfaction. For example, drive theories cannot explain why humans are naturally inclined to engage in activities that interest them or to act in a way to promote personal and interpersonal coherence (Deci & Ryan, 2000).

**Murray's theory of personality.** At a time where personality theories in psychology were dominated by the statistics of trait theory, Henry Murray (1938) developed a theory of personality that included the concept of human needs, which he viewed as psychological rather than physiological in nature. He believed that all humans have basic needs but that individual variations in need importance was likely to exist for specific needs. Murray described that needs could be classified as viscerogenic and primary (e.g., need for food, water, sex, urination) or psychogenic and secondary. Murray identified a list of twenty psychogenic psychological needs, some of which are positive or approach types of needs while others are negative or avoidance types of needs. Murray also believed that several needs could combine to motivate behaviour in some situations and that needs could conflict with one another.

Murray's (1938) contributions included that he created an inventory of concepts, which helped to focus theory development and the measurement of motives. In addition, he was one of the first theorists to propose that goal-directed behaviour was a result of an interaction between individuals and their environment, similar to theories of modern interactionism (e.g., Bower, 1973). However, he proposed very few postulates about the relationships among the many variables that he described and in fact did not actually develop a theory (Heckhausen, 1991). Furthermore, his definition of needs was so broad that the

various needs he proposed represent an array of motives whose pursuit may or may not be associated with optimal well-being (Deci & Ryan, 2000).

Nevertheless, Murray's work provided the theoretical basis for the later research of McClelland. Although Murray was the one to develop the Thematic Apperception Test (TAT), it only later became an important instrument for measuring motives (McClelland, Atkinson, Clark, & Lowell, 1953).

**McClelland's Learned Needs Theory.** David McClelland (1965; 1985) adopted a motive disposition approach to understanding needs. Within this approach, basic needs, also referred to as implicit motives, were conceptualized as acquired over time, shaped by one's life experiences, relatively stable over time, and variable in strength from person to person. McClelland's theory suggested that when people are praised after achieving a particular goal, they learn to attach positive feelings to such situations and develop a strong need to reproduce the feeling, thus leading to variations in need strength. Such differences in need strength can help explain differences in sensitivity toward certain kinds of incentives and behaviours (McClelland, 1985). His theory is sometimes referred to as the Learned Needs Theory, the Acquired Needs Theory, or the Three Needs Theory.

Most of the needs represented in McClelland and colleague's research tradition can be classified as achievement, affiliation, or power types of needs. The need for achievement (McClelland et al., 1953) involves the desire to surpass standards of excellence. Individuals with a high need for achievement seek opportunities that allow them to do something better than before or better than another person and aim to improve skills (Burnstein & Heckhausen, 2008; McClelland, 1985). Such individuals prefer work of moderate difficulty and need realistic feedback in order to monitor the progress of their achievements (Atkinson, 1957). On the other hand, individuals with a low need for achievement do not feel as many

positive emotions when striving for and attaining achievement goals. The need for affiliation (McAdams & Bryant, 1987) involves the desire to maintain harmonious relationships with other people, to exchange contact with them, and to feel accepted by them. Individuals with a high need for affiliation tend to prefer situations that provide opportunities for significant personal interactions. The need for power (McClelland, 1985; Winter, 1973) includes the motivation to influence other people, and to maintain a good reputation and prestige.

Because motive disposition theorists believe implicit motives to be non-conscious, they are typically assessed with projective measures such as the Thematic Apperception Test (TAT; Murray, 1938) or semi-projective measures, such as the Multi-Motive Grid (MMG; Sokolowski, Schmalt, Langens, & Puca, 2000). The TAT is composed of a series of ambiguous pictures, from which an individual is asked to develop a spontaneous story, whereas the MMG combines features of the TAT with features of self-report questionnaires. Motive disposition theorists work under the assumption that individuals will project their own needs into the stories they develop, thereby providing information about the strength of their individual needs.

McClelland's theory used individual need differences as the primary basis for predicting behaviour or various outcomes. As such, it failed to recognize the importance of need satisfaction for healthy functioning.

**Maslow.** Abraham Maslow's (1954) approach to personality theory viewed humans as biologically determined being with innate capacities and as fundamentally different from other organisms because of our ability and basic need to achieve self-actualization. Maslow's taxonomy of needs differentiated itself from other earlier attempts in two significant ways (Heckhausen, 1991). Firstly, Maslow's taxonomy identified entire groups of motives or needs rather than single ones. Secondly, the need groups are organized in a hierarchical

manner in terms of their importance to the development of personality. Maslow's five needs, from lowest and most basic to highest and most complex include physiological needs, safety and security needs, love and belonging needs, esteem needs, and self-actualization (Maslow, 1954). Maslow believed that needs influenced behaviour only when they were unmet and that lower level needs had to be satisfied before higher level needs could be satisfied.

Maslow's hierarchical theory of needs has been shown to include several significant theoretical and empirical limitations (e.g., Beer, 1966; Hall & Nougaim, 1968; Herzberg, 1966; Hunt & Hill, 1977; Lawler & Suttle, 1972; Sheldon, Elliot, Kim, Kasser, 2001). In fact, a review of the literature has demonstrated that the majority of research findings do not support the premises of Maslow's theory (e.g., Soper, Milford, & Rosenthal, 1995; Wahba & Birdwell, 1976).

**Self-Determination Theory.** One of the most widely applied theories of motivation is self-determination theory, or SDT (Deci & Ryan, 1985, 1991; 2000; Ryan, 1995; Ryan & Deci, 2000), which utilizes the concept of innate psychological needs to explain the process by which humans are motivated to pursue their desired outcomes or goals (Deci & Ryan, 2000). More specifically, SDT is a general theory of intrinsic human motivation that is concerned with individual choice and free will and claims that psychological needs, which are innate and universal, are imperative in the understanding of human motivation. SDT views psychological needs and the extent to which these needs are fulfilled as the fundamental component to healthy human development and well-being (Deci & Ryan, 2000). Deci and Ryan claim that there are three fundamental intrinsic needs, namely the need for competence, the need for autonomy and the need for relatedness (Deci & Ryan, 1991, 1995). Although not without contention, SDT is generally widely accepted and has led to a large number of studies in the field of motivation and psychological needs (see Deci & Ryan,

2000, for review). However, the countless studies examining the three needs proposed by SDT have demonstrated the reliability of these three needs rather than the validity or comprehensiveness of a three-factor needs paradigm. Therefore, although SDT has expanded upon the available knowledge of basic needs in considerable ways, it has not confirmed in an empirical manner that there are only three basic needs that are important for optimal well-being and mental health. The current model has adopted many of the premises of SDT but it differs from SDT in important ways. In general, the aim of the current dissertation is to enhance the existing understanding of psychological needs by accounting for some of the limitations of SDT.

### **Extrinsic Motivation, Intrinsic Motivation, and Amotivation**

In discussing psychological needs, it is important to understand the difference between certain key motivational constructs. In response to Skinner's (1953) behavioural theory, which claimed that all learned behaviours were a function of reinforcement, researchers began to recognize the concept of intrinsic motivation. Contrary to extrinsic motivation, which refers to the desire to engage in an activity to obtain an external reward, intrinsic motivation refers to the inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn (Ryan & Deci, 2000). In other words, intrinsic motivation represents the drive to engage in an activity for its own sake rather than to obtain some type of external reward (Deci, 1975).

The results of a meta-analysis of over 100 published experiments confirmed that the pursuit and attainment of intrinsic motivations is more closely linked to various forms of well-being than is the pursuit and attainment of extrinsic types of motivation (Kasser & Ryan, 1996) and that extrinsic rewards decrease intrinsic motivation across a range of ages, activities, rewards, and reward contingencies (Deci, Koestner, & Ryan, 1999). However,

SDT explains that extrinsic types of motivation can become internalized (Deci & Ryan, 2008). Deci and Ryan (2000) describe that internalization is “an active, natural process in which individuals attempt to transform socially sanctioned mores or requests into personally endorsed values and self-regulation” (p. 236). In other words, internalization is the process through which individuals come to accept and assimilate within themselves formerly external types of regulation. Extrinsic and intrinsic forms of motivation, as well as the process of internalization, are considered to exist on a continuum, where the most controlled, non-autonomous form of motivation (i.e., extrinsic motivation) represents one extreme and the most autonomous form of motivation (i.e., intrinsic motivation) represents the other extreme, with various degrees of internalization representing midpoints between both extremes (Deci & Ryan, 2000).

Amotivation refers to a state in which people lack the intention to behave. In other words, amotivation involves a complete lack of motivation and self-determination, both intrinsic and extrinsic. SDT assumes that individuals who are amotivated lack a sense of efficacy or a sense of control with respect to a desired outcome, and consequently, are not able to regulate themselves (Deci & Ryan, 2000).

### **Drives, Motives, Goals, and Psychological Needs**

Psychological needs differ from other similar concepts (e.g., drives, motives, and goals) in important ways. Each construct will be defined and differentiated from the others in the sections below.

**Drives.** Drives clearly differentiate themselves from motives, goals and needs since they are defined as biological requirements necessary for survival, (e.g., hunger), that if not satisfied, increase in strength (Beck, 2000). Drives often, but not always, lead to behaviours

that restore the appropriate balance, and reduce the strength of the drive (e.g., eating; Beck, 2000).

**Motives.** On the other hand, there has been a lack of consensus on the criteria used to differentiate needs from motives as well as on the exact definition of psychological needs. Some theorists have deemed needs and motives to be one and the same (Atkinson, 1964; McClelland, 1951), whereas others have described ways to distinguish one from the other (Liebert & Spiegler, 1994; Nuttin, 1984). SDT describes that although similar, both concepts are different from one another in important ways (Deci & Ryan, 2002), a view that is also espoused in the current project. Both needs and motives represent affectively based motivational forces that propel individuals and guide them toward intrinsically attractive objectives (Elliot, McGregor, & Thrash, 2002). What makes these two concepts different from one another is that needs, unlike motives, are part of the individuals' psychological makeup and represent a psychological necessity for optimal functioning and well-being (Elliot et al., 2002). Simply put, a need is a motive that has an innate origin (Elliot et al., 2002).

**Goals.** Similar to the concepts of needs and motives, the concept of goals does not have a widely accepted definition, nor is there a widely shared understanding of how goals differ from needs and motives (e.g., Austin & Vancouver, 1996; Locke & Latham, 1990, Pervin, 1982). Elliot et al. (2002) views goals as different from motives and needs in that the former are cognitive representations that can direct behaviour by allowing the individual to focus on a specific possibility. In other words, goals allow individuals to follow a specific, efficient, and effective path toward the satisfaction of their general desires (i.e., needs or motives).

**Needs.** Although several definitions have been proposed for psychological needs, SDT defines needs as “innate psychological nutrients that are essential for ongoing psychological growth, integrity, and well-being” (Deci & Ryan, 2000, p. 229). This definition is consistent with the understanding and view of psychological needs espoused herein and therefore, was utilized as the definition of needs for the current project.

### **Basic Need Development and Individual Differences**

Deci & Ryan (2000) describe that like other human innate characteristics, the strength of people’s needs are likely to be normally distributed, contributing to individual difference. Nevertheless, these innate individual differences should be considered a given and not be the focus of attention. The way in which basic needs interact with the environment, which either support or hinder their satisfaction, should instead be considered the critical issue (Deci & Ryan, 2000). Following this line of reasoning, an abnormally strong psychological need, similarly to an unusually strong desire for food, should be conceptualized not as an indication of an innate individual difference, but rather, as a compensatory result of a previous experience where the fulfilment of that need was not possible or permitted.

Social contexts and past experiences have an enormous influence on individuals’ ability to satisfy their basic needs and on their resulting need development. Milieus that provide opportunities for individuals to interact with others who love them, who are warm and caring, and who are involved and emotionally available, allow for the healthy development of relatedness and belongingness needs while environments that are hostile or neglectful hinder the fulfilment of these needs and consequently interrupt healthy development (Ainsworth, 1979; Deci & Ryan, 2002; Lamb & Easterbrooks, 1981). In addition, contexts that are responsive, structured, predictable, contingent and consistent, rather than chaotic and uncontrollable, allow individuals to feel competent instead of

incompetent (Bandura, 1981; Carton & Nowicki, 1994; Gunnar 1980; Skinner, Zimmerman-Gembeck, & Connell, 1998). Moreover, social partners and contexts that respect an individual, allow for freedom of expression and action, and attend and accept personal preferences and desires are contexts that provide support for the development and fulfilment of the need for autonomy (Deci & Ryan, 1987, 1991; Grolnick & Ryan, 1989; Reeve, Bolt & Cai, 1999).

As mentioned above, although needs are considered to be innate and universal, the ways in which these needs motivate people toward particular actions are the result of the interaction between the basic needs themselves and the social world, including past experiences of need satisfaction and/or need thwarting (Deci & Ryan, 2000, 2002; Skinner & Edge, 2002; Sheldon, et al., 2001). However, the innate psychological needs carry little information regarding which behaviours lead to their fulfilment and do not require identifiable predetermined behaviours to be fulfilled, leading to enormous behavioural variability and flexibility (Sheldon et al., 2001). Skinner & Edge (2002) describe that past experiences with various social contexts and with differing level of need fulfilment guide people's behaviours and participation in future activities, including their level of ongoing engagement and coping. Engagement is defined as "active, goal-directed, flexible, constructive, persistent, focused interactions with the social and physical environments" (Skinner & Edge, 2002, p. 299) whereas coping describes "patterns of action when ongoing engagement encounters resistance or is disrupted" (Skinner & Edge, 2002, p. 300). The extent to which an individual makes use of these two actions (i.e., engagement and coping) influences social, cognitive, and personality development (Skinner & Edge, 2002).

Since different life domains (e.g., family, work, school, daycare) provide differing types of opportunities for need satisfaction, people are often motivated to fulfill their basic

needs within one particular domain that allows for satisfaction (Skinner & Edge, 2002; Deci & Ryan, 2002). However, needs also pull people toward the same type of experiences and incentives within any one-life domain (Sheldon et al., 2001). In other words, when a person is successful within a particular life domain (e.g., at work), their behaviour is reinforced and the individual is likely to seek further challenges and satisfactions within that domain (Sheldon et al., 2001). One particular standpoint developed to explain this finding, posits that psychological needs evolved to help individuals develop appropriate social and occupational roles and to motivate them to develop their skills further within these environments (Buss, 1997). However, further research is required to validate this theory.

### **Need Variations within Culture, Gender, and Age**

Given that the manifestation of need-based motivation is so strongly linked to environment and past experiences, it is easy to see how culture, gender and age are important factors to consider when speaking of individual differences in psychological needs.

**Culture.** The universality of basic innate needs remains a relatively controversial issue in the field of modern motivational psychology. Some theorists (e.g., Bandura, 1989; Oishi, Diener, Lucas, & Suh, 1999) believe that needs act as important motivators in a proportional fashion to the extent to which the individual has adopted them as important goals through some learning process. This standpoint allows for significant individual and cultural differences in the importance placed on certain needs and the degree to which they are deemed motivational. For example, some theorists (e.g., Heine, Lehman, Markus & Katiyama, 1999) believe that autonomy needs are higher in cultures that value individualism, such as western cultures, whereas relatedness needs are higher in cultures that value collectivism, as do several eastern cultures. Although limited, some research supports this viewpoint. One study (Sheldon et al., 2001) examined psychological needs in both a

collectivist and individualist culture and found that the single most important need in the South Korean sample was relatedness, whereas self-esteem related needs were deemed most important in the U.S. sample. Such findings may indicate that although basic need satisfaction is crucial for well-being and development, some cultures may emphasize or condone some experiences over others, leading to important individual differences within the basic set of needs (Sheldon et al., 2001).

On the other hand, SDT posits that all humans have the same basic needs which must be fulfilled in order to experience well-being but that these needs may be expressed and satisfied in different ways depending on cultural context, age, or gender (Deci & Ryan, 2002). Being of a certain cultural background as opposed to another, does not in any way, ensure that an individual will have a higher need for autonomy or relatedness, or any other need, nor does it ensure the satisfaction of one need over another. SDT explains that the psychological effects of cultural values on groups of people or entire cultures depend, to a large extent, on how the values are transmitted and the extent to which the individuals integrate the values exposed to them (Deci & Ryan, 2002). It is possible that individuals can fulfill an assortment of needs, while holding a range of different value sets. For example, findings of research conducted on samples from South Korea, Russia, Turkey, and the United States, indicate that having one's values for collectivism or individualism match those of one's culture is not as important for psychological health than is acting out those values autonomously (Chirkov, Ryan, Kim, and Kaplan, 2003). Furthermore, although some affirm that more research in this area is required (Sheldon et al., 2001), there is now a preponderance of evidence to support the universality of basic psychological needs (e.g., Chirkov & Ryan, 2001; Deci, et al., 2001; Ryan, et al., 1999, Yamauchi & Tanaka, 1998). Such studies have illustrated that even though psychological needs may be expressed and

satisfied in different ways in different social and cultural contexts, psychological needs remain important for well-being.

**Gender.** Although popular lore (Gray, 1992) portrays men as having high needs for autonomy and women as having high needs for affiliation, research findings on this topic are equivocal. Some believe that, similar to cultural differences, gender differences in needs are likely to be present. Jordan, Kaplan, Miller, Stiver, and Surrey (1991) for example, argue that men put a higher value on autonomy needs whereas women view relatedness needs as more central. Similarly, Chodorow (1978), Gilligan (1982), and Miller (1976, 1984) described that young girls' development and identity growth are based on differentiated levels of interpersonal relationships, whereas boys' development and identity growth are based on achievement, autonomy, and individualization. Some research findings support this claim for gender-based psychological need differences (e.g., Chiu, 1990; Greeley & Tinsley, 1988; Harvey & Retter, 2002; Lang-Takac & Osterweil, 1992).

Conversely, several studies have failed to show that significant gender differences in needs exist. Bar-Yam (1991) for example, was unable to find any gender differences in self-evolution, autonomy, and attachment. Likewise, a study conducted by Maccoby and Jacklin (1974), did not find a significant gender difference in autonomy-related behaviours. Another study on attachment found that although no gender differences in attachment were discovered, women valued the maintenance of autonomy more than men did (Cochran & Peplau, 1985). As with research examining cultural differences, more research is required in order to fully understand how and if social environments affect psychological needs by emphasizing or condoning particular experiences or goal-directed behaviours within the two genders.

**Age.** Several developmental theories (e.g., Erickson, 1950; Freud, 1920; Kohlberg, 1973) have postulated that an individual's age and developmental stage is likely to have an impact on which basic need takes precedence at particular time points during development, as well as on how individuals behave to fulfill their basic needs. Some research findings support the fact that differences in need strength may emerge throughout the developmental lifespan. Harvey and Retter (2002) for example found that both boys and girls expressed an increased interest in freedom as they became adolescents, that they expressed more interest in power and control during younger ages than during adolescence, and that adolescent girls expressed much lower levels of need for love and belonging than did latency-age girls. On the other hand, some research findings suggest that there may not be an age-related difference for some psychological needs. For instance, in addition to not finding a gender difference, Maccoby and Jacklin (1974), did not find a significant age difference in autonomy-related behaviours. All in all, although basic needs are considered to be innate and universal and necessary for optimal well-being and life satisfaction, factors such as culture, gender, and age may impact how these needs are expressed and satisfied, accounting for individual differences.

### **Consequences of Unmet Psychological Needs**

Research examining the effects of unfulfilled psychological needs on overall functioning and well-being has a long and rich history. Several sources have provided validation for the view, first proposed by Maslow (1954), that psychological needs are qualities whose presence is associated with well-being and personal growth and whose absence leads to unhappiness, disorders, and deficiency diseases (Sheldon et al, 2001; Deci & Ryan 2000, 2002; Prager & Buhrmester, 1998). It is not surprising then, that there is such a wide range of studies examining the impact that unmet psychological needs have on

individuals. Overall, the satisfaction of psychological needs has been repeatedly shown to be an important feature in many aspects of well-being. SDT expects fluctuations in need fulfillment to, in turn, predict fluctuations in well-being, an assumption that has received much empirical support (e.g., Sheldon, Ryan, & Reis, 1996). In fact, Reis, Sheldon, Gable, Roscoe, and Ryan, (2000) showed that daily fluctuations in the level of satisfaction of the need for competence, autonomy, and relatedness, independently predicted daily fluctuations in well-being. Furthermore, SDT describes that various forms of psychopathology can be linked to developmental deprivations in the satisfaction of basic psychological needs (Ryan, Deci, & Grolnick, 1995). Environments that do not allow for the satisfaction of basic psychological needs push people to develop need substitutes (Deci, 1980) or compensatory motives that do not actually satisfy the unmet need itself but rather provide some form of collateral satisfaction (Deci & Ryan, 2002). Such need substitutes or compensatory motives (e.g., extrinsic motivators such as wealth) often lead to negative consequences that continue to interfere with the satisfaction of the original unmet need, even after the individual is detached from the unsupportive environment (Deci & Ryan, 2002).

Several researchers have documented the link between unfulfilled agentic types of needs and resulting negative outcomes. For example, environments that do not support the development and satisfaction of the need for autonomy, such as hostile, neglectful or abusive environments or those that offer contingent love, can result in several problematic outcomes including individual inner conflict, anxiety, depression, somatic complaints, amotivation, and rigid maladaptive behaviour patterns (Cicchetti, 1991; Deci & Ryan, 2002). Some have even suggested that eating disorders are a response to environments that do not allow for the satisfaction of competence and autonomy (e.g., Burch, 1973). Other maladaptive behaviour patterns such as health care negligence (Sackett & Snow, 1979), face saving (Goffman,

1955), and learned helplessness (Seligman, 1975) have been linked to amotivation and unfulfilled basic needs (Boggiano, 1998). Similarly, research has shown that individuals who do not fulfill their competence or achievement needs have lower scores on measures of subjective well-being (e.g., Emmons, 1996; Oishi, et al., 1999), have increase likelihood of experiencing depressive symptoms (Crocker, Karpinski, Quinn & Chase, 2003), are more likely to experience stress and anxiety or to disengage and withdraw their effort, both of which may undermine learning (see Crocker & Knight, 2005 for review). Furthermore, individuals with unmet psychological needs are more likely to experience direct physical health problems through increased stress and to experience indirect physical health problems through increased substance abuse and unsafe sexual practices (Crocker, 2002).

Similarly, numerous researchers agree that communal types of needs, such as the need for interpersonal relationships and the need to belong, constitute fundamental needs, which when not satisfied, can negatively affect all areas of well-being (see Baumeister & Leary, 1995, for a review). In general, the absence of close social ties and meaningful interpersonal relationships is associated with lower levels of general well-being and overall happiness (Bassoff & Glass, 1982; Baumeister & Leary, 1995; Whitley, 1983). In addition, individuals who do not satisfy their affiliation or relationship needs are more likely to experience both physical and mental illnesses including anxiety, depression, eating disorders, and post-traumatic stress disorder (Baumeister & Leary, 1995; Holahan & Spence, 1980; Roos & Cohen, 1987). Marital and relationship research has also examined the negative outcomes and consequences associated with having unfulfilled needs, particularly within the context of intimate and marital relationships. Prager and Buhrmester (1998) for example, found that need fulfilment within the context of personal intimate relationships correlated with higher levels of overall life satisfaction and lower levels of depression, anxiety,

psychological distress, low self-esteem, and loneliness. Another line of marital research has documented the importance of personal psychological needs for relationship satisfaction. Drigotas and Rusbult (1992) found that the satisfaction of five different needs within a romantic relationship (intimacy, sex, emotional involvement, companionship, and intellectual involvement) increased both relationship satisfaction and relationship longevity.

Furthermore, the fulfilment of stability, fairness, and status needs has been shown to play an important role in well-being. More specifically, disruptions of continuity and predictability within home, school, or relationship contexts (e.g., inconsistent caregiving; frequent changes in residence, school, or parents' intimate partners), have been shown to lead to various forms of maladjustment, internalizing and externalizing problems, and to threatened well-being (Bronfenbrenner, 1979; Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 1998; Forman & Davies, 2003). Specific types of instability such as residential mobility (Wood, Halfon, Scarlata, Newacheck & Nessim, 1993), partner instability (Ackerman, Brown, Schoff, D'Eramo, & Izard, 2002; Sandefur & Wells, 1999), school transfers (Fenzel, 1989), and childhood care placements (Cashmore & Paxman, 1996) have also been linked to various negative outcomes. Similarly, when people experience their situation and interactions with others as unfair, various forms of psychopathology and maladjustment occur (Lipkus, Dalbert, & Siegler, 1996). Furthermore, with respect to the need for status, research has demonstrated that feeling looked down on or negatively judged by others constitutes an acute stressor and is one of the most powerful stimulators of the cortisol-stress response (Dickerson & Kemeny, 2004). Some studies have also shown that pressure to impress others, extensive concern with appearances and self-presentation, and fear of rejection if viewed by others as inferior, all of which could indicate an unfulfilled need for status, may be linked to various forms of psychopathology (Gilbert, 1989, 1992,

1995; Leary, 1995, 2001). Furthermore, the need for status, as conceptualized within the given project, when not fulfilled, is believed to lead to excessive validation-seeking, that is, an excessive pressure to prove oneself as likeable and acceptable to others (Dykman, 1998).

In sum, having unmet needs has been shown to have a widespread negative impact on overall life satisfaction and on various aspects of well-being. The reviewed findings conclusively illustrate that unmet psychological needs, including those within both the self-worth and the relationship domains, have a widespread impact not only on mental well-being but also on overall physical health. However, given that research on this topic is so highly related to the manner in which unmet needs are defined, conceptualized, and measured, this area deserves a far more detailed examination. For example, there exists tremendous disagreement in the literature regarding what constitutes a fundamental human need and which criteria should be used to identify the most basic human needs. Thus, various researchers have each identified different psychological needs as the most essential, each focusing their research on their perceived subset of basic human needs. As a result, it can be difficult to appropriately interpret and generalize results on this topic.

### **Negative Life Events, Personality Vulnerability Characteristics, Depression, and Needs**

Psychological needs have also been considered to be an important factor in depressive vulnerability research. The impact of major and minor negative life events on mood is a well-documented phenomenon (David, Green, Martin, Suls, 1997; Marco & Suls, 1993). However, several researchers have begun to examine whether the psychological meaning of events also matters in predicting mood (e.g., Kopala-Sibley & Santor, 2007; Santor & Kopala-Sibley, 2007; Reis et al., 2000). Such research has recently demonstrated that events do in fact affect mood through the underlying self-worth or interpersonal needs that those events fulfill or thwart (Kopala-Sibley & Santor, 2007; Santor & Kopala-Sibley,

2007). Findings indicated that the extent to which events impacted self-worth or interpersonal needs both accounted for the relationship between events and mood and moderated this relationship, such that events more strongly affected mood when they negatively impacted self-worth or interpersonal needs. These findings highlight the importance of need fulfilment over and above the presence of negative life events for the onset of depressive symptoms. Similarly, Sheldon and Kasser (1995) have argued that daily activities may enhance well-being if these activities are consistent with one's presumed basic needs and long-term goals (Csikszentmihalyi, 1992). Research supporting this view shows that fluctuations in daily activities can predict fluctuations in feelings of relatedness, competence, and autonomy, which in turn can predict fluctuations in daily measures of well-being (Reis, et al., 2000). Similarly, research findings have shown that intimate interpersonal contact may mediate the impact of catastrophic events on individuals, such that people who have access to a confidant after the event experience less psychological deterioration than do those who do not have access to such a confidant (Hobfoll & Lerman, 1988). In sum, these findings provide support for the notion that the way in which events are experienced and interpreted and how they may thwart need fulfilment constitutes an important factor in determining whether depressive symptoms occur.

Another important factor to consider in the relationship between negative life events, depression, and psychological need fulfilment is personality. There currently exists two theoretical ways in which to conceptualize and understand personality (Beck, 2000). The first type of theory, which aims to explain individual difference in terms of a select number of characteristics that every individual possesses to some degree, is generally referred to as a trait theory. Researchers have proposed a number of traits over the years (e.g., Eysenck, 1967; Cattell, 1965) but The Five Factor Theory and its five traits (i.e., extraversion,

conscientiousness, agreeableness, neuroticism, and openness) have become widely accepted within the field (Norman, 1963; Wiggins & Trapnell, 1997). The largest criticism associated with this type of theory hinges on whether people have such permanent characteristics (i.e., traits) or whether they simply respond in similar ways to situations in which they repeatedly find themselves. The second type of personality theory, which sorts out this limitation and is usually labeled a dynamic or motivational theory, adopts a more behavioural approach to understand the concept of personality. Dynamic theories do not assume that people possess permanent characteristics such as traits, but rather assume that behaviour is motivated by a variety of drives, needs, goals, or motives (Beck, 2000). Although the current project's theoretical framework adopts a needs-based model of motivation, which largely accounts for individual difference and behavioural variability, the concept of trait-based personality is also utilized and reviewed when relevant. As described within SDT, people's social contexts and past experiences with need fulfilment and need thwarting impact their future behavioural choices, including active engagement, development, and compensatory behaviours (Deci & Ryan, 2000). In this sense, characteristics that are believed to be traits can be understood as acquired responses to past environments and experiences, which in turn influence future behavioural and situational choices, and can appear to be permanent characteristics within the individual. Although people can develop trends and patterns of behaviour, variability and flexibility are to be expected.

SDT's description of the development of compensatory behaviours in situations of need thwarting is consistent with depressive vulnerability research showing that some individuals develop personality styles that emphasize an abnormally high need for achievement and mastery (Blatt & Shichman, 1983), whereas others are preoccupied with their relationships and have an unusually high need to be close to others (Blatt & Zuroff,

1992). More precisely, highly self-critical individuals are described as having a strong need to strive for mastery and achievement, to be acknowledged and respected, and tend to define themselves in terms of their achievements (Blatt & Shichman, 1983). On the other hand, highly dependent individuals are described as having a heightened need for love, closeness, intimacy, and interpersonal support, and tend to define themselves with respect to their relationships with others (Blatt & Zuroff, 1992). Conventional theories of depressive vulnerability adopt a stress-diathesis model and posit that negative life events awaken such personality vulnerability factors in individuals and consequently lead to depressive symptoms. Depressive vulnerability characteristics, such as dependency and self-criticism described above, have been shown to influence the type of attributions that people make of others and the way in which they interact with others (Santor & Zuroff, 1997). Following this line of reasoning, typical depressive vulnerability research assesses, categorizes, and aggregates the number and type of life events occurring between baseline and follow-up. Individuals scoring high on a vulnerability factor, such as dependency or self-criticism, who also experience events that are congruent with their vulnerability, are expected to be more depressed at follow-up than are individuals who either did not initially possess the vulnerability factor, or who did not experience events congruent with their vulnerability. An important limitation of depressive vulnerability research that adopts this model is that it categorizes life events based solely on their descriptive characteristics while neglecting the psychological significance of such events. Santor (2003) explained that this methodology is problematic because the way in which one experiences a particular life event depends not only on the descriptive characteristics of that event, but also, on the extent to which that event impacts that individual's psychological needs. An example can help to illustrate this line of reasoning. The conventional vulnerability model would predict that a person high on

self-criticism (vulnerability factor) who experiences a promotion at work (positive life event related to self-worth) would *not* experience an increase in depressive symptoms. However, it is possible that this individual, even if he/she is high on self-criticism, would experience sad mood after being promoted if he/she perceived it as a loss in relationships with former colleagues, thereby impacting the fulfilment of that individual's relationship needs. Although the psychological needs-based model of depressive vulnerability can account for this individual's depressive symptoms, the conventional model of vulnerability cannot (see Santor, 2003 for a detailed explanation of this theory).

Consistent with Santor's (2003) theory, the model proposed here hypothesizes that much of the impact of negative life events on physical and mental health depends on the extent to which negative life events impact the fulfilment or thwarting of psychological needs. More specifically, this needs-based approach to depressive vulnerability assumes that the most important factor in predicting depressive symptoms in individuals is the number of unmet needs and the length of time that these needs remain unmet rather than the number of negative life events that are experienced by the individual. Similarly, the model presented here presumes that unmet needs have a significant impact on the relationship between depressive vulnerability factors and depression. More specifically, lack of need fulfilment within the need domain associated with the depressive vulnerability characteristic (i.e., self-worth need domain and characteristics of self-criticism) is expected to be extremely important in the relationship between that personality characteristic and depressive symptoms. All in all, consistent with Santor's theory, the proposed model suggests that unmet needs not only play a significant role in the relationship between depressive vulnerability characteristics, and depressive symptoms, but also that need fulfilment may in

fact moderate these relationships (Kopala Sibley & Santor, 2007; Reis et al., 2000; Santor & Kopala Sibley, 2007).

### **Challenges in the Field of Needs and Focus of the Dissertation**

Psychological needs have been the focus of theory and research for approximately the last hundred years, yet there remain several shortcomings and challenges in the field. More specifically, little consensus exists with regards to the definition and identification of basic needs, the structural organization of needs, as well as the operationalization and measurement of such needs. These limitations will be addressed and discussed in the next sections, followed by a detailed description of the proposed new model of needs and how it addresses the aforementioned shortcomings.

**Definitional and conceptual challenges.** The way in which needs are defined and conceptualized among researchers in the field has been, on the whole, inconsistent. For example, needs have often been conceptualized in two distinct ways (Ryan, 1995). On the one hand, needs have been equated to any motivational force including desires, goals, wants, or values, whether they are implicit or self-attributed (McClelland, Koestner, & Weinberger, 1992). In the second more specific definition, needs refer to essential nutrients or conditions for human growth and integrity (Ryan, 1995). The latter conceptualization assumes that needs represent a distinct motivational construct and distinguish themselves from drives, motives and goals in important ways. Such definitional variability has created inconsistency not only in need theories but also in the resulting needs-based body of research.

There has also been little consensus regarding where needs come from and which aspect of needs are most central. Some theorists (e.g., McClelland, 1985) have proposed that needs are acquired over time and are shaped by one's life experiences. Such theorists have

focused on need strength, which is hypothesized to vary as a result of learning, and have concentrated their efforts on examining individual differences in need strength.

On the other hand, some theorists have proposed that needs are innate and universal (e.g., Deci & Ryan, 2000) and that need strength is normally distributed in any given population. Although needs are assumed to vary slightly based on an individual's life experiences in environments that either support or thwart need fulfilment, the most important factor in SDT is the degree to which people are able to satisfy their needs, rather than individual differences in need strength (Deci & Ryan, 2000). In fact, SDT claims that needs are a necessary nutriment for optimal functioning and that if neglected or unmet, significant negative consequences will result. This view is inconsistent with that of several other theorists (e.g., Murray) in that psychological integrity and health are expected to be unreachable without having all of the proposed needs well satisfied (Van den Broeck, Vansteenkiste, De Witte, Suenens, & Lens, 2010).

In addition, disagreement exists regarding the manner in which psychological needs are perceived to affect motivation. Many theorists (e.g., Maslow and McClelland) have adopted a deficit approach in which particular needs are hypothesized to become less potent when they are reasonably well satisfied, at which point the resulting behaviour is decreased or stopped until the need becomes salient again (Van den Broeck, et al. 2010). Conversely, more recent conceptualizations of psychological needs, such as the one proposed in SDT, assume that the experience of a deficit is not necessary for needs to motivate behaviour, but rather that individuals are inherently attracted to situations in which need satisfaction is likely occur (Deci & Ryan, 2000).

Following from such theoretical discrepancies and definitional dissimilarities, it is not surprising that there is also some disagreement regarding which criteria should be used to

identify needs. In spite of the longstanding tradition to enumerate needs without acknowledging that any criteria should be followed, Baumeister and Leary (1995) suggested that certain criteria must be satisfied in order for any need to be considered a fundamental human motivation. They described that a fundamental need should (a) produce effects readily under all but adverse conditions, (b) have affective consequences, (c) direct cognitive processing, (d) lead to ill effects (such as on health or adjustment) when thwarted, (e) elicit goal-oriented behaviour designed to satisfy it (subject to motivational patterns such as object substitutability and satiation), (f) be universal in the sense of applying to all people, (g) not be derivatives of other motives, (h) affect a broad variety of behaviours, and (i) have implications that go beyond immediate psychological functioning. Such criteria have since been used by many motivational theorists and have helped to guide research on psychological needs.

**Basic need identification.** A large body of research has been dedicated to the identification of the most basic psychological needs. This quest is longstanding, dating as far back as the early theories of McDougall (1908) and Freud (1920) and continuing throughout the 20<sup>th</sup> century with Murray (1938), Maslow (1954), and the more current theories of Deci and Ryan (2000). However, as with the definition of psychological needs, there has been little consensus thus far regarding which psychological needs are fundamental or most important. In fact, a considerable number of needs have been proposed as crucial or primary throughout the years by several researchers in a variety of different fields. Among the list are the need for competence (Bandura, 1997; Deci & Ryan, 1991, 1995; Harter, 1978; Koestner & McClelland, 1990; White, 1959), achievement (Murray, 1938), mastery (McClelland, 1951; McClelland, et al., 1953), status (Buss, 1997; Glasser, 1984; Murray, 1938; Winter, 1988, 1992), autonomy (Deci & Ryan, 1991, 1995; Erikson, 1963; Murray, 1938; Rogers,

1963), power and control (Glasser, 1984), freedom (Glasser, 1984), agency (Miller 1993; Overton, 1984; Reese, 1991), independence (Deci & Ryan, 2008; Ryan & Lynch, 1989), self-esteem (Maslow, 1954), self-actualization (Maslow, 1954), meaning (Baumeister, 1991, Frankl, 1997), attachment (Ainsworth, 1979; Bowlby, 1969), relatedness (Deci & Ryan, 1991, 1995; Reis, et al, 2000), belongingness (Baumeister & Leary, 1995; Glasser, 1984; Maslow, 1954, Weiner, 1991), love (Glasser, 1989), intimacy (McAdams, 1992; Reis & Shaver, 1988; Swann, 1990), stability and predictability (Bronfenbrenner, 1979), security (Maslow, 1954), money and luxury (Derber, 1979), self-consistency (Epstein, 1990), fairness (Hafer & Bogue, 2005; Lerner & Miller, 1978), enjoyment (Prager & Buhrmester, 1998), and fun (Glasser, 1989).

A theory that includes all of the proposed psychological needs may prove to be overly complex, with redundant factors (e.g., Murray's theory), while Deci and Ryan's SDT may be oversimplified, with too few factors to capture enough of the meaningful differences among psychological needs. The identification of a reasonable number of need factors that efficiently summarize the most important basic human needs, which when fulfilled lead to overall well-being, may offer a way to unify the field of motivational psychology in the same way that the Big Five theory has unified personality trait psychology. However, such a meaningful basic set of psychological needs, which can be supported by empirical data, has yet to be identified and recognized in the field. Accordingly, one of the purposes of the current project is to identify an empirically-based meaningful subset of psychological needs that are essential for well-being.

**Structural and hierarchical organization of needs.** In spite of the myriad of theories and studies focusing on psychological needs, relatively little is understood about how needs are hierarchically organized. In fact, with the exception of Maslow's hierarchy,

which has received very little empirical support, there is no widely recognized or accepted organizing need structure in the field. Nevertheless, many theorists have made important contributions to our understanding of how needs are organized and structured. Such relevant theories will be reviewed and discussed below.

*Maslow.* Although there were others before him (e.g., Freud, 1920), Maslow (1954) was among the first to attempt to organize needs in a hierarchical fashion. Maslow believed that needs should be arranged in order of importance, starting from the most basic needs to the most complex ones and that the satisfaction of lower level needs was required for the satisfaction of higher level ones (Maslow, 1954). Maslow's five needs, from lowest and most basic to highest and most complex include: physiological needs, safety and security needs, love and belonging needs, esteem needs, and self-actualization (Maslow, 1954).

Maslow proposed that well-being and happiness were associated with the satisfaction of the higher level needs. The limitations of Maslow's theory have been known for some time (e.g., Beer, 1966; Hall & Nougaim, 1968; Herzberg, 1966; Hunt & Hill, 1977; Lawler & Suttle, 1972). Maslow's five-level hierarchal understanding of human needs is one of the most widely discussed theories of motivation, yet it has received little research support (Sheldon et al., 2001). In fact, Maslow himself never provided empirical support for his theory but rather based it on his own clinical work (Maslow, 1970). In addition, several researchers (e.g., Soper, et al., 1995; Wahba & Birdwell, 1976) have concluded that the majority of the research in fact does not support Maslow's theory, including the hierarchical organization of needs, and that the evidence that does exist is weak.

Contrary to Maslow's hierarchical conceptualization of needs which has received little support, there has been some support for a two-level conceptualization of needs, where deficiency or security needs constitute a more basic category and enhancement or growth

types of needs constitute another more complex category (Wahbah & Bridwell, 1976). Similarly, Lawler and Suttle (1972) detected a two-level distinction among needs, with Maslow's physiological needs existing at the bottom, separate from the higher order needs. However, neither of these studies was able to detect any need rank within the higher order psychological needs (Wahbah & Bridwell, 1976; Lawler & Suttle, 1972). Therefore, another purpose of this dissertation is to examine whether higher-order psychological needs can be categorized and organized in a meaningful manner.

***Self-Determination Theory.*** Given the popularity and acceptability of SDT, it is important to review its conceptualization of need structure and organization. Unlike Maslow's hierarchy, SDT does not postulate a particular order in which the need for competence, relatedness and autonomy must be met. Rather, STD proposes that the fulfilment of all three needs (not just one or two) is necessary for well-being (Van den Broeck, et al., 2010).

Nevertheless, an underlying structure can be indirectly implied from SDT. Although the three needs are considered to be relatively independent of one another (Ryan, 1993), the need for autonomy occupies a unique position within SDT because it acts as an overarching need necessary within all goal-directed behaviours, even those aimed at fulfilling other basic needs. In other words, the satisfaction of other needs can be accomplished in an autonomous or controlled way but it is only when the fulfilment of other needs results from autonomous rather than controlled behaviours that people experience optimal engagement and psychological well-being (Ryan, 1993).

***Vallerand's hierarchical model of intrinsic and extrinsic motivation.*** Although Vallerand's (1997, 2001) hierarchical theory of motivation is not uniquely about the organization and hierarchical structure of needs, it provides a conceptual framework for

understanding and organizing the mechanisms involved in intrinsic and extrinsic motivation and, therefore, is important to review here. Vallerand's model incorporates many elements of SDT and asserts that self-determined motivation exist at three levels of generality: the global, contextual, and situational levels. Motivation at the global level is considered to represent an individual's general pattern of motivation (or personality) and is thought to be relatively stable across situations (Vallerand & Ratelle, 2002). On the other hand, motivation at the contextual level of generality is thought to reflect one's motivational orientation toward a particular life domain (e.g., education, leisure, interpersonal relationships), which is considered to be moderately stable (Vallerand & Ratelle, 2002). Motivation at the situational (or state) level reflects an individual's motivation for a specific activity at a specific time and is considered to be relatively unstable, as it is largely dependent on the particular situation and environment (Vallerand & Ratelle, 2002).

Vallerand's model also includes social factors, both human (e.g., comments from another person) and nonhuman (e.g., instructions on a sign), which exist at each level of generality and can have a significant impact on motivation. Examples of social factors that may affect an individual's motivation include receiving a standing ovation after a recital (situational), having a controlling third-grade teacher (contextual), and having a supportive parent (global).

The model further proposes that the impact of such social factors on motivation is mediated by perceptions of autonomy, competence, and relatedness (Vallerand & Ratelle, 2002). In essence, social factors that foster or promote the perception of these three needs increase self-determined motivation. The model further suggests that the mediating role of needs occurs at each of the three levels in the hierarchy (Vallerand & Ratelle, 2002). This premise has important implications for the current project because it suggests that the impact

of all social factors on motivation is mediated by global, contextual, and situational need fulfilment. Furthermore, this assumption has important implications for the assessment of psychological needs. The model implies that separate scales are needed to test motivation, as well as the mediating role of needs, at each level of generality. In other words, perceived need fulfilment can be measured at three levels of generality: the situational level (e.g., perceived competence after writing an exam), the contextual level (e.g., overall perceived educational competence), and the global level (e.g., an individual's perceived global competence).

Another corollary of the model is an acknowledgement that motivation at any given level may be impacted in a top down fashion from motivation at the next level up in the hierarchy, and in a bottom up fashion from motivation at the next level down in the hierarchy (Vallerand & Ratelle, 2002). In other words, motivation at any level is influenced by the motivation existing both at the level higher and lower in the hierarchy. This notion is also important for the current project because perceived need fulfilment in the three levels of generality may be understood as operating in a similar fashion. For example, if an individual rates their perceived global competence highly, they are also likely to rate their competence highly in a variety of life contexts. However, if this individual repeatedly has experiences that are in opposition to the fulfilment of his/her need for competence at the situational level, it is likely to have an impact his/her ratings of competence at the contextual level.

Another component of Vallerand's model involves motivational consequences and describes that such consequences occur at the level of generality corresponding to that of the motivation which produced the consequence. Examples include cognitive consequences such as concentration, attention, and memory, affective consequences such as interest, satisfaction, and positive emotions, and behavioural consequences such as choice of

behaviour, persistence at a task, intensity, behavioural intentions, and performance (Vallerand & Ratelle, 2002). Following from this reasoning, need fulfilment is also likely to have cognitive, affective, and behavioural consequences.

Overall, Vallerand's hierarchical model of motivation is useful in that it provides a hierarchical understanding of motivation and helps to explain the mediating role of need in motivation, not only in a global fashion but also in different contexts and in particular situations. This model also provides a motivational framework from which theoretical principles can be extended to apply to needs and to need fulfilment.

***Bakan's division of self and others.*** Researchers of higher order psychological needs have proposed another, perhaps more useful, type of need classification. Following the distinction originally proposed by Bakan (1966), psychological needs have been said to fall into one of two higher order dimensions or human modalities: agency and communion (Bakan, 1966). In general, agency refers to self-assertion and self-expansion while communion refers to contact and relationships with others (Bakan, 1966; Prager & Buhrmester, 1998). These two modalities can be conceptualized as reflecting a) self-worth needs, achievement needs, and agentic needs and b) interpersonal needs, affiliation needs, and communal needs. Although described with varying terminology, such dimensions have been utilized and repeatedly replicated in the research (e.g., Prager & Buhrmester, 1998; Santor, 2003), and consequently will be examined in the current project.

***Alternative method of structuring needs.*** Borrowing from personality trait research, it may be useful to identify and structure basic human needs by means of empirical analyses (i.e., utilizing factor analyses). To identify the "Big-Five" personality traits, Cattell (1943, 1945) developed a comprehensive list of personality descriptive terms, used it as guide to construct scale items, developed a set of clusters of related terms by examining correlations

between scale items, and factored them to identify a set number of factors that are replicable (Goldberg, 1990). By using a similar technique, it is possible that the most basic human psychological needs would be identified and that a better understanding of how they are structured and related to each other would arise.

**Operationalization and measurement challenges.** Another significant challenge in the field of psychological needs is the lack of consensus on how to best operationalize and assess basic human needs. The relevant motivational theories that helped guide the decisions surrounding operational and measurement issue in the current project will be described in the following section. More specifically, the next section will outline the key measurement indices associated with psychological needs, as well as describe the different ways one can operationalize needs.

***Important measurement indices.*** Given a review of the field and of relevant need theories, a number of measurement indices were identified as essential. Among such indices are need importance, need fulfilment, need discrepancy, and time, each of which will be described below. For further detail on these indices, please refer to the Glossary.

***Need importance.*** This index represents the extent to which an individual attributes importance to a particular psychological need in his/her life. Although some need theorists are beginning to include this index in their measures of needs (e.g., Prager & Buhrmester, 1998), it is not common to do so (e.g., Gagné, 2003). Nevertheless, this measurement index is meaningful because it allows for the identification of basic human needs as well as for the exploration of their structure and organization without being confounded by need fulfilment (i.e., whether the need is met or unmet in the person's life). It may also act as a reference point and help to qualify the meaning of responses on the fulfilment index.

*Need fulfilment.* This index represents the extent to which a particular psychological need is being met or unmet in an individual's life. Given that unmet needs are linked to a variety of negative consequences (see Deci & Ryan, 2000 for review), the level of fulfilment or satisfaction of psychological needs has been the focus of many questionnaires. Although some assessment tools indirectly measure need fulfilment or ask individuals to comment on their level of satisfaction or dissatisfaction with a need, assessing need fulfilment in a straightforward and overt way is important because it directly measures an individual's perception of a need deficit in their life, and consequently, has high construct validity.

*Need discrepancy.* This index represents the discrepancy between the level of importance an individual attributes to a particular need and its associated level of fulfilment. This index is vital in distinguishing between individuals who state that a need is unmet in their life but that it is not important to them, and others who state that a need is unmet in their life and that it is very important to them. An example may help to illustrate this point. If an individual reports that their need for competence is unmet in their life (i.e., he/she perceives themselves as incompetent), but that they do not perceive being competent as important, the repercussions of having this need unmet are likely to be less devastating than for an individual who greatly values feeling competent.

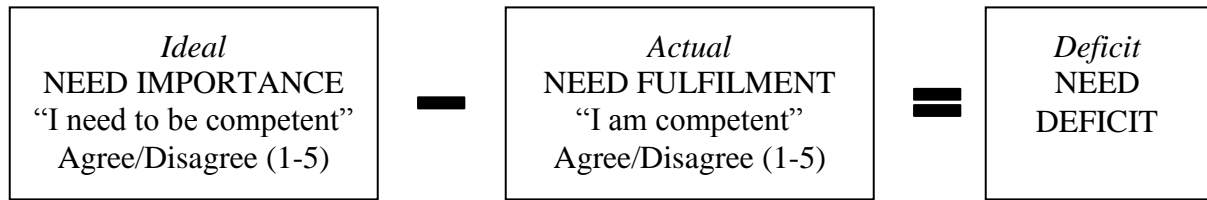
*Time.* This index represents the time frame associated with the fulfilment (or lack thereof) of a particular psychological need in an individual's life. Assessing the time frame associated with fulfilment is central to the new needs theory because it allows for the investigation of whether the duration of the lack of need fulfilment is associated with mental and physical health outcome variables.

***Operationalization of needs.*** The way in which the concept of psychological needs is operationalized has important implications for the measurement approach utilized. Several

operational options, derived from theory and research in the field, were considered in the current project. These options, along with their advantages and disadvantages will be described below.

*Higgins' Self-Discrepancy Theory.* The first option considered was rooted in Higgins' Self-Discrepancy Theory (1987), which was developed to help explain why negative feelings arise as a result of discrepancies in self-beliefs. Higgins described that the Self is composed of three domains: the actual self, the ought self, and the ideal self. Whereas the actual self represents the set of attributes that an individual believes they actually possess, the ought self represents the set of attributes an individual believes they should possess, and the ideal self represents the set of attributes that an individual believes they would possess, under ideal circumstances (Higgins, 1987). Higgins described that when discrepancies arise, that is, when certain domains of the self are at odds with one another, negative emotional consequences occur. More specifically, Higgins postulated that the greater the magnitude and accessibility of an individual's self-discrepancy, the more the individual will suffer the kind of discomfort associated with that type of self-discrepancy.

By borrowing from Higgins' conceptualization of discrepancy, whereby discomfort occurs when inconsistency between two aspects of the self arise, the discrepancy between an individual's ideal and actual level of need fulfilment may prove to be valuable, not only in operationalizing the need concept, but also in measuring need fulfilment. Following from this line of reasoning, the fulfilment of psychological needs could be measured by asking individuals about their ideal need or need importance (e.g., "I need to be competent") and their actual need or level of need fulfilment (e.g., "I am competent") and calculating the difference between the two as an indicator of need discrepancy.



Operationalizing and assessing need fulfilment in this way offers many advantages. For example, including a measure of need importance independent from its level of fulfilment is advantageous because it provides data on the needs themselves. This is crucial because an individual’s perceived need importance may impact the way in which they report on their level of fulfilment. For example, if an individual reports that being competent is not important, his/her reported fulfilment of this need may be confounded and easily misinterpreted.

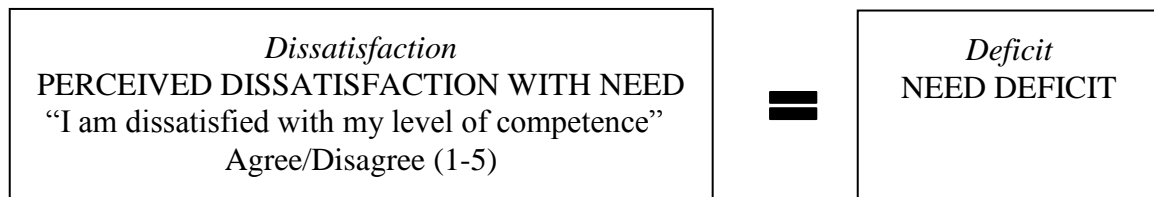
Given that this set of questions indirectly measures need deficit, it is also less likely to be subject to social desirability bias, and thus may be a more objective measure of a deficit. Assessing needs in such a way may prove to be particularly useful in context where social desirability biases are high (e.g., couples, parent-child interactions). Furthermore, by using this method of measurement, an individual is not required to explicitly recognize a need discrepancy or need deficit for one to be reported, thereby limiting the effects of poor insight.

In spite of such advantages, this approach also has some disadvantages. Firstly, this approach may have less face validity because rather than directly asking about a deficit, it infers one by calculating it. It is also questionable whether need fulfilment is actually being assessed in this approach.

*Diener’s subjective well-being.* Another option considered was based on Diener’s (1984; 1994) conceptualization of life satisfaction and subjective well-being (SWB). SWB is

assumed to be comprised of three main components: positive affect, negative affect, and life satisfaction (Andrews & Withey, 1976; Diener, 1984). The life satisfaction component of SWB refers to a cognitive evaluation of one's life and is typically measured with the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), which asks individuals to make global judgments about their life satisfaction. The concepts of need satisfaction and SWB are closely related. In fact, some studies have shown that the fulfilment of universal needs predicts SWB in a variety of populations worldwide (Diener & Tay, 2010).

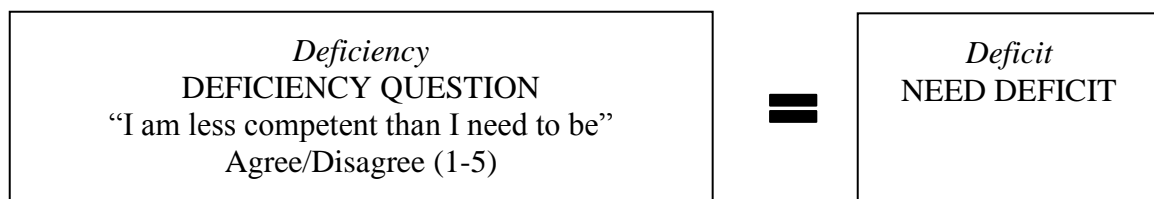
By making use of Diener's conceptualization of SWB and the way that the life satisfaction component is measured, whereby individuals are asked to make self-report judgments on their level of satisfaction with life, it is possible to see how the fulfilment of psychological needs could be assessed in a similar fashion. For instance, individuals could be asked to report on their level of satisfaction with the fulfilment of various needs in their life. Within this type of conceptualization, people's perceived satisfaction with need fulfilment would imply that the needs they deem important are being met in their life, whereas perceived dissatisfaction would imply a lack of need fulfilment for needs that are deemed important, thus reflecting high need deficit.



Operationalizing unmet needs in such a way may be advantageous because it may correlate more highly with sad mood, especially in the short term (Schwarz & Clore, 1983; Schwarz & Strack, 1999). However, this method of conceptualization has significant

limitations. For example, an individual's perception of the words satisfaction and dissatisfaction and what they could possibly imply may impact or alter responses to the question, due to social desirability effects for example. Furthermore, Diener and colleagues' method for assessing global life satisfaction has been criticized with regard to its reliability and validity because of evidence showing that satisfaction judgments are largely influenced by temporarily accessible information (e.g., context, mood fluctuations, item order) rather than representing careful evaluations of one's life as a whole (Schwarz & Clore, 1983; Schwarz & Strack, 1999). Although some researchers in the field of needs have assessed needs in such a way (e.g., Prager & Buhrmester, 1998), it is possible that measuring need fulfilment by means of satisfaction judgments could lead to similar problems.

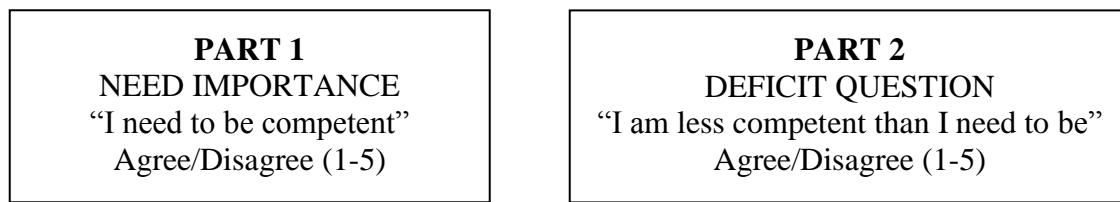
*Direct question regarding deficit.* Considerable thought was also given to the operationalization of needs in a different, perhaps more intuitively meaningful way, whereby need discrepancy is assessed with a direct question implying such a deficit. For example, need fulfilment could be measured by asking individuals the extent to which they agree with a statement such as "I need more X than I currently have" or "I am less X than I need to be.



A significant advantage of this approach is that it directly measures the perception of a need deficit, and therefore, has higher face validity. However, this approach does not allow for the measurement of need importance and, as a result, the magnitude of the deficiency may influence one's response to this type of question. If the deficit is minimal for example,

an individual may be more likely to disagree with this type of statement, even though a deficit, although small, is present.

*Other options.* In considering the advantages and disadvantages of the aforementioned operational and measurement options, another more advantageous approach was developed. By combining the best features of several approaches, an optimal two part measurement method was created. Given its previously outlined necessity, a direct question of need importance was included (e.g., “I need to be competent”). To assess need fulfilment, the deficiency question presented in the previous section (i.e., “I am less competent than I need to be”) was considered to be the best option due to its high face validity.



Part one of this approach allows for the gathering of data on psychological needs themselves, without being confounded with their level of fulfilment. On the other hand, part two of this approach represents a direct and valid assessment of unmet needs (i.e., need deficiency).

**Measurement Challenges.** Other measurements challenges, which may impact the way in which needs are assessed, exist in the field. For example, there has been lots of variability in whether needs are deemed best assessed via implicit or explicit procedures.

*Projective testing.* Some theorists (e.g., McClelland & Murray) believe that accurate information about motives is only accessible via projective methods (Veroff, 1992). Directly asking individuals about their motivation is deemed undesirable by such theorists because it produces test-taking and self-presentation biases, and may lead to defensiveness,

suspiciousness, or anxiety (Lundy, 1988). These theorists have thus used thematic or implicit tests, such as the Thematic Apperception Test (TAT; Murray, 1943), to assess needs. The disadvantages of this approach include the qualitative nature of such tests as well as their highly subjective scoring, which are typically linked to reduced reliability (Murstein, 1963; Weinstein, 1969).

*Self-report.* A more recent approach of need assessment involves self-report methods such as questionnaires (e.g., Gagné, 2003) and daily dairies (e.g., Reis, et al., 2000).

Although it is inherent difficulty to ask people to report on their level of need importance and need fulfilment, it is now customary to do so in this way. Countless self-report questionnaires assessing need fulfilment have been created and employed in empirical research over the years.

Although impression management has been documented to be a problem when assessing need fulfilment in some contexts (i.e., at work; Van den Broeck, et al., 2010), bias is assumed to be minimal in other contexts, particularly when the respondents as well as their responses remain anonymous. In addition, self-report internet surveys, as compared to paper-based methods, have been linked to lowered social anxiety and reduced social desirability, especially when participants remain anonymous (Joinson, 1999).

*Behavioural observation.* Researchers have also utilized observational methods to assess human motivation. Deci (1971) for example, assessed situational motivation by means of the free-choice measure, which assumes that individuals who are intrinsically motivated toward an activity will continue to engage in such activities when they are free to do so. This method therefore analyses the amount of time an individual spends on any particular activity during a free-choice period. However, several limitations of this approach have been highlighted, including its difficulty in distinguishing between types of motivation (Vallerand,

1997). Similarly, it is likely to be difficult to distinguish between different needs by observing behavioural outputs. Although the use of behavioural observations minimizes several biases inherent in self-report procedures, it is problematic when assessing psychological needs because it involves inferring internal states from observable behaviour.

*Existing measures of psychological needs.* Given the operational and measurement challenges described above, it is not surprising that there is no widely accepted measure of needs (e.g., Deci & Ryan, 2000; La Guardia, Ryan, Couchman, & Deci, 2000). Although several researchers have begun to create measures to assess the satisfaction of psychological needs in individuals (e.g., Deci & Ryan, 2000; La Guardia et al., 2000), many of these scales have operational and methodological limitations. For example, many existing measures assess need fulfilment in a particular context (e.g., within a romantic relationship, within a work environment) or in relation to a specific and small number of needs (e.g., fulfilment of the need for intimacy, need for autonomy). In addition, most existing measures of needs assume that needs strength is consistent across individuals and do not assess the importance or significance of the needs for each individual, but rather, simply measure the satisfaction of a list of predetermined psychological needs. Furthermore, measures of psychological needs typically do not assess the time frame associated with the fulfilment (or lack thereof) of the need.

### **Summary of Challenges in the Field of Needs**

All in all, several challenges exist within the field of psychological needs. In addition to the lack of consistency with regard to the definition and conceptualization of psychological needs, countless needs have been proposed as most basic by various researchers, and a meaningful set of fundamental needs has yet to be agreed upon in the field. Furthermore, although many theories have been proposed over the years, there remains

little consensus regarding how needs are structured or hierarchically organized, as well as regarding how psychological needs are best operationalized and measured.

### **A New Needs Model**

A new model of psychological needs was proposed to address the aforementioned challenges and shortcomings in the field of psychological needs. Overall, this new needs model is consistent with other need theories (e.g., SDT), which suggest that the fulfilment of basic human needs is essential for overall well-being. In general, such theories propose that when basic needs are unmet, people are at higher risk of experiencing both mental and physical health problems, a notion that has received extensive empirical support (see Deci & Ryan, 2000 for review). The new model of needs proposed within this dissertation is unique in that it aimed to unify the field by proposing a replicable and comprehensive list of need factors and creating a questionnaire to reliably assess them. In doing so, the new model of needs offered a viewpoint on many conceptual issues (e.g., definition, identification, and structure of needs) as well as many on several operationalization and measurement issues (e.g., important measurement indices, different methods of assessment). The following sections will outline the proposed model's standpoint on a variety of relevant need topics.

**Need classification.** By applying empirical procedures to the task of constructing a need taxonomy, the new model suggests that all essential human needs can be encompassed by a comprehensive list of basic need factors or subscales that allows researchers to sample the domain extensively without creating an unmanageable list or including redundant factors. Given the documented link between the fulfilment of the need for autonomy, competence, and relatedness, and several types of well-being (Deci & Ryan, 2000), it is expected that these three need constructs will be represented in the list of need factors discovered via factor analyses. However, the countless studies examining the three needs proposed by SDT have

demonstrated the reliability of these three needs rather than the validity or comprehensiveness of a three-factor needs paradigm. The current model therefore suggests that beyond the division of self and other types of needs, there are second-order need constructs that are more specific and more useful, both at a conceptual and a clinical level. For example, the need for relatedness is more reasonable as a construct if broken down into several more distinct needs (e.g., intimacy, belonging to a group), all of which fall within the interpersonal domain. Dividing needs in such a way allows for the investigation of whether each of these need factors is associated with specific types of well-being or with particular problems and symptoms.

**Perceived need importance and need discrepancy.** Although the new model of needs hypothesizes that need fulfilment is more important in predicting negative outcomes than is perceived need importance (i.e., whether the individual perceives it as something important in his/her life), need importance nevertheless plays an important role in determining the subsequent outcomes of unmet needs. For example, if an individual does not perceive the need to belong to a group as an important need in their life, it is possible that the impact of having this need unmet would be less severe than it would be for an individual who perceived this as an incredibly important need in their life. Following from this reasoning, and from Higgins' Self-Discrepancy Theory (1987), is the concept of need discrepancy. Within this project, the concept of discrepancy represents the difference between an individual stated level of need importance and its reported level of fulfilment. The new model of needs proposes that although need importance is not expected to predict negative outcomes, it is expected to moderate the relationship between unmet needs and various outcome variables.

**Cumulative and time sensitive effects of unmet needs.** The proposed model implies a cumulative and time sensitive approach to the impact of unmet needs on well-being, in that the more unmet needs an individual has and the longer those need remain unmet, the more likely they are to experience significant psychological problems and physical symptoms. On the other hand, if an individual experiences only one or a few unmet needs for a short period of time, they are less likely to experience negative outcomes. Consequently, the model not only proposes that the duration of the lack of need fulfilment would predict a variety of indicators of poorer well-being but also proposes that it would maintain predictive utility once the effects of need fulfilment were accounted for.

**Developmental perspective.** The proposed model of needs accounts for individual differences in the way needs are valued and fulfilled and assumes that age, gender, and culture-based variations exist.

**Age.** Although basic psychological needs are assumed to be universal, this model suggests that certain types of needs may be emphasized or deemed more important at certain developmental periods. For example, adolescence may be characterized by strong interpersonal needs (i.e., belongingness with peers) while young adulthood may be more focused on self-worth needs (i.e., increasing autonomy, academic achievement).

The new needs-based model also allows for a better understanding of the impact of unmet needs within different age groups. For example, during childhood, unmet parental needs may be most likely to lead to negative outcomes, whereas unfulfilled peer needs may prove to be most important in predicting mental and physical problems during adolescence. Similarly, unmet relationship and career needs may be most damaging in adulthood.

**Gender.** The current model also suggests that gender could impact the way in which need importance and need fulfilment is promoted in an individual's life. Therefore,

systematic differences in needs between men and women may help to explain why men and women are more prone to experiencing different types of negative psychological and physical problems. Consequently, even though psychological needs are expected to be universal, the model would predict that men and women are likely to report different levels of perceived need importance as well as varying levels of general and domain-specific need fulfilment.

**Culture.** Furthermore, different cultures are likely to differentially support the extent to which various needs are valued, thereby creating a tendency for conflicts in the satisfaction of particular needs. In the same way that gender socialization is likely to impact the way in which different needs are fulfilled, culture-based norms and traditions are likely to impact the manner in which needs are perceived, valued, and satisfied in various life contexts.

**Changes in need fulfilment over time.** Although the importance of human needs for well-being is assumed to be constant and stable throughout the lifespan, the levels of fulfilment of such needs is expected to vary over time and to change as a result of negative life events, varying life circumstances, and changes occurring in interpersonal relationships. Consistent with research showing that daily fluctuations in need fulfilment lead to subsequent fluctuations in well-being (e.g., Reis et al., 2000), the new needs model proposes that as need fulfilment varies over time, so will mental and physical symptoms. In other words, when individuals experience higher levels of fulfilment of their basic needs (either by way of positive events or changing circumstances), their mental and physical symptoms are expected to decrease, whereas when they experience lower levels of need fulfilment, their mental and physical symptoms are expected to increase.

**Needs as mediators and moderators.** The new needs model can also be extended to explain mechanism through which other phenomenons occur. The new model proposes that needs are central to many aspects of well-being and consequently, may play a mediating or moderating role in other previously documented empirical relationships. For example, need satisfaction was recently used to explain the relationship between self-concealment and negative well-being outcomes (Uysal, Lin, Knee, 2010) and between adult attachment and distress variables such as shame, depression, and loneliness (Wei, Philip, Shaffer, Young, & Zakalik, 2005). This line of reasoning has also been investigated by researchers (e.g., Kopala-Sibley & Santor, 2007; Santor & Kopala-Sibley, 2007) who have proposed that unmet needs act as a mediating variable in the relationship between negative life events, personality characteristics and depressive symptoms, a premise which is consistent with the current model of needs. Moreover, the model suggests that differing levels of need fulfilment could help to explain the documented association between gender and outcome variables such as depression, anxiety, and physical symptoms.

**Threats to needs.** The concepts introduced in the new needs model can also help explain the impact of *threats* to needs. It is expected that when the fulfilment of a need is threatened, it is likely to result in similar circumstances to that of having an unmet need. This tendency was originally suggested by Santor (2003) and can be explained through attribution theory, yet it extends beyond the scope of this dissertation and therefore will not be discussed in more detail here.

### **Structural and Measurement Components of the Model**

The proposed hierarchical model of needs is expected to reflect a three-level confirmatory model in which the latent construct of psychological needs can be broken down into two primary need domains, namely the self-worth domain and interpersonal domain,

which correspond to the two fundamental dimensions of needs proposed by Bakan (1966). Contrary to Bakan's original formulation, need fulfilment on one of the two basic dimensions is not expected to contend with fulfilment of the other. Rather, the current model of needs suggests that well-being is dependent on the fulfilment of both sets of needs and that balance in need fulfilment across life contexts is also important, a view that has recently been proposed and received empirical support (e.g., Milyavskaya et al., 2009; Sheldon & Niemiec, 2006).

The hypothesized model further posits that within each need domain, there exists several second-order constructs, each of which reflects a basic human needs and are represented by the different subscales of the Psychological Needs Questionnaire. The fulfilment of any one need is not perceived as a pre-requirement for the fulfilment of others. It is hypothesized that this need structure will be confirmed in multiple samples.

Furthermore, the PNQ is expected to demonstrate good psychometric qualities, including a replicable factorial composition, good internal consistency, construct validity, and predictive utility.

### **Construct Validity Component of Model**

Conceptual validation of this multi-factorial model of psychological needs requires that construct validity be considered. Construct validity refers to the extent to which a scale actually measures what it was designed to measure. Construct validity is typically inferred from the manner in which the scale was constructed as well as through convergent and divergent validity (DeVellis, 2003). The details of the scale development process will be described study one.

**Concurrent validity and divergent validity.** Concurrent validity describes the extent to which the operationalization of a construct is similar or related to other constructs

that it should theoretically be related to (VandenBos, 2007). Divergent validity, on the other hand, describes the extent to which the operationalization of a construct is not highly correlated with other tests designed to measure theoretically different concepts (VandenBos, 2007). As is recommended in scale development (DeVellis, 2003), these types of validity were assessed in various samples.

In line with existing theory and research which suggests that need satisfaction is positively related to both hedonic and eudaimonic well-being (Ryan, Huta, & Deci, 2008) and negatively related to ill being (Ryan & Deci, 2000), it was hypothesized that unmet psychological needs would be positively associated with various psychological symptoms and physical ailments. Additionally, it was expected that correlations between scores on the Psychological Needs Questionnaire and other variables of interest, such as self-esteem, personality characteristics, negative life events, relationship quality and satisfaction, and social support, would be logical and interpretable. Furthermore, the model presumes that each basic need differentiates itself in terms of its correlations with the various measures of well-being and mental health. Convergent validity, which is demonstrated when a test correlates well with another measure of the same construct that has previously been validated (VandenBos, 2007), was also assessed in the current project and was hypothesized to further demonstrate construct validity of the PNQ.

### **Global Objectives of Dissertation**

To examine some of the premises proposed by the new model of needs and to account for the limitations in the currently available scales of psychological needs, this dissertation aimed to develop and validate a scale of general need fulfilment, hence the creation of the Psychological Need Questionnaire (PNQ). In order to develop the scale, the following five steps were taken (DeVellis, 2003; Hinkin, 1998). In Phase 1, a large item pool

was generated. In Phase 2, item analyses such as exploratory factor analysis and item-total correlation were conducted to determine the final set of items. Phase 3 consisted of confirmatory factor analysis, which was used to further validate the factor structure of the scale and to examine the discriminant validity of the different needs. In Phase 4, other psychometric properties of the measure, such as its internal consistency reliability, were assessed. Finally, in Phase 5, the scale's criterion-related, discriminant, and predictive validity were examined. To complete these five phases, a review panel was consulted and two separate university-based samples were recruited and asked to complete a series of online questionnaires. See Table 1 for an overview of the samples used throughout the five phases of scale development.

More specifically, study 1 asked 221 university students to complete a series of online questionnaires assessing basic needs, psychological and physical symptoms, social support, relationship satisfaction and quality, life events, and personality characteristics, with the goal of identifying a list of basic human needs, creating a scale to assess the fulfilment of such needs, examining the internal structure of the scale, and beginning to assess the content validity of the scale through correlational data. As part of study 2, 283 university students completed online questionnaires assessing mood, anxiety, physical symptoms, negative life events, and depressive vulnerability characteristics. Study 2 aimed to examine the factorial composition, internal consistency, construct validity, and predictive utility of the PNQ-v2, to examine the effect of gender on psychological needs, as well as to investigate whether need fulfilment moderated the relationship between gender and various outcome variables (i.e., depression, anxiety, and physical symptoms), between negative life events and depressive symptoms, and between dependency and self-criticism and depressive symptoms.

Table 1

*Overview of the Samples throughout the Five Phases of Scale Development*

	Review Panel <sup>a</sup>	Sample 1 <sup>b</sup>	Sample 2 <sup>c</sup>
Phase 1			
Item development	X		
Phase 2			
Item selection		X	
Phase 3			
Factor structure			
Exploratory		X	
Confirmatory		X	X
Phase 4			
Intercorrelations		X	X
Reliability		X	X
Phase 5			
Criterion-related and discriminant validity			
Relationship quality		X	
Relationship satisfaction		X	
Anger		X	
Self-esteem		X	
Anxiety		X	X
Depression		X	X
Physical symptoms		X	X
Negative life events		X	X
Depressive vulnerability characteristics		X	X

Note. <sup>a</sup> n = 12. <sup>b</sup> n = 221. <sup>c</sup> n = 283

## CHAPTER 2

### Detailed Description of Each Basic Need

Research on basic human needs has spanned the last hundred years, and as a result, is extremely rich and comprehensive. In order to fully understand the research in this area and to comprehend the importance of each need for optimal well-being and health, a careful and detailed examination of the research associated with each basic need will be provided here. To avoid redundancy, only the needs identified as most essential by the data in the current project will be reviewed.

#### Competence

Over the years, many theorists have assumed that humans have a deep-seated desire to achieve competence and to avoid incompetence. Rooted in White (1959) and Harter's (1978) effectance motivation, which was conceptualized as the human urge to have an effect on and master the surrounding environments, SDT defines the need for competence as the need to experience oneself as capable and competent in influencing the environment and as being effective in one's activities within it (Deci & Ryan, 1991, 1995, 2002). As mentioned above, the need for competence constitutes one of the three basic psychological needs proposed by Deci and Ryan (1991, 1995) but several other theorists have alluded to this concept using variable terminology (e.g., competence motivation, Koestner & McClelland, 1990; self-efficacy Bandura, 1997). Competence driven motivation, which is described as a relatively non-specific tendency in humans, allows individuals to engage in activities for their own sake rather than for external prompts or reinforcements (Deci & Ryan, 2002). When fulfilled, the need for competence allows an individual to be interested, open, and ready to learn in his/her environment as well as to better adapt to new challenges presented within it (Deci & Ryan, 2002; Greenough, Black & Wallace, 1987). In so doing, competence

satisfaction stimulates cognitive, motor, and social growth (Elkind, 1971; White, 1959). The way in which the need for competence, as understood within the current project, differs from other similar agentic needs will be described below.

### **Autonomy**

The need for autonomy, also sometimes referred to in SDT as the need for self-determination, denotes the need to experience one's actions as a result of autonomous choice, according to one's genuine desire and personal preference, without external interference (Deci & Ryan, 1991; 1995). Skinner and Edge (2002) describe that indication of the need for autonomy is evident, even in very young infants. In addition to protesting restraint from others, infants express and defend their states, actions, desires and preferences, demonstrating that from birth, infants have the capacity and will to act autonomously (Skinner & Edge, 2002). Of the three needs proposed by SDT, autonomy is far less prevalent in empirical research and is more controversial than the other two (Deci & Ryan, 2000). However, the need for autonomy occupies a unique position within SDT because it acts as an overarching need necessary within all goal-directed behaviours, even those aimed at fulfilling other basic needs. In other words, the satisfaction of other needs can be accomplished in an autonomous or controlled way but it is only when the fulfilment of other needs results from autonomous rather than controlled behaviours that people experience optimal engagement and psychological well-being (Ryan, 1993).

The construct of autonomy is featured in several theories of personality (e.g., Murray, 1938; Erikson, 1963; Rogers, 1963) and many other researchers have discussed a similar motivational force but have described it with differing terminology. For example, Glasser (1984) discussed the need for freedom, which he described as "the freedom to choose how we live our lives, to express ourselves freely, associate with whom we choose, read and write

what satisfies us, and worship or not worship what we believe” (p. 12). Furthermore, although similar and often used interchangeably in the literature, Deci and Ryan state that the need for autonomy is distinct from concepts such as internal locus of control, independence, and individualism (Deci, et al., 1999; Ryan, 1995).

### **Agency**

Founded in an organismic view of human behaviour that regards behaviour as volitional and goal-directed and deems individuals inherently active and self-regulating, the concept of personal agency refers to the capacity of humans to act as agents in their lives (See Miller 1993; Overton, 1984; Reese, 1991). More specifically, agency refers to one’s ability and motivation to act as an active agent to “plot and navigate a chosen course through the uncertainties and challenges of the social and ecological environment” (Deci & Ryan, 2002). Similarly, deCharms (1968) described agency as an individual’s primary motivational drive to feel like a causal agent with respect to his/her own actions. Deci & Ryan (2002) describe that the fulfilment of basic needs, including the need for autonomy, competence, and relatedness, is dependent on agentic behaviours. In other words, because all needs-based motivational behaviour involves action executed by the individual, personal agency is required to execute such actions (Little, Hawley, Henrich, & Marsland, 2002). In this sense, Deci and Ryan (2002) do not consider the need for agency to be a basic psychological need, but rather, consider it to be a precondition to the satisfaction of their proposed three basic needs. However, although similar, each concept involves distinct features and is often discussed as being separate from one another in the literature (e.g., Little et al., 2002). Whereas agency as a basic need refers to the necessity to have personal life goals and to engage in purposeful actions related to these goals, the need for autonomy reflects the wish to experience one’s actions as a result of self-directed choice, without

constraint or external interference. Because of this marked distinction, agency and autonomy were considered separately within the given project.

### **Independence**

The need for independence refers to one's need to be self-sufficient and to avoid excessive dependence on others (Deci & Ryan, 2008). As with autonomy, some have argued that independence is a value that is learned within a particular cultural context (Deci & Ryan, 2008). However, even though the need for independence may be emphasized and satisfied differently within various cultures, it is considered within this project to be an important psychological need that must be fulfilled in order for optimal well-being to be experienced.

Although some researchers have interpreted independence as being synonymous to the need for autonomy (e.g., Markus, Kitayama, & Heiman, 1996), both concepts differ from one another in important ways (Ryan & Lynch, 1989). The concept of independence refers to self-reliance and the ability to care for oneself, contrary to dependence, which refers to the obligation to rely on others for the satisfaction of one's needs (Ryan & Lynch, 1989). An individual's need for autonomy can be fulfilled and even supported in an environment where the individual is not controlled, even if that individual is dependent on others and lacking independence (Bretheron, 1987; Memmi, 1984). Similarly, Soenens et al. (2007) discuss that independence and autonomy are very different concepts and that the fulfilment of one does not imply the fulfilment of the other. Whereas autonomy refers to acting volitionally, without external pressure, independence refers to one's ability to function alone while not having to depend excessively on others (Deci & Ryan, 2008).

### **Stability**

Present in many early need theories (e.g., Maslow, 1954; Bronfenbrenner, 1979), the need for stability in an individual's environment and interpersonal relationships has been

proposed as an important basic psychological need. Conceptualized by Maslow as the need for security, the need for stability as implied within the current project refers to the need for predictable and stable social interactions and environments (Maslow, 1954; Bronfenbrenner, 1979). Research has demonstrated that regular, predictable, and supportive types of environments and interactions with others within several different settings (e.g., home, school, neighbourhood) promote healthy development (Bronfenbrenner, 1979; Bronfenbrenner & Evans, 2000; Bronfenbrenner & Morris, 1998; Forman & Davies, 2003). Instability has been demonstrated to be distinct from constructs such as stressful life events and poverty (Marcynyszyn, Evans, & Eckenrode, 2008). Because of its theoretical and empirical basis, the need for stability was included as a basic need within the current project and was conceptualized as necessary for optimal well-being.

### **Fairness**

Included in Maslow's need for security was the need for a fair world in which injustice and inconsistency are under control (Maslow, 1954). Several other theorists have referred to the human need to view the world as a fair place in which people get what they deserve (for reviews see Hafer & Begue, 2005; Lerner & Miller, 1978). This justice motive can help explain research findings showing that people will often intervene to end, reduce, or compensate undeserved suffering (Lerner & Simmons, 1966). Believing in a just world enhances general psychological functioning (Lerner, 1980), and more specifically, positively impacts quality of sleep, feelings of loneliness, negative affect, and overall stress levels (for review, see Dalbert, 1999; Furnham, 2003). Interestingly, psychological adjustment is related to beliefs that the world is fair to the self but not to beliefs that the world is fair to others (Lipkus, Dalbert, & Siegler, 1996). For this reason, the need for fairness or justice as

conceptualized within this project refers to fairness to the self rather than to overall notions of justice or general fairness.

### **Relatedness**

The absolute need for interaction with others is a widely accepted notion. In fact, there is a whole field of research on attachment that asserts that normal human beings are born with the innate desire and capacity to be attracted to, interested in, and responsive to interactions with social partners and to protest in situations of separation (Ainsworth, 1979; Bowlby, 1969, 1973; Papousek & Papousek, 1980). In Deci & Ryan's motivational model, relatedness refers to need to care for and be close and connected to others. It includes the need to experience authentic and meaningful connections with others and to experience satisfaction in such participation and involvement (Deci & Ryan, 2002; Skinner & Edge, 2002). As with the other basic needs, the need for relatedness has been labeled in various ways (e.g., attachment, affiliation, belongingness, intimacy). However, several researchers have suggested that relatedness, as an all-encompassing interpersonal need concept, may not be the only means by which interpersonal relations affect individual well-being (Reis et al., 2000). Consequently, to combine all interpersonal needs into one global need category may not be useful. Thus, the concept of relatedness, as defined by SDT, was further broken down into several empirically based interpersonal needs for the purpose of this project.

### **Belongingness**

The need for belongingness refers to the inherent desire to belong and to be an accepted member of a group (e.g., family, social groups or teams, friends, co-workers). Several researchers have recognized that the human desire to belong is rooted in our evolutionary history (Daly & Wilson, 1993). More specifically, with the emergence of hunter-gather societies, the innate tendency to care for and protect one's offspring was

extended to non-kin group members. Such types of interpersonal connectedness and cooperation were not only essential for survival but were also advantageous for each group member, providing opportunity for optimal individual well-being within the group setting (Daly & Wilson, 1993). Although this type of group social reciprocity no longer exists in Western society, individuals still have the desire to belong to a group and to protect those within it, a need that has been documented across the lifespan (Glasser, 1984, 1989, 1998; Baldwin, 1992; Baumeister & Leary, 1995; Weiner, 1991).

Although Deci and Ryan use the terms belongingness and relatedness interchangeably, each concept, as conceptualized within this project, represents related but different fundamental needs, and were treated accordingly. Whereas the need for relatedness refers to the human desire to feel close and connected with others, the need for belongingness refers to the need to belong to a group (Baumeister & Leary, 1995; Newcomb, 1961; Rubin, 1983), to participate in shared activities (Duck & Wright, 1993; Markman & Kraft, 1989; Tiger, 1969; Wood & Inman, 1993), and to be part of something bigger than oneself.

### **Physical Intimacy**

The concept of intimacy has been proposed by many as an important vehicle through which social relationships affect psychological well-being (McAdams, 1992; Reis & Shaver, 1988; Swann, 1990). Although McAdams (1992) referred to the need for intimacy as a “readiness for experiences of warm, close, and communicative interactions with other persons” (p. 224), which is largely encompassed within the previously described need for relatedness, the concept of physical intimacy proposed within this document refers to the need for physical intimacy that is characterized by romantic or passionate attachment, attraction, and sexual chemistry. McAdams, Jackson, and Kirshnit (1984) showed that

individuals with a high intimacy motive, which encourages experiences of love, happiness, and sexual activity, enjoy their social interactions more than do individuals with low intimacy motives.

### **Status**

The need for status, also frequently referred to in the literature as the need for power or control, has been an issue of interest within the field of motivation for many years (Buss, 1997; Glasser, 1984; Murray, 1938; Winter, 1988, 1992). Winter (1988, 1992) described the power motive as the need to exert influence over other people, to be in charge, to be noticed, and to have high status. Some studies have shown that the acquisition of popularity and influence as well as wealth and luxuries, recognized as vital by the “American Dream,” may not be important and in fact, may be inversely related with well-being (Carver & Baird, 1998; Kasser & Ryan, 1996; King & Nappa, 1998). Consequently, the need for status referred to in this project does not reflect the concept of accumulation of material wealth and power over others but rather, taps into the need for respect and admiration of others that often accompanies positions of status, as well as the need for others to ask for one’s opinion and to follow one’s advice. This need conceptualization differs from the need for competence and the need for achievement in that both formerly described needs refer to the need to experience oneself as capable and as excelling in activities, whereas the need for status includes one’s signal of capability relative to that of others, and the admiration and respect that such a distinction brings about. Such a need concept is supported by research showing that having an unfulfilled need for status is linked to cortisol stress responses (Dickerson & Kemeny, 2004), to various forms of psychopathology (Gilbert, 1989, 1992, 1995; Leary, 1995, 2001), and to maladaptive compensatory responses (Dykman, 1998).

**Enjoyment**

The need to encounter enjoyable experiences and to have fun in daily life occurrences has been categorized as an important psychological need by some researchers (e.g., Glasser, 1984, 1989, 1998; Prager & Buhrmester, 1998). Some SDT followers have proposed that participating in fun or enjoyable activities may be one of several forms of interaction that leads to feelings of relatedness and connectedness with social partners (Clark & Watson, 1988; Lott & Lott, 1972). However, one study found that fun in social activities did not affect overall feelings of relatedness, but that it did predict well-being over and above the mediating role of relatedness (Reis et al., 2000). Such findings not only indicate that relatedness may not be the only vehicle for the beneficial effects of social interactions, but also indicate that enjoyment and fun should be considered an important psychological need.

### **CHAPTER 3: Study 1**

#### **Developing and Validating a New Self-Report Measure of General Psychological Need**

##### **Fulfilment**

Basic human needs have been the topic of countless theories and the focus of an extensive amount of empirical research over the course of the past century. The link between basic psychological need satisfaction and psychological health is widely accepted and virtually uncontested in the literature (e.g., Deci et al., 2001; Ryan, Deci, Grolnick, & La Guardia, 2006). In fact, there is an ever-growing body of literature demonstrating the beneficial effects of need fulfilment, both in general and in specific contexts or life-domains (Deci & Ryan, 2008). Nevertheless, there remains a great deal of disagreement in the field regarding many central aspects of needs. For example, the way in which basic human needs are defined, conceptualized, and identified among researchers in the field has been largely inconsistent. For example, some theorists (e.g., Maslow, 1954, 1970; McClelland, 1951) have adopted a deficit approach to needs, whereby a need deficit must be experienced for it to fuel motivation, whereas others (e.g., Deci & Ryan, 2000) maintain that individuals are inherently attracted to situations in which need satisfaction may occur, whether a deficit is present or not. Researchers and theorist also disagree on where needs come from, which aspect of needs are most central, and how needs are structured and organized. While some (e.g., Deci & Ryan, 2000; Hull 1943) have proposed that needs are innate and universal, others (e.g., McClelland, 1951; Murray, 1938) have suggested that needs are learned and vary in strength. Furthermore, a considerable number of needs have been proposed as crucial or primary throughout the years, with little consensus regarding which ones are most important or fundamental. Although Self-Determination Theory (SDT) (Deci & Ryan, 2000; 2002) suggests that there are three basic needs which are essential for overall well-being,

namely competence, relatedness and autonomy, a review of the literature suggests that there may exist other distinct and equally important needs constructs (e.g., freedom, agency, independence, belongingness, love, intimacy, stability and predictability, security, self-consistency, fairness, enjoyment and fun). The identification of a meaningful basic set of psychological needs supported by empirical data may allow for the unification of the field of motivational psychology in the same way that the Big Five theory has unified personality trait psychology. Such a list, however, has yet to be identified or widely recognized in the field.

### **Limitations of Current Measures of Need Fulfilment**

In spite of the documented link between need fulfilment and overall well-being and of the large number of studies examining need fulfilment in various contexts (see Deci and Ryan, 2000 for review), little attention has been paid to how needs are being measured and assessed. In fact, there currently is no widely accepted measure of need fulfilment and many of the existing measures are psychometrically flawed, too narrow, or incomplete. While many existing measures assess need fulfilment in a context-specific setting such as work (e.g., Deci et al. 2001) and relationships (e.g., La Guardia, Ryan, Couchman, & Deci, 2000) or in relation to a specific and small number of needs (e.g., intimacy or autonomy), few scales assess global need fulfilment. Furthermore, those that are currently available have psychometric properties that are either weak or unknown, which is likely to hamper the coherent and cumulative development of this line of research (Johnston & Finney, 2010). For example, the Basic Need Satisfaction in General Scale (BNSG-S; Gagné, 2003), which has been used in several studies to assess basic need satisfaction (e.g., Gagné, 2003; Neff, 2003; Niemiec, Ryan, & Deci, 2009; Wei, Philip, Shaffer, Young, & Zakalik, 2005), has recently

been shown to have serious theoretical and psychometric limitations (see Johnston & Finney, 2010 for a review).

In addition, most existing measures of need fulfilment assume consistent need strength across individuals and consequently do not assess the importance or significance of needs for each individual. Rather, such scales simply measure the satisfaction of a list of predetermined psychological needs. In doing so, it become nearly impossible to examine the extent to which need strength or perceived need importance may impact perceived need fulfilment and its relationship to various indicators or well-being. This is problematic because research has indicated that implicit need importance or strength can have an effect on need fulfilment and subsequent outcomes. For example, Schuler, Sheldon, and Frohlich (2010) demonstrated that individual differences in the need for achievement moderated the relationship between fulfilment of the need for competence and subsequent motivation.

Similarly, without a measure of need strength, which can act as a sort of baseline, comparisons between individuals and within the same individual at different time points are more difficult. Moreover, although both theory and research suggest that the time frame associated with need fulfilment, or lack thereof, is important (e.g., Deci & Ryan, 2000; Sheldon, Ryan, & Reis, 1996), measures of psychological needs typically do not include an estimation of the length of time of the lack of fulfilment.

### **Objectives of the Study**

In an effort to address some of the aforementioned challenges and inconsistencies in the current field of psychological needs and to account for the limitations of the scales available at this time, the current study aimed to: a) identify a comprehensive list of the most basic, essential, and/or empirically derived need concepts proposed in the literature as being important psychological needs; b) create a measure to reflect the proposed list of basic needs;

c) examine the internal structure of the needs measure created; and to d) begin to investigate the measure's content validity through correlational data.

### **Scale Development**

A five-step scale development process (DeVellis, 2003; Hinkin, 1998) was employed to develop and validate the PNQ. Phase 1 consisted of item generation. Phase 2 involved item analyses (e.g., exploratory factor analysis) to determine the final set of items, while phase 3 consisted of confirmatory factor analysis to further validate the factor structure of the scale. In Phase 4, other psychometric properties of the measure, such as its internal consistency reliability, were assessed. Finally, in Phase 5, the scale's criterion-related, discriminant, and predictive validity were examined. Although the five steps involved two separate samples, the current paper will describe analyses related to the first sample, while the second sample will be discussed in later articles.

**Need Operationalization.** Need fulfilment has been operationalized in various ways by previous researchers. Some (e.g., Prager & Buhrmester, 1998) have assessed need fulfilment by means of the concept of satisfaction, whereby needs are explicitly listed and individuals are asked to rate their current level of satisfaction with each need. Others (e.g., Gagné, 2003) have measured need fulfilment via questions that assess need fulfilment in an implicit manner (e.g., "I really like the people I interact with"). By borrowing theory and concepts from other fields, need fulfilment may also be understood, operationalized, and measured in other ways. For example, Higgins' (1987) Self-Discrepancy Theory describes that negative consequences occurs when there is a discrepancy between an individual's ideal and actual self. Similar concepts can be applied to the assessment of need fulfilment by asking individuals to rate both their ideal level of need fulfilment (e.g., "I need to feel

competent”) as well as their actual level of need fulfilment (e.g., I feel competent”) and calculating the difference between the two as an indicator of a need deficit.

Although the approaches mentioned above would be suitable, a more intuitively meaningful operationalization and method of assessment was chosen for the PNQ. More specifically, need fulfilment was assessed by asking individuals to rate the extent to which they agreed with a statement that explicitly declared the presence of a need deficit (e.g., “I need more X than I currently have” or “ I am less X than I need to be”), a method which has better face validity. The PNQ also asked participants to rate their perceived importance of each need as well as the time frame associated with the level of need fulfilment.

**Item generation.** To develop a pool of candidate items to include in the scale, the writings of several researchers from both the motivation and needs fields (e.g., Maslow, Murray, McClelland, Deci, Ryan, Vallerand) were reviewed and the currently available measures of need fulfilment were examined. A list of the most basic, essential, and empirically derived need constructs proposed in the literature was then generated. Items for the Psychological Needs Questionnaire (PNQ) were selected and developed based on the following criteria. First, an empirically validated construct was considered to be a potentially important psychological need if it was labeled as any of the following: need, drive, motive, end goal, want, desire, wish, ultimate concern, or incentive.

Secondly, although many scale developers choose to write both negatively and positively worded items within the same scale to avoid an acquiescence, affirmation, or agreement bias, such scales have been shown to often be confusing for respondents and items worded in the opposite direction consistently perform poorly (DeVellis, 2003). Thus, the disadvantages of using both positively and negatively worded items within the same scale appear to outweigh any advantages of doing so (DeVellis, 2003). As a result, all items were

written in the same direction to avoid the need for reverse scoring. All of the importance items were worded positively and all of the fulfilment items were formulated to include an explicitly stated need deficit. In addition, items were designed to be simple, short, and reflect a sixth-grade reading level (DeVellis, 2003).

All items were formulated as declarative statements following the stem 'Please indicate the extent to which you agree with the following statements'. As is suggested by Hinkin (1998), items were scaled on a five-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree), with 3 (neither agree or disagree) as a neutral midpoint.

**Number of Items.** In general, guidelines suggest that considerably more items than are planned to be included in the final scale should be generated, with the initial pool being at least 50% larger than the final scale (DeVellis, 2003; Hinkin, 1998). Consequently, a large number of initial items were generated, with the intent of adequately representing each basic human need and of retaining a smaller subset of items for the final version of the PNQ.

Many arguments in favour of shorter scales have been presented. Studies have shown that adding items indefinitely to a scale has progressively less of an impact on scale reliability (Carmines & Zeller, 1979). In fact, it has been suggested that adequate internal consistency reliabilities of a latent construct can be obtained with as few as three items (Cook et al., 1981), and that it is difficult to improve the internal consistency of a scale composed of five appropriate items by adding more items (Hinkin, 1995; 1998). Shorter measures have also been shown to minimize response biases caused by boredom or fatigue (Schmitt & Stults, 1985; Schriesheim & Eisenbach, 1990), providing further evidence for the use shorter scales.

**Item Ordering.** As a general rule, Converse and Presser (1986) suggest that items within a measure affect each other mainly when their content is clearly related or when the

answer to one question has obvious implications for the answer to another questions.

Although items in the needs measure reflect similar content, in that they all assess needs importance and need fulfilment, there is no reason to suspect that answers of items relating to one need subscale of domain would have implications for the answers of the items relating to other need subscales or domains. With regards to the items that reflect the same need subscale or domain, it is reasonable to expect that answers to one question would be similar to answers on the next questions. Consequently, all question items were organized in a random fashion in the PNQ.

**Content Validity Assessment.** A review panel comprised of 12 graduate and undergraduate university students assessed the quality and face validity of the items included in the initial pool of item for the PNQ. The members of the panel were asked to complete the measure items and comment on their level of understandability, on the formatting of the questions, and on the extent to which the needs listed reflected “needs that people in general have.” Members of the panel also had the opportunity to propose any needs that were not listed in the questionnaire but that they deemed important and representative of “needs that people in general have.” Data from this panel were used to refine the instrument (i.e., questions structure) and allowed for increased content validity of the list of needs included in the measure.

### **Research Hypotheses**

**Structural hypotheses.** It was expected that human needs as measured by the PNQ would be multidimensional in nature. More specifically, it was hypothesized that items would cluster together to form various need subscales, each representing a distinct basic psychological need (hypothesis 1). Furthermore, in accordance with Bakan’s (1966) distinction between agency and communion, which has been utilized and repeatedly

replicated in the research (e.g., Prager & Buhrmester, 1998; Santor, 2003), it was hypothesized that items relating to the self-worth domain would cluster together and that items relating to the interpersonal domain would cluster together (hypothesis 2).

Furthermore, we predicted that a three-level confirmatory factor model of needs in which items loaded onto their respective need subscales, which in turn loaded onto their respective need domains, both of which loaded onto the latent global need factor, would provide a better fit for the data than would other models, including a two-level model and a one-level model (hypothesis 3).

**Content validity hypotheses.** The extent to which the PNQ accurately represents all facets of need fulfilment was also examined via hypotheses about the relationship between the various PNQ indices and other scales included in the study.

**Overall need fulfilment.** Given the documented link between unmet needs and poorer mental and physical health (Deci et al., 2001; Ryan, Deci, Grolnick, & La Guardia, 2006; Deci & Ryan, 2008), it was expected that unmet psychological needs, as assessed by the lack of fulfilment index of the PNQ, would be positively correlated to a variety of mental health problems (i.e., depressive symptoms, anxiety, and anger; hypothesis 4a, 4b, 4c) to overall physical symptoms (hypothesis 5), to poor self-esteem (hypothesis 6), to depressive vulnerability characteristics (i.e., dependency and self-criticism; hypothesis 7a, 7b) and to negative life events (hypothesis 8), and would be negatively correlated to relationship satisfaction and social support (hypothesis 9a, 9b).

**PNQ subscales.** The various need subscales were also expected to differentiate themselves with regard to their patterns of correlations with the various indicators of poorer health and well-being. In other words, it is expected that different subscales will correlate significantly with different measures of well-being and mental health (hypothesis 10).

**Importance index.** Given theory suggesting that basic psychological needs are universal and necessary for all human well-being and that need strength is assumed to be normally distributed within a given population (Deci & Ryan, 2002), the extent to which needs were perceived as important, as indicated by the importance index of the PNQ, was expected to be unrelated to the various indicators of poorer psychological and physical health (hypothesis 11).

**Time index.** Consistent with past studies showing that fluctuations in need fulfillment predict fluctuations in well-being (Sheldon, et al., 1996), the new model of needs suggests that the longer needs go unmet, the more likely they are to be associated with psychological and physical symptoms, as well as with lower levels of satisfaction with relationships. Consequently, it was hypothesized that the time index would be significantly positively correlated to a variety of indicators of poorer well-being (hypothesis 12). It was further hypothesized that the duration of the lack of need fulfillment would have predictive utility for depression beyond that afforded by need fulfillment scores (hypothesis 13).

**Need discrepancy.** The new needs model tests whether the relationship between unmet needs and psychological symptoms differs in individuals who perceived the listed needs as unimportant versus highly important to them. Although needs are considered to be universal, it is reasonable to assume that individuals who report that their needs are unmet, while also indicating that such needs are *unimportant* to them, may be less affected by the lack of fulfillment and experience fewer symptoms than individuals who reports that their needs are unmet and that these needs are *highly important* in their lives. Accordingly, it was hypothesized that need importance would moderate the relationship between unmet needs and depressive symptoms, such that in high perceived need importance conditions, the relationship between unmet needs and depressive symptoms would be magnified (hypothesis

14). This hypothesis is consistent with recent findings that indicated that achievement need strength moderated the relationship between competence need fulfilment and subsequent motivation (Schuler et al., 2010).

## Methods

### Participants

Participants included 226 students at the University of Ottawa who were recruited through the School of Psychology's Integrated System of Participation in Research (ISPR), 5 of which were excluded from analyses because of missing data due to not having completed the entire series of questionnaires. To be eligible for the study, participants had to be able to read and answer questions in English.

**Sample size justification.** Although recommendations for item-to response ratios vary greatly, a minimal ratio of 1:4 is suggested (Rummel, 1970). In addition, while a sample size of 150 is considered sufficient for exploratory factor analyses (Guadagnoli & Velicer, 1988), a minimal sample size of 200 is recommended for confirmatory factor analysis (Hoelter, 1983). Therefore, the sample size in the current study is sufficiently large to enable reliable estimations of the correlation matrix (Byrne, 2001).

### Measures

**Demographics information.** Demographic information such as age, gender, and relationship status was gathered from participants. Of the 221 participants included in the analyses (52 males and 169 females), 128 reported being single while 93 reported being in a relationship. The age of participants ranged from 16 to 51 ( $M = 19.98$ ,  $SD = 4.80$ ).

**Psychological Needs.** General need importance, need fulfilment, and the length of time associated with need fulfilment were assessed with the newly developed Psychological Need Questionnaire (PNQ; See Appendix A). Need importance and need fulfilment items

were both scaled on a five-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), with 3 (*neither agree nor disagree*) as a neutral midpoint. Potential scores for the need importance index ranged from 44 to 220 ( $M = 176.77$ ,  $SD = 19.60$ ), with high scores indicating an elevated level of perceived need importance and low score indicating a minimal level of perceived need importance. Potential scores for the need fulfilment index also ranged from 44 to 220 ( $M = 113.43$ ,  $SD = 23.05$ ), with high scores indicating a lack of need fulfilment and low score indicating overall need fulfilment.

The time index items were scaled on five-point Likert-type scale with the following anchors: 1 (*less than 2 week*), 2 (*1 to 3 months*), 3 (*4 to 6 months*), 4 (*7 to 12 months*), and 5 (*more than 1 year*). High score indicate longer periods of time while low scores reflect shorter periods of time. The mean time frame score associated with unmet needs in the current sample was 35.26 ( $SD = 28.84$ ) whereas the mean time frame associated with fulfilled needs was 98.81 ( $SD = 51.53$ ). Preliminary validity and reliability estimates for the PNQ will be discussed in the results section.

**Depression.** Depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R; Santor & Coyne, 1997). The CESD-R, a 20-item short version of the original CES-D (Radloff, 1977) is intended for use in the general population and assesses the frequency with which depressive symptoms including mood, somatic complaints, interpersonal relationships, and motor functioning, were experienced in the last week (see Appendix B). Items are scaled on four-point scale ranging from 1 (*Rarely or None of the Time: less than once a week*) to 4 (*Most or All of the Time: 5-7 days a week*). Possible scores range from 20 to 80 with high scores indicating the presence of more depressive symptoms and of greater impairment.

The CESD-R is a well-established measure that has been used in both adolescent and adult populations and has excellent psychometric properties (Cronbach's  $\alpha = .87$ , Santor & Coyne, 1997). Scores on the CESD-R correlate highly with the Beck Depression Inventory-II ( $R = .85$ , Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995), suggesting suitable concurrent validity of the two scales (See Appendix F). In the current sample, the Cronbach's  $\alpha$  for the scale was .90, indicating good reliability. The mean score was 36.18 ( $SD = 10.69$ ).

**Depressive vulnerability characteristics.** The presence of two depressive vulnerability characteristics, namely dependency and self-criticism, were assessed with the Depressive Experiences Questionnaire- Revised (DEQ-R; Santor, Zuroff, & Fielding, 1997), which is a 48-item version of the original DEQ (Blatt, D'Affitti, & Quinlan, 1976). Items are scaled on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) and higher scores indicate higher levels of self-criticism or dependency. The DEQ-R uses unit-weighted scoring rather than factor scoring (see Appendix C).

The DEQ-R has shown good psychometric properties in both clinical and non-clinical populations (Cronbach's  $\alpha$  from .72 to .78, Santor et al., 1997; Santor & Yazbek, 2006). Furthermore, both dependency and self-criticism have been shown to be highly stable over time, demonstrating excellent test-retest reliability (Zuroff, Moskowitz, Wielgus, Powers, & Franko, 1983). The DEQ-R also offers a more valid estimate of the relations among dependency, self-criticism, and other theoretically relevant constructs, such as depressed mood and agreeableness, than do other existing revisions (Santor et al., 1997). In the current sample, the Cronbach's  $\alpha$  for the scale was .72, indicating adequate reliability. The mean score was 196.23 ( $SD = 21.20$ ).

**Negative life events.** The number of negative life events experienced during the past year was assessed with the Negative Life Events Inventory (NLEI; Wills, McNamara, Vaccaro, & Hirky, 1996). The NLEI consists of a 20-item checklist of negative life events, 11 of which occurred to family members (e.g., "Somebody in my family had a serious illness"), and 9 of which occurred directly to the individual (e.g., "I had a serious accident"). The NLEI is based on previous inventories of adolescent life events (Newcomb & Harlow, 1986; Wills, Vaccaro, McNamara, 1992) and is appropriate for use with young adults in their first year of post-secondary schooling. Items were scored on a dichotomous (*yes-no*) response scale, with higher scores indicating the occurrence of a greater number of negative life events in the past year. Possible scores ranged from 0 to 20 (see appendix D).

Internal consistency estimates of reliability of .67 have been reported for the scale (Wills, 1986). In the current sample, the Cronbach's  $\alpha$  for the scale was .66, with a sample mean of 3.87 ( $SD = 2.62$ ).

**Anxiety.** Anxiety symptoms were assessed with the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986). The ASI is a 16-item self-report measure intended to assess anxiety sensitivity. More specifically, the ASI measures fear of anxiety-related sensations such as rapid heartbeat, shortness of breath, nervousness, and stomach growling. Items are scaled on a five-point likert-type scale ranging from 1 (very little) to 5 (very much), with higher scores being indicative of greater sensitivity to anxiety (see appendix E).

The ASI demonstrates excellent psychometric properties in both clinical and nonclinical samples with internal consistency estimates ranging from  $\alpha = 0.82$  to  $\alpha = 0.91$  (Peterson & Heilbronner, 1987; Peterson & Reiss, 1992). Test-retest reliability was also shown to be high over a 3-year period ( $r = 0.71$ ; Maller & Reiss, 1992). In the current

sample, the Cronbach's  $\alpha$  for the scale was .87, indicating good reliability. The mean score was 33.71 ( $SD = 10.15$ ).

**Anger.** Feelings of anger were assessed with the 30-item State-Trait Anger Scale (STAS; Spielberger, Jacobs, Russell, & Crane, 1983). The STAS is comprised to two parts, one that assesses stable anger (trait anger) and another that assesses anger that is variable over time (state anger). Each part yields a distinct subscale score. Items are scaled on a four-point likert-type scale ranging from 1 (*almost never*) to 4 (*almost always*), with high scores indicating higher levels of anger and frustration.

Both subscales have demonstrated good reliability (Trait Anger Cronbach's  $\alpha = .86$  and State Anger Cronbach's  $\alpha = .93$ ; Spielberger, 1988). Good construct validity of the trait anger subscale has been demonstrated through its moderately high correlations with neuroticism in both men and women ( $R = .49 - .50$ ; Spielberger et al., 1983). Good construct validity of the state anger subscale has also been demonstrated through reliable changes in state anger scores in the expected direction in response to acute behavioural challenges (Kamarck, Manuck, & Jennings, 1990; see appendix F). In the current sample, the Cronbach's  $\alpha$  for the trait subscale scale was .89, and for the state anger subscale was .94, both of which indicate excellent reliability. The mean score for trait anger was 28.25 ( $SD = 7.72$ ) and the mean score for state anger was 22.20 ( $SD = 8.77$ ).

**Self-esteem.** Global self-esteem was assessed with the ten-item Rosenberg Self-Esteem Scale (SES; Rosenberg, 1965). The SES, a unidimensional scale designed to measure self-perceptions of global self-esteem, assesses the extent to which a person is generally satisfied with his/her life, considers him/herself worthy, holds a positive attitude toward him/herself, or, alternatively, feels useless, and desires more respect. Five items are phrased positively whereas the other five items are phrased negatively (see appendix G).

Items are scaled on a three-point Likert scale ranging from 1 (*strongly agree*) to 3 (*strongly disagree*), with 2 (*uncertain / don't know*) as a neutral midpoint. Possible scores range from 10 to 30 and high scores indicate poorer self-esteem.

The SES has demonstrated good reliability and validity across a large number of different samples and has been validated for use with both male and female adolescent, adult, and elderly populations (Rosenberg, 1965). More specifically, Rosenberg's SES has demonstrated reliability Cronbach's  $\alpha$  of .85 and item-total correlations that range between .40 and .70 (Kartal, 1996). The SES also has a test-retest reliability of .82 (Kartal, 1996). In the current sample, the Cronbach's  $\alpha$  for the scale was .85, indicating good reliability. The mean sample score was 15.12 ( $SD = 4.44$ ).

**Relationship satisfaction.** Relationship satisfaction was assessed using the seven-item Relationship Assessment Scale (RAS; Hendrick, 1988). The RAS is brief measure of generic satisfaction for partnered love relationships that is appropriate for use across samples of ethnically diverse and age-diverse couples, as well as for partners seeking marital and family therapy (see appendix H; Hendrick, Dicke, & Hendrick, 1998). Items are scaled on a five-point Likert-type scale with differing anchors for each question. Potential total scores ranged from 7 (low satisfaction) to 35 (high satisfaction).

The RAS has been show to be reliable (Cronbach's  $\alpha$  of .86) and to correlates with relevant relationship measures, such as the Dyadic Adjustment Scale ( $R = .80$ ) (Hendrick, 1988). Good construct validity is further demonstrated by the RAS's ability to reliably discriminate between couples that stay together from couples that brake up (Hendrick, Dicke, & Hendrick, 1998). In the current sample, the Cronbach's  $\alpha$  for the scale was .87, indicating good reliability. The mean sample score was 28.64 ( $SD = 5.64$ ).

**Relationship quality.** Partner relationship quality and adjustment was assessed with the 32-item self-report Dyadic Adjustment Scale (DAS; Spanier, 1976). The DAS asks partners to rate the approximate extent of agreement or disagreement in their relationship in fifteen areas (e.g., confiding in their partner, quarrelling with their partner), how often they do things together, how happy the relationship is, and how they feel about the future of their relationship. Items are scaled differently for each section (see appendix I). High scores indicate a greater level of relationship adjustment and better relationship quality.

This DAS has excellent reliability (Cronbach's  $\alpha$  of .96), and has been used with a wide variety of couples (e.g., married, co-habiting, divorced), indicating good validity (Spanier, 1985). In the current sample, the Cronbach's  $\alpha$  for the scale was .92, indicating great reliability. The mean sample score was 66.41 ( $SD = 15.99$ ).

**Social support.** Social support was assessed with the Social Support Questionnaire-Short Form, Revised (SSQS-R; Sarason, Sarason, Shearin, & Pierce, 1987), which is based on the SSQS (Sarason, Levine, Bashan, & Sarason, 1983). The SSQS-R is composed of six items, each of which has two parts. The first part asks respondents to list up to nine social support network members who perform different support functions, as well as to note the nature of the relationship (e.g., friend, sister, mother, cousin). The second part of each item asks respondents how satisfied they are with the specified support function using a six-point Likert scale ranging from 1 (*very dissatisfied*) and 6 (*very satisfied*). High scores indicate greater satisfaction with one's support network (see appendix J).

Alpha coefficients of internal consistency for the measure have been reported to range from .90 to .93 (Sarason et al., 1987), indicating great reliability. In the current sample, the Cronbach's  $\alpha$  for the scale was .87, indicating good reliability. The mean satisfaction score was 30.53 ( $SD = 6.25$ ).

**Physical symptoms.** Physical symptoms were measured using the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983). The CHIPS consists of a list of 33 common physical symptoms, which were carefully selected so as to exclude symptoms of an obviously psychological nature (e.g., felt nervous or depressed). The scale does, however, include many physical symptoms that have been traditionally viewed as psychosomatic (e.g., headache, weight loss). Each item is rated for how much the problem bothered or distressed the individual during the past two weeks. Items are scaled on a three-point scale with the following anchors: 1 (*not at all*), 2 (*somewhat*), 3 (*quite a bit*). High scores indicate more frequent physical symptoms, greater distress, and poorer functioning (see appendix K).

The scale has been shown to have good internal consistency (Cronbach's  $\alpha = .89$ ) and adequate test-retest reliability (Cohen & Hoberman, 1983). The CHIPS has also been found to predict the use of student health services in the 5-week period following completion of the scale (Cohen & Hoberman, 1983). In the current sample, the Cronbach's  $\alpha$  for the scale was .91, indicating excellent reliability. The sample mean was 56.50 ( $SD = 11.85$ ).

## **Procedures**

Participants used the ISPR system to search for the study, to read its description, and to sign up to participate. When an individual displayed interest in participating in the study, they were provided with a link to the [isurvey.com](http://isurvey.com) website, a secure website that acted as the third party administering the survey to the participant. When the participant logged onto this secure website, they were provided with a unique identification number and access code and were then presented with the consent form. If they agreed to participate, they were presented with the series of online questionnaires, which they could choose to complete all at once or in several sessions. Each participant completed a variety of online questionnaires assessing

needs, psychological and physical symptoms, social support, relationship satisfaction and quality, life events, and personality characteristics.

**Online surveys.** Although web studies can have methodological problems, such as higher rates of drop out and repeated participation, research has demonstrated that valid and reliable data can be collected online (Preckel & Thiemann, 2003). In fact, Internet surveys, as compared to paper-based methods, have been linked to lowered social anxiety and reduced social desirability, particularly when participants remain anonymous (Joinson, 1999). Internet studies are also cost-effective and allow for rapid recruitment of large samples as well as the standardization of procedures. Consequently, an online methodology was considered appropriate for the given study.

## Results

### Item Selection and Reduction

Data from the PNQ allows information about psychological needs to be extracted from three different need indices (i.e., Importance Index, Fulfilment Index, and Time Index). The Importance Index was used in all factor analyses to examine the structure of psychological needs and to select the items to remain on the PNQ.

**Descriptive analyses.** Item completeness and item distribution were examined for the Importance Index of the PNQ. The number of missing values was low, ranging from 0.5% to 1.4% and was considered to be completely random (Little's MCAR test: chi-Square = 122.46,  $df = 109$ ,  $p = .18$ ; Tabachnick & Fidell, 2007). Table 3 shows the statistics (mean, standard deviation, skewness, and kurtosis) of the PNQ items. Possible scores for each item ranged from 1, (low need importance) to 5 (high need importance). The means of all items ranged from 2.90 to 4.58 and all standard deviations exceeded 0.64, indicating adequate variability (Strumpf, Colarelli, & Hartman, 1983). The global mean of all item means was

4.03 ( $SD = .86$ ), indicating that overall, participants perceived the listed needs as important to them. Skewness values ranged from  $-1.57$  to  $.35$ , indicating deviation from the normal curve, as suggested by Tabachnick and Fidell (2007). In addition, kurtosis values showed that for many items, there was a tendency for more of the values to be located in the tails of the distribution rather than around the mean.

**Exploratory factor analyses.** The dimensionality of the 44 items of the Importance Index on the PNQ were analyzed in PASW 18 using principle axis factoring (PAF), which is recommended if the assumption of multivariate normality is violated (Fabrigar, Wegener, MacCallum, & Strahan, 1999). In PAF, the most widely used method in factor analysis, the analysis focuses on accounting for the shared variance in the variables through the least number of factors, rather than on sources of error that are unique to each variables in an effort to represent all of the variance in the variables through a small set of components, as is the case in principle components analysis (Tabachnick & Fidell, 2007). Three criteria were used to determine the number of factors to rotate: the a priori hypothesis that the measure was multidimensional, the scree test, and the interpretability of the factor solution. The scree plot indicated that our initial hypothesis of multidimensionality was correct. Based on the plot, 11 factors were rotated using a Varimax rotation. Table 4 outlines the eigenvalues for the 11 factors, which accounted for a total of 51.40% of the item variance. The rotated solution, as shown in Table 5, yielded 11 factors, 9 of which were clearly interpretable, namely Relatedness, Competence, Belongingness, Physical Intimacy, Status, Agency, Stability, Fairness, and Independence. The other two factors (9 and 10) were composed of items that did not load significantly on the factor, appeared theoretically unrelated, and were difficult to interpret. As we aimed to reduce the total number of items, we deleted these items

and excluded these two factors. The present data thus provide evidence for the existence of nine distinct basic human psychological needs.

**Item reduction technique.** Given that parsimony and simple structure are desired for the scale (Hinkin, 1998), items that loaded on multiple factors were deleted and the ones retained were those that clearly loaded on a single appropriate factor. In addition to the .40 criterion level (Ford, MacCallum, & Tait, 1986), changes in the total item variance explained as well as theory were used to identify the items that most clearly represented the content domain of the underlying construct. Hinkin (1998) suggests that scales should not only have the simplest possible factor constitution, but also, should be composed of the minimum number of items that adequately tap into the domain of interest. Following from this reasoning and with the goal of creating an efficient and brief scale, the three items that loaded most heavily on each factor were retained to create the final version of the PNQ. Exceptions included the Fairness and Independence subscales, which only had two meaningful items with significant factor loadings to retain. The resulting short version of the PNQ included 25 items.

After having deleted the inappropriately loading items and before conducting confirmatory factor analyses on the remaining 25 items, the exploratory factor analyses were repeated to examine whether a clear factor structure matrix that explained a significant amount of item variance was obtained, as is recommended by Hinkin (1998). Based on the scree plot, 7 factors accounting for 49.43% of the variance were rotated using Varimax rotation procedures. The identified factors clearly included the need for competence, physical intimacy, relatedness, belongingness, status, and fairness. All items had a minimum pattern loading of .52 on their expected factor. However, the need for agency and stability appeared to have been combined to form a single factor and the need for independence was

not represented by a factor, perhaps because of the inadequate number of items representing these domains.

**Internal consistency estimates of reliability.** Internal consistency estimate of reliability using Cronbach's alpha (Price & Mueller, 1986) were calculated for both versions of the PNQ. The coefficient alpha for the 44-item version was .93, indicating excellent reliability (DeVellis, 1991). However, such a high coefficient may be an indication of item redundancy (DeVellis, 1991).

The coefficient alpha for the 25-item version of the PNQ was .87, indicating very good reliability (DeVellis, 1991). The full and short versions of the PNQ also correlated significantly at a .97 level ( $p < .000$ ), providing further support for shortening the scale.

**Domain Reliabilities.** The internal consistency estimates (Cronbach's alphas) for the need domains of the 25-item scale were .74 (relationship domain) and .86 (self-worth domain).

**Subscale Reliabilities.** The internal consistency estimates (Cronbach's alphas) for the different subscales of the 25-item scale were: .80 (competence), .73 (agency), .73 (stability), .63 (fairness), .47 (independence), .72 (relatedness), .70 (belongingness), .77 (physical intimacy), and .68 (status). Although the values for the 2-item subscales (i.e., fairness and independence) were not high, providing an indication that these subscales are not adequately represented by their 2 items and that more items should be written to capture the content of these subscales, the values for the other subscales suggest that the sampling domains have been captured adequately with three items.

### **Confirmatory Factor Analysis**

A confirmatory factor analysis (CFA) was conducted using maximum-likelihood estimation in AMOS 18 (Arbuckle, 2007) to further examine the factor structure of the PNQ

and to test the discriminant validity of the different subscales. The purpose of the CFA was twofold. First, the goodness of fit of the hypothesized multitrait model was assessed and compared to two other models with more simple structures. Second, the fit of individual items within the specified model was examined using modification indices and  $t$  values.

**Assumptions.** Expectation Maximization procedures were used to estimate missing data points on the Importance Index to allow for the production of modification indices via CFA in AMOS. Mardia's coefficient, an indicator of multivariate normality based on functions of skewness and kurtosis, was 150.95 in the current sample, indicating severe noncompliance with the assumption of multivariate normality. Twenty-two multivariate outliers were identified through their Mahalanobis distance ( $\chi^2$  critical ratio = 52.62,  $df= 25$ ,  $p = .001$ ), representing 9.9% of the sample. However, the deletion of such a large proportion of the sample was considered unacceptable. Rather, with the goal of deleting only the most extreme outliers with significant contributing to the sample's multivariate kurtosis, as suggested by Gao, Mokhtarian, and Johnston (2008), a stepwise approach to the deletion of outliers was taken to examine the extent to which Mardia's coefficient would decrease with each deletion. The deletion of 12 outliers allowed for the reduction of Mardia's coefficient to 91.00 and for more acceptable values of skewness and kurtosis for the PNQ items (Muthéan and Kaplan, 1985). After the deletion of the top 12 outliers, the absolute skewness and kurtosis values of most items fell below 1, with a maximum skewness value of 1.4, and only two kurtosis values that were above 2.

In the context of CFA, nonnormality can lead to under or over-estimations of the standard errors of the parameter estimates, and inflated or deflated  $t$ -statistics, potentially leading to erroneous attribution of significance to specific relationships in the model (Gao, Mokhtarian, & Johnston, 2008). Therefore, to estimate the level of bias, we conducted a

standard bootstrapping procedure with a resampling of 1000 samples, which allowed for the comparison of values estimated without the bootstrapping procedure with those estimated in the bootstrap. In order to reject the null hypothesis that the factor loadings are equal to zero in the population, the confidence intervals cannot include zero (Byrne, 2001). Results of the bootstrapping (see Table 6) indicated that the standard errors of the factor loadings ranged from .00 to .73, and were similar to those obtained in the original sample. Furthermore, the level of bias was low and the adjusted confidence intervals did not include the value zero, indicating that the estimated parameters can be assumed to be different from zero in the population. For the purpose of model identification, some parameters were constrained to a value of 1. *P*-values for the bias-corrected confidence intervals of such parameters were replaced with dots (...).

Three models were assessed for goodness of fit: a single common factor model in which all items loaded onto the global need latent factor (Model A), a two-level factor model in which items loaded onto their respective need domain, which in turn both loaded onto the global need latent factor (Model B), and the hypothesized three-level model of needs in which items loaded onto their respective need subscales, which in turn loaded onto their respective need domain, both of which loaded onto the global need latent factor (Model C). Figure 1 displays Model A and B whereas figure 2 depicts the hypothesized model (Model C). As suggested by Hu and Bentler (1999), model fit was evaluated using three indices: the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residuals (SRMR). Excellent fit is indicated by CFI values above .95, RMSEA values below .05, and SRMR values below .09, whereas good fit is indicated by CFI values above .90, RMSEA values below .08, and SRMR values below .10 (Byrne, 2001; Hu & Bentler, 1999).

Given the nonnormality of sample, which leads to an overestimation of the chi-squared statistic and potentially to false rejection of the model as a whole (Bryne, 2001; Muthén & Kaplan, 1985), interpretation of the chi-statistic must be conducted with care. Although a nonsignificant chi-square is desirable (Hinkin, 1998), it has been suggested that a chi-square two or three times as large as the degrees of freedom is acceptable (Carmines & McIver, 1981).

Global indices of fit (Table 7) indicated that model A and model B fit the data poorly (see Table 5). However, indices of fit indicate that the initial three-level model (model C) fit the data very well ( $\chi^2 = 420.65$ ,  $p > .000$ ,  $df = 265$ , CFI = .90, RMSEA = .05, SRMR = .07). However, possible cross-loadings of items onto other factors, as indicated by modification indices, were examined in the interest of completeness. Although the reported modification did not suggest that any of the items loaded significantly on factors other the expected ones, indices did suggest that a set of error terms for items within the belongingness domain, as well as a couple of error terms for subscales within each domain should be correlated to improve goodness of fit for the model. After making such changes, global indices of fit indicated that the final three-level model provides an even better fit for the data ( $\chi^2 = 366.90$ ,  $p > .000$ ,  $df = 257$ , CFI = .93, RMSEA = .05, SRMR = .06). Significant differences in  $\chi^2$ -values indicated that the modified model yielded a significantly superior fit compared to the unmodified model ( $p < .001$ ).

Also supporting the fit of the hypothesized three-level model of needs were the significant ( $p < .001$ ) loadings for all items on their intended latent factors (Table 6). There was no evidence of significant cross-loadings of items on other factors, providing factorial validity for the subscales of the PNQ (Hinkin, 1998). Furthermore, the standardized factor loadings between the subscales and their respective need domains ranged from .41 to .84,

which provides further evidence for the scale's internal structure (see Table 8). The present data thus provides factorial validity for the three-level structure of the PNQ, which suggests that the latent construct of psychological needs can be structured and organized into two broad categories, namely self-worth and relationship oriented types of need, which can also be further broken down into smaller need constructs, each of which represents a basic human psychological need.

### **Construct Validity of Model**

In addition to testing the factorial validity of the new needs model, we also assessed the construct validity of the PNQ by examining the patterns of correlations between the different indices and a variety of measures of well-being. Correlations displayed in Table 9 indicate that the fulfilment and duration indices of the PNQ are significantly related to scores on several measures of well-being.

As hypothesized, the extent to which a need is recognized as important (i.e., Importance Index) was not significantly related to the measure of physical symptoms and to most measures of psychological symptoms. A significant positive correlation was found however, between need importance and anxiety levels, indicating that individuals who report that several needs are very important to them also tend to endorse more symptoms of anxiety. Similarly, a positive correlation between need importance and dependency levels was found, indicating that individuals who identify many needs as very important to them tend to be more dependent.

Furthermore, as expected, the fulfilment index was positively correlated to measures of mental and physical symptoms and negatively related to social support and relationship satisfaction, suggesting that individuals who do not have their needs met also tend to endorse higher levels of anxiety, depression, and anger, are more likely to be dependent on others and

critical of themselves, have poorer self-esteem, have experienced a higher number of negative life events in the past year, report lower relationship quality, and are less likely to be satisfied with their level of social support and with their romantic relationship.

Consistent with model hypotheses, the time index was also correlated with a variety of indicators of poor well-being, suggesting that the longer needs go unmet, the more likely they are to be associated with psychological symptoms, physical complaints, and lower levels of relationship satisfaction.

Given the established factorial validity for the PNQ and its subscales, content validity was further assessed by examining the patterns of correlations between the need subscales and various measures of well-being, mental and physical health. Table 10 displays the coefficients for the need subscales that fall within the self-worth domain while Table 11 displays the coefficients for the subscales that fall within the relationship domain.

As the model would predict, the correlations provide preliminary evidence that the need subscales differentiate themselves in their patterns of correlations with the various indicators of poorer health and well-being. Whereas the lack of fulfilment of some needs (e.g., competence, stability, relatedness, belongingness) is significantly related to all types of negative outcomes, other needs, when unmet, are associated with a specific meaningful pattern of outcomes.

For example, the pattern of correlations suggests that the lack of fulfilment of the need for agency and fairness is not significantly related to levels of dependency or to relationship satisfaction. In addition, an unmet need for independence appears to be significantly related to many psychological and physical symptoms but does not appear to be related to levels of anxiety or to measures of relationships quality or satisfaction. Similarly, having an unmet need for intimacy is not significantly associated with negative life events,

with dependency levels, or with physical symptoms. However, the interpretation of these correlations must be performed cautiously, particularly for the subscales with lower internal consistency reliability coefficients.

### **Need Discrepancy**

Need discrepancy involved the examination of whether need importance affected the relationship between need fulfilment and well-being to determine whether individuals who report that their needs are *unimportant* to them experience fewer negative symptoms associated with unfulfilled needs than do individuals who report that their needs *highly important*. Accordingly, hierarchical regression was employed to determine whether need importance moderated the relationship between need fulfilment and depression. Analyses were performed using SPSS REGRESSION and SPSS EXPLORE for evaluation of assumptions. The number of missing values was low, ranging from 0% to 1.4%. With the use of a  $p < .001$  criterion for Mahalanobis distance, no univariate or multivariate outliers were identified. Although some variables (i.e., depression, need importance) were slightly positively skewed, all other skewness and kurtosis values were acceptable, indicating similarity to the normal curve (Tabachnick & Fidell, 2007). Tabachnick and Fidell (2007) suggest that in samples of 200 or more, substantive skewness does not make a substantial difference in the analyses. Therefore, transformations were not performed, which also allowed for more meaningful interpretation of the results.

Furthermore, although many researchers (e.g., Aiken & West, 1991) recommend centering continuous independent variables as a solution to the problems encountered in moderated regression, others have indicated that the tests for difference in  $R^2$  in both additive and nonadditive models are not affected by centering (Cohen, 1978; Cronbach, 1987; Kromrey & Foster-Johnson, 1998) and that interpretation of the regression weights is

unchanged with centered data if it is conducted properly (Kromrey & Foster-Johnson, 1998; Mossholder, Kemery, & Bedeian, 1990). Accordingly, the continuous independent variables were not centred.

Table 12 displays the total r-squared value ( $R^2$ ), the change r-squared values ( $\Delta R^2$ ), the unstandardized regression coefficients ( $B$ ) along with their standard errors ( $SE B$ ), and the standardized regression coefficients ( $\beta$ ) after entry of both IVs as well as their interaction term.  $R$  was not significantly different from zero after the first step, but was significantly different from zero after the other steps. After step 3,  $R^2 = .39$ ,  $F(3, 214) = 44.74$ ,  $p < .001$ . The adjusted  $R^2$  of .38 indicates that 38% of the variability in depressive symptoms is predicted by the two IVs and their interaction.

After step 1, with need importance in the equation,  $R^2 = .00$ ,  $F_{inc}(1, 216) = .39$ ,  $p > .05$ , indicating that need importance does not significantly predict depression scores. After step 2, with need fulfilment added to the prediction of depression,  $R^2 = .38$ ,  $F_{inc}(1, 215) = 132.56$ ,  $p < .001$ , indicating that the addition of need fulfilment to the equation resulted in a significant increment in  $R^2$ . After step 3, with the interaction term added to the prediction of depression,  $R^2 = .39$ ,  $F_{inc}(1, 214) = 1.03$ ,  $p > .05$ . The addition of the interaction term did not reliably improve  $R^2$ , indicating that moderation is not taking place.

This pattern of results suggests that need importance does not account for a significant portion of the variability in depressive symptoms but that need fulfilment, when added to the equation, accounts for 38% of the variance in depressive symptoms. Furthermore, the non-significant interaction term indicated that, contrary to hypotheses, need importance did not affect the relationship between need fulfilment and depressive symptoms.

In the interest of completeness, the hierarchical regression analysis was repeated with the order of entry for the two predictors reversed. As in the first regression analysis, the

addition of need importance and the interaction between need importance and fulfilment to the equation did not result in a significant increment in  $R^2$  (see lower part of Table 9).

### **Duration of Lack of Fulfilment**

The time index involved the examination of whether the duration associated with the lack of need fulfilment affected the relationship between need fulfilment and well-being. Accordingly, hierarchical regression was employed to determine whether the duration of unmet needs moderated the relationship between need fulfilment and depression.

Table 13 displays the total r-squared value ( $R^2$ ), the change r-squared values ( $\Delta R^2$ ), the unstandardized regression coefficients ( $B$ ) along with their standard errors ( $SE B$ ), and the standardized regression coefficients ( $\beta$ ) after entry of both IVs as well as their interaction term.  $R$  was significantly different from zero after each step. After step 3,  $R^2 = .40$ ,  $F(3, 202) = 45.42$ ,  $p < .001$ . The adjusted  $R^2$  of .39 indicates that 39% of the variability in depressive symptoms is predicted by the two IVs and their interaction.

After step 1, with need fulfilment in the equation,  $R^2 = .37$ ,  $F_{inc}(1, 204) = 120.92$ ,  $p < .000$ , indicating that need fulfilment significantly predicted depression scores. After step 2, with duration of the lack of fulfilment added to the prediction of depression,  $R^2 = .40$ ,  $F_{inc}(1, 203) = 8.517$ ,  $p = .004$ , indicating that the addition of the duration of the lack of fulfilment to the equation resulted in a significant increment in  $R^2$ . In other words, the duration of time associated with the lack of need fulfilment significantly predicted depression scores even after having controlled for the effects of need fulfilment. After step 3, with the interaction term added to the prediction of depression,  $R^2 = .40$ ,  $F_{inc}(1, 202) = 1.82$ ,  $p = .178$ . The addition of the interaction term did not reliably improve  $R^2$ , indicating that moderation is not taking place.

This pattern of results suggested that although need fulfilment accounted for 37% of the variability in depressive symptoms, the time frame associated with the unmet need added significantly to the equation by accounting for another 3% of the variance in depressive symptoms, beyond that afforded by need fulfilment. The non-significant interaction term however, indicated that contrary to hypotheses, the duration of the unmet need did not affect the relationship between need fulfilment and depressive symptoms.

In the interest of completeness, the hierarchical regression analysis was repeated with the order of entry for the two predictors reversed (see lower part of Table 10). As in the first regression analysis,  $R$  was significantly different from zero after each step. After step 1, with duration in the equation,  $R^2 = .30$ ,  $F_{inc}(1, 204) = 87.71$ ,  $p < .000$ , indicating that the time frame associated with unmet needs significantly predicted depression scores. After step 2, with need fulfilment added to the prediction of depression,  $R^2 = .40$ ,  $F_{inc}(1, 203) = 32.59$ ,  $p < .000$ , indicating that the addition of need fulfilment to the equation resulted in a significant increment in  $R^2$ . In other words, need fulfilment significantly predicted depression scores even after having controlled for the effects of the duration of the lack of fulfilment. As in the first regression, the interaction between duration and need fulfilment did not result in a significant increment in  $R^2$ ,  $R^2 = .40$ ,  $F_{inc}(1, 202) = 1.82$ ,  $p = .178$ , indicating that moderation is not taking place.

Taken together, the results of these two hierarchical regressions indicate that both lack of need fulfilment and the time frame associated with lack of fulfilment significantly predict depressive symptoms and account for a unique proportion of the variability in depressive symptoms. Although neither variable adequately captures all of the variance accounted for by the other, need fulfilment appears to be capturing a larger proportion of the variance in depressive symptoms.

## Discussion

The goal of the present study was to create a measure of general psychological needs, which accounted for the limitations in many of the currently available measures. The development and initial validation of the PNQ, a self-report instrument with a three-level confirmatory structure designed to assess psychological need importance, lack of fulfilment, and duration of fulfilment, have been described here. In summary, the results of this study supported several psychometric qualities of the scale, including its factorial composition, internal consistency, construct validity, and predictive utility. However, given the low internal consistency estimates of the fairness and independence subscales, additional items should be written to better capture the content of the subscales.

### Need Structure and Organization

The results of the CFA supported the hypothesized three-level structure of the PNQ. In addition to all items loading onto their intended subscales, each subscale loaded significantly onto its intended need domain, with no evidence of cross-loadings, providing excellent support for the scale's internal structure and factorial validity. These results are consistent with Bakan's (1966) division of agency and communion and suggest there are two general types of psychological needs, namely self-worth types of needs (i.e., agentic needs) and relationship types of needs (i.e., communion needs). Furthermore, contrary to the accepted notion within Self-Determination Theory (SDT) that there are only *three* basic needs (Deci & Ryan, 2000), results of the current study demonstrated that within each of the two broad need domains, *several* distinct needs, which are important to both optimal mental and physical health, can be clearly identified.

Although the validity and psychometric qualities of subscales composed of a small number of items are often poorer than those composed of a higher number of items (Hinkin,

1998), the results of the present study indicated that the need construct was captured adequately with three-item subscales. This has important implications for the usability of the scale, both in research and clinical contexts. In particular, the brevity of the scale is likely to minimize response biases caused by boredom or fatigue (Schmitt & Stults, 1985; Schriesheim & Eisenbach, 1990).

The internal consistency estimates for the scale also indicated that the PNQ has good reliability, thus provide psychometric support for the use of the PNQ's total scores, as well as its domain and subscale scores. These results demonstrated that the PNQ could be used as a global scale of need fulfilment, or as a measure of need fulfilment within a specific domain or with respect to on specific need.

### **Construct Validity of the PNQ**

Support for the construct validity of the PNQ came from concurrent and discriminant validity correlations. Consistent with the research hypotheses and with the literature on the impact of unmet needs (Assor, Alfi, Kaplan, Roth, & Katz, 2000; Cicchetti, 1991; Crocker, Karpinski, Quinn & Chase, 2003; Crocker & Knight 2005; Deci & Ryan, 2002), the results suggested that individuals with lower levels of need fulfilment also endorsed higher levels of anxiety, depression, and anger, were more likely to be dependent on others and critical of themselves, to have poorer self-esteem, to have experienced a higher number of negative life events in the past year, to report lower relationship quality, and to be less likely to be satisfied with their level of social support and with their romantic relationship.

In addition, as predicted by the needs model, the duration of the lack of fulfilment was associated with various outcome variables, such that longer periods of unmet needs were significantly related to poorer mental and physical health. On the other hand, need importance did not predict scores on measures of well-being and mental health, which is not

surprising given SDT's conceptualization of psychological needs as universal (Deci & Ryan, 2000).

The current study also examined the relative contribution of each need (i.e., each subscale) in the prediction of each of the various outcomes. As expected, the subscales yielded different relations with particular outcomes, in that some needs were associated with all indicators of poorer well-being and psychological symptoms, while others were associated with only some symptoms and measures of poorer well-being. For example, while unmet needs for competence, stability, relatedness, and belongingness were linked to all the indicators of negative outcomes, unmet needs for fairness and physical intimacy were significantly associated to only some of the measures of well-being and mental health. Nevertheless, replication is needed to better understand the relationship between the various need subscales and the different outcome measures.

### **Moderation of Need Importance**

Contrary to hypotheses, need importance did not moderate the relationship between need fulfilment and depressive symptoms, indicating that whether or not individuals perceive psychological needs as personally important in their lives, basic unfulfilled needs are associated with depression. In other words, the extent to which individuals recognize psychological needs as essential or useful to them is irrelevant in the prediction of outcomes associated with such unmet needs. These results are in accordance with SDT's claim that individual differences in need strength are to be expected, but that they are regulatory in nature and, therefore, relatively unimportant (Deci & Ryan, 2000). SDT maintains that the effects of need fulfilment versus need thwarting on future functioning and motivational outcomes are of more importance (Deci & Ryan, 2000).

**Duration of Lack of Fulfilment**

The new model of needs suggests that the longer needs go unmet, the more likely they are to be associated with negative outcomes such as psychological and physical symptoms. Results of the current study indicated that, as expected, the duration of the lack of fulfilment significantly predicted symptoms of depression, even after accounting for the predictive utility of need fulfilment. Nevertheless, need fulfilment appeared to be capturing a larger proportion of the variance in depressive symptoms than was the time frame associated with the unmet needs.

**Implications, Research Limitations, and Future Directions**

The findings of the current study have important theoretical implications for psychological needs. This study identified nine basic human needs, which are important for optimal well-being, as well as psychological and physical health. Future studies should aim to replicate the existence and importance of these nine needs, with the hope that this list of needs can be agreed on in the literature and unify the field of needs in the same way that the ‘Big Five’ personality dimensions have unified the field of personality psychology. The study findings also propose an organizing need structure, whereby needs fit a three-level confirmatory model. Future studies should aim to replicate this need structure in various samples.

The current findings also have significant implications for the measurement of need fulfilment, not only at a general level, but also within the two broad need domains and with respect to each distinct basic need. The PNQ has demonstrated excellent preliminary validity and reliability. Future studies should aim to replicate its psychometric properties so that it can be used in research as well as in clinical settings.

However, the present research contains some limitations. First, a sample of convenience composed of first-year university students was utilized in the study. Replication in more representative samples is required to generalize findings and increase interpretability of the results. Future studies should consist of both cross-sectional and longitudinal samples in community settings as well as in health clinics. The use of such samples is imperative because individuals in these settings are likely to be experiencing both physical and psychological symptoms, allowing for a broader and more ecologically valid analysis of the effects of unmet psychological needs on physical and mental health.

Secondly, the measures employed in the current sample relied on individuals to self-report on their mental and physical health as well as on their level of need fulfilment. Although the study was completed online, which has been linked to lower levels of social desirability (Joinson, 1999), the current study did not include a measure of impression management. Future studies should examine potential method effects, such as response bias and impression management. It might also be useful to compare self-ratings of need fulfilment and well-being to partner-ratings (or ratings from another individual that is close to the participant) of the same variables to assess the extent to which self- and other-ratings differ from one another.

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Table 2

*Study 1 Research Hypotheses and Confirmation Status*

#	Description	Confirmed	
		Yes	No
1	Items will form various subscales	√	
2	Subscales will form 2 domains (self-worth, relationship)	√	
3	Three-level confirmatory factor model will fit data best	√	
4	PNQ + correlated with depression, anxiety, anger	√	
5	PNQ + correlated with physical symptoms	√	
6	PNQ + correlated with poor self-esteem	√	
7	PNQ + correlated with dependency and self-criticism	√	
8	PNQ + correlated with negative life events	√	
9	PNQ - correlated to relationship satisfaction and social support	√	
10	Different subscales will correlate with different measures	√	
11	Importance will be unrelated to symptoms	√	
12	Time + correlated to indicators of poorer well-being	√	
13	Time predicted depression after controlling for fulfilment	√	
14	Importance moderated relation between fulfilment and depression		√

*Note.* ‘+’ indicates a hypothesized positive correlation and ‘-’ indicates a hypothesized negative correlation.

Table 3

*Descriptive Statistics of the PNQ Importance Index Items*

Items	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
1	4.29	.81	-1.24	2.15
2	4.01	.87	-.70	.37
3	3.98	.88	-.74	.39
4	4.15	.82	-.95	1.20
5	3.86	.84	-.89	.94
6	4.14	.85	-.86	.45
7	4.26	.74	-.87	.73
8	4.29	.75	-1.06	1.56
9	3.38	1.15	-.24	-.81
10	3.95	.88	-.73	.20
11	3.78	.90	-.70	.18
12	4.41	.70	-1.57	4.59
13	3.40	.99	-.30	-.71
14	4.52	.65	-1.14	.59
15	4.58	.64	-1.46	1.85
16	3.89	1.01	-.95	.49
17	3.77	.95	-.70	.17
18	3.79	.96	-1.04	.96
19	4.13	.85	-.79	.05
20	4.09	.80	-.92	1.42
21	4.24	.78	-1.21	2.40
22	4.07	.87	-.80	.31
23	4.30	.81	-1.34	2.32
24	3.94	.91	-.45	-.68
25	4.41	.66	-.88	.51
26	4.40	.76	-1.40	1.94
27	4.27	.79	-1.24	2.22
28	4.13	.80	-.84	.85
29	4.31	.84	-1.35	1.77
30	2.90	1.13	.35	-.75
31	3.38	1.00	-.32	-.38
32	3.96	.89	-.87	.81
33	3.11	1.08	-.07	-.69
34	3.07	.96	-.08	-.21
35	4.10	.80	-.83	.60
36	4.33	.79	-1.11	.84
37	4.38	.72	-1.24	2.35
38	4.16	.87	-1.16	1.59
39	4.15	.93	-1.16	1.09
40	4.29	.83	-1.22	1.36
41	4.15	.91	-1.26	1.66
42	3.96	.95	-.86	.11
43	4.24	.83	-1.06	.97
44	4.26	.80	-1.42	3.12

Note:  $N = 221$ . *SE* of skewness = .16; *SE* of kurtosis = .33.

Table 4

*Eigenvalues and Variance Explained*

Factor	Initial Eigenvalues		Rotation Sums of Squared Loadings	
	Total	% variance	Total	% variance
1	11.41	25.93	3.73	8.48
2	2.93	6.66	3.21	7.30
3	2.64	6.00	3.01	6.84
4	1.95	4.42	2.33	5.29
5	1.75	3.98	2.12	4.82
6	1.37	3.12	1.83	4.16
7	1.31	2.97	1.70	3.87
8	1.22	2.77	1.50	3.40
9	1.14	2.60	1.16	2.63
10	1.13	2.56	1.04	2.37
11	1.05	2.38	.99	2.24

*Note.* Total variance explained was 51.40%

Table 5

*Factor Loadings for Exploratory Factor Analysis with Varimax Rotation of the PNQ*

Item: <i>I need....</i>	Factor										
	1	2	3	4	5	6	7	8	9	10	11
57. Others will love me and be there in a tough situation	<b>.66</b>	.13	.14	.11	.05	.04	.10	.10	.10	.13	.10
29. People to support me and be on my side	<b>.63</b>	.00	-.01	.22	.10	.09	.14	.09	.12	-.02	-.01
61. To have others I can trust	<b>.62</b>	.17	.13	.17	-.04	.18	-.03	.15	.03	-.06	.08
25. To feel safe with others	<b>.51</b>	.12	.17	.13	-.01	.05	.13	.03	.07	.05	.09
77. To be loved by others	<b>.47</b>	.14	.40*	.11	.14	-.02	.01	.10	.16	.35	-.06
65. To have others who can reassure me that things will be ok	<b>.46</b>	.22	.19	-.12	.11	-.02	.16	.24	.04	-.09	-.32
41. To be appreciated by others	<b>.46</b>	.35	.28	.05	.15	.11	.08	.04	.12	.24	-.01
49. To be respected by others	<b>.44</b>	.27	.18	.05	.01	.20	-.03	.12	.06	-.01	.07
9. To feel successful	.22	<b>.67</b>	.11	-.00	.10	.25	.15	.22	.06	.00	-.02
17. To feel intelligent	.19	<b>.67</b>	.20	.16	.05	.15	.07	-.01	-.04	.21	.17
13. To feel accomplished	.19	<b>.65</b>	.05	.06	.16	.25	.11	.17	.04	-.14	.03
1. To feel competent	.11	<b>.41</b>	.22	.09	.06	.06	.13	.23	.03	.15	.04
73. To be liked by others	.15	.01	<b>.73</b>	.06	.14	.09	-.01	.09	-.03	.05	.04
45. To feel that I fit in	.10	.11	<b>.60</b>	.04	.14	.04	.11	.03	.17	-.15	.14
81. To feel that I am important to others	.33	.34	<b>.54</b>	.16	.15	-.03	.10	.08	-.04	.29	.03
29. To feel important	.24	.37	<b>.53</b>	.05	.22	.13	.12	.10	.13	.11	-.03
69. To be needed by others	.32	.24	<b>.50</b>	.18	.21	.03	.11	.05	.08	.16	-.07
9. To feel turned on by my partner	.15	.01	.09	<b>.77</b>	.04	-.01	-.01	-.04	.06	.01	.14
13. To feel that my partner is turned on by me	.19	.03	.08	<b>.68</b>	.00	-.02	.01	-.04	-.04	-.05	.10
5. To be physically close and connected to my partner	.09	.10	.01	<b>.62</b>	-.01	-.03	-.03	-.01	.13	.07	.00
1. To be emotionally close and connected to my partner	.02	.12	.24	<b>.52</b>	.04	.15	.10	.24	.15	.34	-.15
37. Others to follow my advice	.01	-.02	.11	-.06	<b>.70</b>	.04	.02	.03	.02	.05	.06
33. Others to ask my opinion	.15	.11	.18	.10	<b>.65</b>	.05	.02	.10	.03	.01	-.09
21. To be number one	-.11	.35	.08	-.06	<b>.54</b>	-.00	.09	.03	.17	-.01	-.05
25. To be admired by others	.17	.27	.39	.10	<b>.42</b>	.11	.01	.08	.11	.05	-.04
61. To feel that I am working towards a goal	.11	.28	.08	-.05	.01	<b>.76</b>	.19	-.05	.09	-.05	.06
57. To have a clear sense of where I am going	.14	.19	.12	.02	.08	<b>.52</b>	.29	.17	-.03	.06	-.04
73. To feel that my life has a purpose	.21	.21	-.00	-.00	.13	<b>.52</b>	.10	.31	.14	.28	.12

65. To have stability in my life	.09	.16	.18	-.10	-.01	.30	<b>.66</b>	.02	.20	.11	.01
93. To have stability and consistency in my relationships	.34	.10	.08	.04	.09	.11	<b>.64</b>	.13	.08	.05	-.04
69. To feel that I have control over what happens to me	.05	.27	.07	.09	.21	.24	<b>.49</b>	.26	.02	-.06	.17
89. To feel that I have as many opportunities as others	.12	.29	.29	-.10	.09	.08	.11	<b>.61</b>	-.05	.00	.17
85. To feel that I am treated fairly by others	.24	.16	.04	.03	.03	.11	.12	<b>.48</b>	.10	.12	.06
21. My partner to make me feel special and cherished	.17	.03	.10	.39	.09	.07	.12	.17	<b>.60</b>	-.06	-.11
17. To be committed to others	.28	-.04	.13	.09	.05	.08	.05	-.10	<b>.50</b>	.12	.09
Int41. To be self-sufficient	.30	.10	.02	.16	-.10	.03	.02	.23	-.03	-.05	<b>.50</b>
49. To be independent	.06	.25	.28	.16	-.00	.11	.09	.16	.13	.15	.39
33. To be the most important person in someone else's life	.17	.17	.31	.14	.27	-.04	.16	.06	.31	.05	-.19
37. To have others who participate in my day to day life	.39	.05	.17	.03	.19	-.01	.16	-.08	.19	.05	.10
53. To belong to a group	.26	-.11	.34	.06	.43	.04	.22	-.13	-.06	-.04	-.01
97. The consequences of my actions to be logical/predictable	.14	.19	-.05	-.04	.08	.06	.20	.20	.28	-.04	.11
5. To feel confident	.21	.40*	.18	.23	.04	.21	.14	.15	-.01	.32	.10
45. To feel that my life is meaningful	.27	.34	.12	.11	-.07	.30	.13	.16	.12	.35	.30
53. To have a clear sense of who I am	.04	.17	-.01	.09	.23	.27	.25	.29	-.02	.30	.24

*Note.* Factor loadings > .40 are in boldface. Factor 1 = Relatedness, 2 = Competence, 3 = Belongingness, 4 = Physical Intimacy, 5 = Status, 6 = Agency, 7 = Stability, 8 = Fairness, 11 = Independence. Factor 9 and 10 = not interpretable.

\* = item loadings were not bolded because actual value was below .40 before it was rounded up

Table 6

*Standard Errors of the Bootstrap Factors, Mean of the Estimated Nonstandardized Parameters, Adjusted 95% Confidence Intervals of the Parameters, and Standardized Factor Loadings for the PNQ Items*

Parameters	SE	SE-SE	Mean	Bias	SE-BiasLL	HL	<i>p</i>		Loadings
Relatedness 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.55
Relatedness 2	.17	.00	1.09	.02	.01	.82	1.50	.002	.72
Relatedness 3	.23	.01	1.30	.03	.01	.97	1.88	.002	.80
Belongingness 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.53
Belongingness 2	.36	.01	1.11	.00	.01	.61	2.10	.001	.73
Belongingness 3	.17	.00	1.03	.01	.01	.71	1.37	.003	.54
Physical Intimacy 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.62
Physical Intimacy 2	.18	.00	1.22	.02	.01	.93	1.58	.002	.79
Physical Intimacy 3	.19	.00	1.44	.04	.01	1.12	1.83	.003	.86
Status 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.51
Status 2	.25	.01	1.15	.04	.01	.77	1.71	.003	.67
Status 3	.59	.01	1.55	.09	.02	.93	2.71	.002	.78
Competence 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.84
Competence 2	.09	.00	1.03	.00	.00	.87	1.24	.001	.81
Competence 3	.09	.00	.82	.01	.00	.63	.98	.003	.64
Agency 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.74
Agency 2	.10	.00	.87	.00	.00	.67	1.06	.002	.71
Agency 3	.13	.00	.87	.00	.00	.62	1.10	.003	.69
Stability 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.66
Stability 2	.16	.00	1.22	.02	.01	.95	1.55	.002	.69
Stability 3	.21	.01	1.27	.02	.01	.92	1.76	.002	.69
Fairness 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.71
Fairness 2	.19	.00	1.06	.01	.01	.76	1.50	.002	.71
Independence 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.49
Independence 2	.73	.02	1.58	.16	.02	.87	3.05	.002	.78

*Note.* SE = standard error; LL = lower limit; HL = higher limit, CR = critical ratio. Factor loadings are those of the items on their respective factors. All loadings were significant ( $p < .001$ ).

Table 7

*Fit Indexes for One-Level, Two-Level and Three-Level CFA Models*

Model	$\chi^2$	<i>df</i>	<i>p</i> ( $\chi^2$ )	<i>CFI</i>	<i>RMSEA</i>	<i>SRMR</i>
Model A	992.83	275	<.000	.55	.11	.11
Model B	922.93	275	<.000	.60	.11	.12
Model C	420.65	265	<.000	.90	.05	.07
Modified	366.90	257	<.000	.93	.05	.06

*Note.* *N* = 209. CFA = Confirmatory Factor Analysis; CFI = Comparative Fit Index; RMSEA = Root Mean Squared Error of Approximation; SRMR = Standardized Root Mean Residual.

Table 8

*Standardized Factor Loadings of the Need Subscales on their Respective Need Domains*

Need Subscale	Self-Worth Domain	Interpersonal Domain
Relatedness	-	.79
Belongingness	-	.84
Physical Intimacy	-	.41
Status	-	.44
Competence	.79	-
Agency	.77	-
Stability	.79	-
Fairness	.68	-
Independence	.59	-

*Note.* All loadings were significant at the  $p < .001$  level.

Table 9

*Correlation between Indices of PNQ and Measures of Well-Being*

	Importance	Lack of Fulfilment	Duration of lack of fulfilment
Anxiety	.24*	.52**	.56**
Depression	-.04	.62**	.55**
Dependency	.36**	.27**	.32**
Self-criticism	.11	.59**	.55**
Negative Events	-.05	.35**	.30**
Physical Symptoms	.01	.35**	.33**
Self-esteem	-.01	.60**	.59**
State Anger	-.01	.43**	.40**
Trait Anger	.13	.32**	.36**
Social Support	.07	-.44**	-.33**
Relationship Quality (DAS)	-.04	.45**	.39**
Relationship Satisfaction	-.04	-.40**	-.32**

*Note.* \*\*Correlation is significant at the 0.01 level (2-tailed). \*Correlation is significant at the 0.05 level (2-tailed).

Table 10

*Correlations between Measures of Well-Being and Unmet Needs in the Self-Worth Subscales*

	Competence	Agency	Fairness	Stability	Independ.
Anxiety	.48**	.42**	.24*	.50**	.13
Depression	.49**	.43**	.34**	.62**	.33**
Dependency	.19**	.12	.08	.34**	.26**
Self-criticism	.45**	.40**	.37**	.49**	.27**
Negative Events	.18**	.28**	.26**	.35**	.15*
Physical Symptoms	.25**	.32**	.22**	.37**	.17*
Self-esteem	.48**	.43**	.32**	.52**	.40**
State Anger	.33**	.38**	.27**	.51**	.21**
Trait Anger	.33**	.26**	.12	.34**	.14*
Social Support	-.16*	-.23**	-.30**	-.35**	-.18**
Rel. Quality (DAS)	.25*	.22*	.16	.35**	.05
Rel. Satisfaction	-.25*	-.17	-.11	-.31**	-.07

*Note.* Independ. = Independence.

\*\*Correlation is significant at the 0.01 level (2-tailed). \*Correlation is significant at the 0.05 level (2-tailed).

Table 11

*Correlations between Measures of Well-Being and Unmet Needs in the Interpersonal Subscales*

	Relatedness	Belongingness	Physical Intimacy	Status
Anxiety	.47**	.32**	.24*	.29**
Depression	.48**	.42**	.26**	.21**
Dependency	.17*	.23**	-.01	.15*
Self-criticism	.44**	.40**	.32**	.27**
Negative Events	.32**	.18**	.06	.16*
Physical Symptoms	.32**	.17*	.12	.18**
Self-esteem	.46**	.44**	.27**	.15*
State Anger	.32**	.19**	.22**	.17*
Trait Anger	.33**	.18**	.16*	.15*
Social Support	-.43**	-.35**	-.29**	-.29**
Rel. Quality (DAS)	.34**	.35**	.53**	.25*
Rel. Satisfaction	-.36**	-.23*	-.51**	-.08

*Note.* \*\*Correlation is significant at the 0.01 level (2-tailed). \*Correlation is significant at the 0.05 level (2-tailed).

Table 12

*Hierarchical Multiple Regression Analyses Examining Moderator Role of Need Importance on the Relationship between Need Fulfilment and Depression*

	$\Delta R^2$	<i>B</i>	SE <i>B</i>	$\beta$
Step 1	.00			
Importance		-.02	.04	-.04
Step 2	.38**			
Fulfilment		.29	.03	.62**
Step 3	.00			
Importance X Fulfilment		-.00	.00	-.56
Total $R^2$	.39			
Step 1	.38**			
Fulfilment		.28	.03	.62**
Step 2	.00			
Importance		.01	.03	.02
Step 3	.00			
Importance X Fulfilment		-.00	.00	-.56
Total $R^2$	.38			

Note.  $N = 282$ .

\*  $p < .05$ . \*\*  $p < .001$ .

Table 13

*Hierarchical Multiple Regression Analyses Examining the Moderator Role of the Duration of the Unmet Needs on the Relationship between Need Fulfilment and Depression*

	$\Delta R^2$	<i>B</i>	SE <i>B</i>	$\beta$
Step 1	.37**			
Fulfilment		.30	.02	.61**
Step 2	.03*			
Duration		.09	.03	.23*
Step 3	.01			
Fulfilment X Duration		.00	.00	.53
Total $R^2$	.40			
Step 1	.30**			
Duration		.20	.02	.55**
Step 2	.10**			
Fulfilment		.22	.04	.45**
Step 3	.01			
Fulfilment X Duration		.00	.00	.53
Total $R^2$	.40			

Note.  $N = 282$ .

\*  $p < .05$ . \*\*  $p < .001$

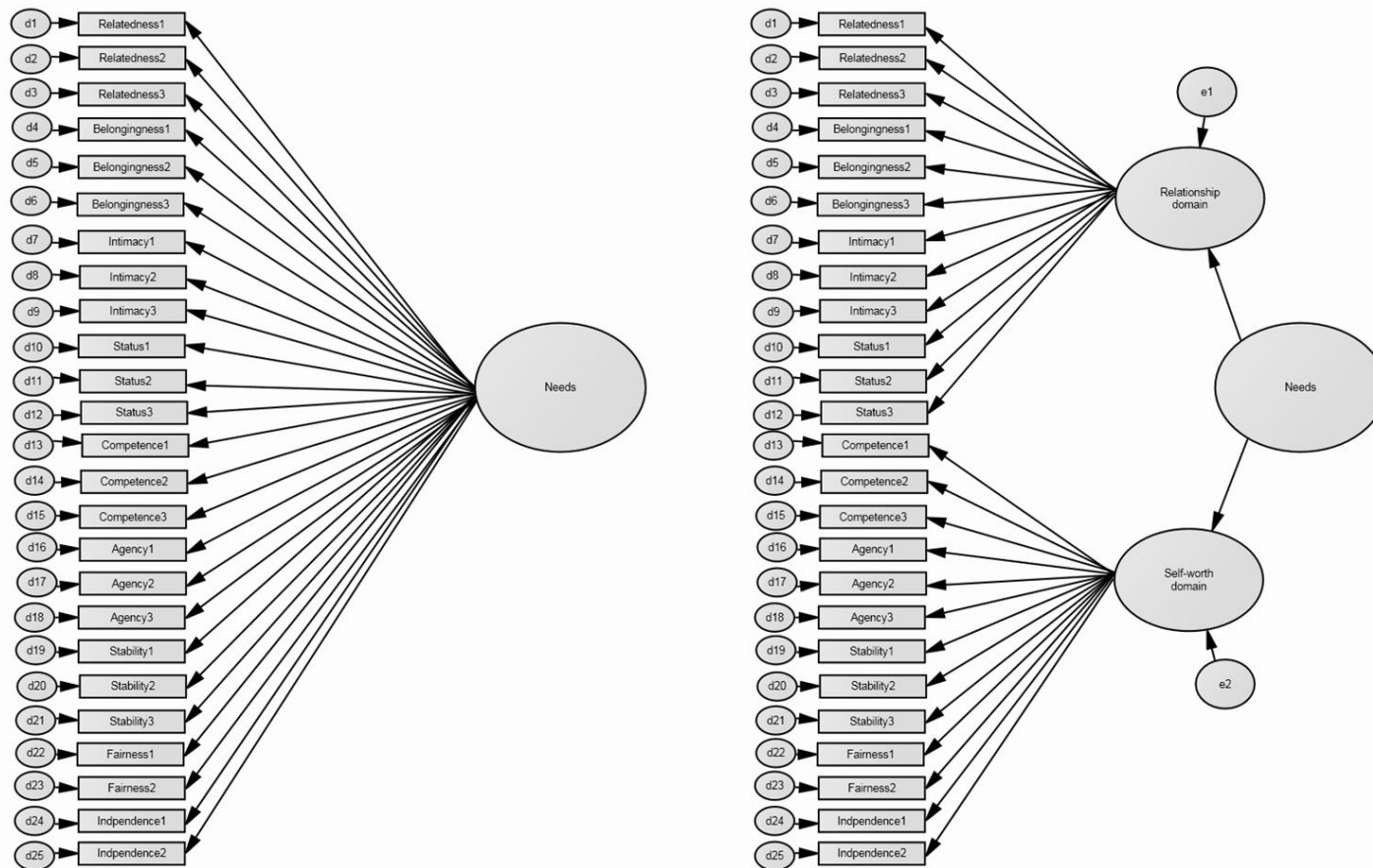


Figure 1. Models A and B examined via Confirmatory Factor Analysis in AMOS 18. Model A (left) represents the 1-level model of needs whereas model B (right) represents the 2-level model of needs. Rectangles represent observed variable (i.e., PNQ items) and

ovals represent latent factors and error terms (labeled d1-d25 and e1-e2). Single-headed arrows indicate the path between the hypothesized latent variables and the PNQ items.

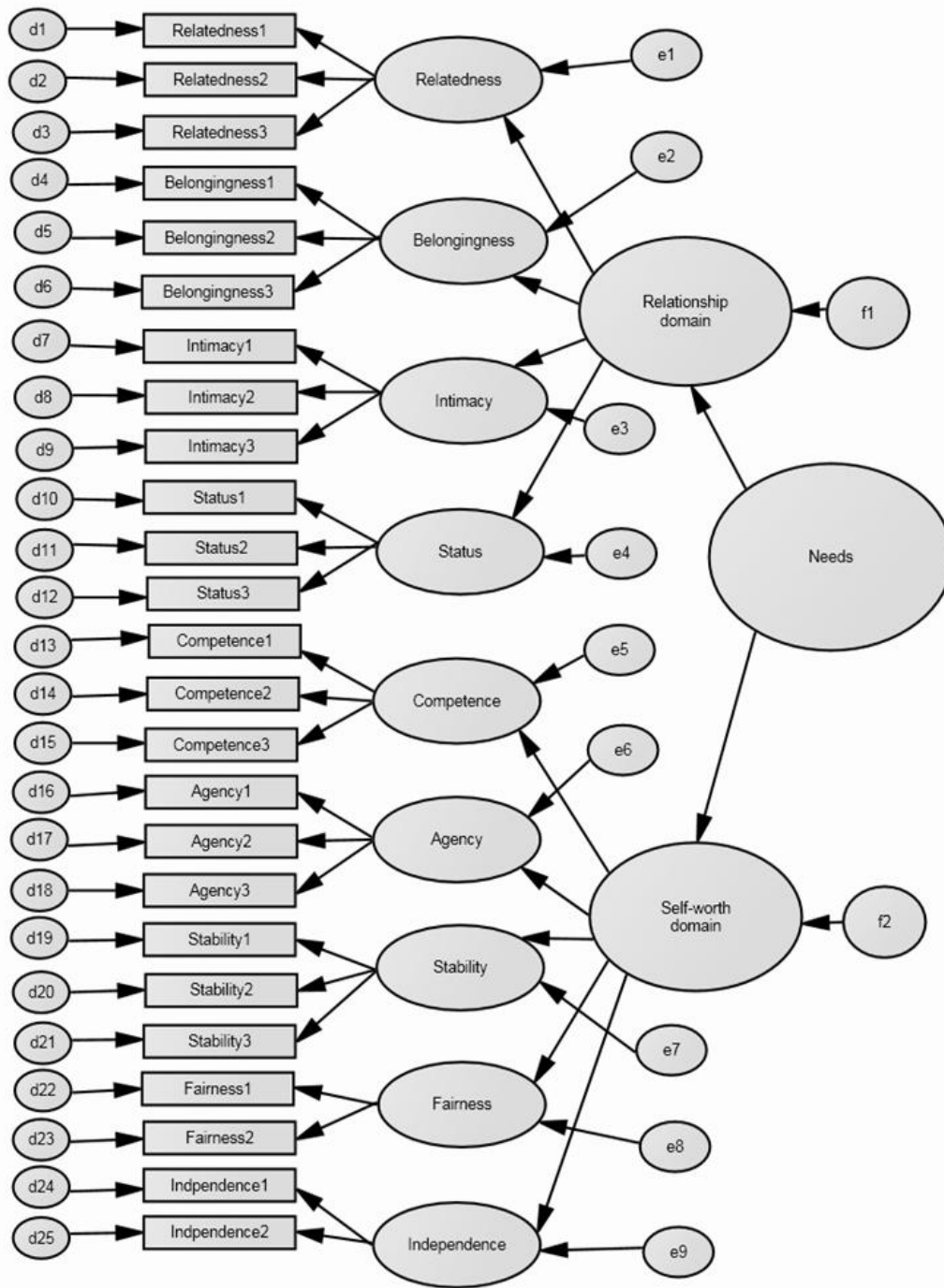


Figure 2. Hypothesized needs model (Model C) examined via Confirmatory Factor Analysis. Rectangles represent observed variable (i.e., PNQ items) and ovals represent latent factors and error terms (labeled d1-d25, e1-e9, and f1-f2). Single-headed arrows indicate the path between the hypothesized latent variables and from the latent variables to the PNQ items.

## **CHAPTER 4: Study 2a**

### **Validation of the Revised PNQ and an Examination of the Gender Differences in Psychological Need Fulfilment**

Although the importance of need fulfilment for optimal well-being and mental and physical health has been well-documented in the literature (see Deci & Ryan, 2000 for review), little attention has been devoted to the development of a widely accepted, empirically supported, measure of general need fulfilment. As a result, many of the existing studies on psychological needs have used a variety of different scales to assess need fulfilment, many with questionable or unknown psychometric properties (e.g., Johnston & Finney, 2010), thus significantly limiting the usefulness and interpretability of the research in the field.

The Psychological Needs Questionnaire (PNQ) was developed and validated in a previous sample (Beausoleil & Santor, 2008). Results supported several psychometric qualities of the PNQ, including its factorial composition, internal consistency, construct validity, and predictive utility. One of the purposes of the current study is therefore to replicate these findings with the revised version of the scale (i.e., PNQ-v2) in a different sample.

#### **Modifications of the Scale**

A few noteworthy modifications were made to the PNQ after the first study. Following an ongoing literature review and the documented importance of the need for autonomy (e.g., Deci & Ryan, 1991; 1995; 2000; Skinner & Edge, 2002) and the need for fun and enjoyment (e.g., Glasser, 1984, 1989, 1998; Prager & Buhrmester, 1998), items to create such subscales were written and added to the revised version of the PNQ. In addition, an extra item was added to the two-item subscales, namely independence and fairness, to

increase the internal consistency reliability of the subscales and for each subscale to be composed of the same number of items (i.e., three). The new items were modeled after items in existing measures that assessed similar need constructs and were discussed with the same review panel involved in the development of the initial pool of items for the PNQ.

In light of the previous results which indicated that perceived need importance was not correlated with negative outcomes and did not mediate the relationship between unmet needs and negative outcomes (Beausoleil & Santor, 2008), the need importance index was removed from the PNQ, allowing for the scale length to be reduced by half. However, to distinguish between individuals who perceived the listed needs as important versus unimportant, a response option indicating that the listed need was perceived as unimportant (i.e., *Not important to me/I do not need this*) was added to the scale.

Considering that brevity of the scale was essential, the removal of the time index was also considered. Although the duration of the lack of fulfilment significantly predicted depression scores even after controlling for the effects of need fulfilment, duration did not moderate the relationship between fulfilment and depression (Beausoleil & Santor, 2008), and therefore, the time index was removed from the scale.

Consequently, the PNQ-v2 assessed lack of general need fulfilment. All items were formulated as declarative statements and presented with the following instructions: 'Below is a list of psychological needs that are important to many people. Please indicate how well each need has been met in your own life'. Items were scaled on a five-point Likert-type scale with the following anchors: 0 (*not important to me / I do not need this*), 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), and 4 (*strongly agree*).

### **Gender Differences in Psychological Needs**

Another purpose of the study was to examine the extent to which basic psychological needs are similar in men and women. More specifically, the current study aimed to assess whether gender differences in need fulfilment were present, not only in terms of general need fulfilment, but also with regard to fulfilment within the previously identified two broad need domains (i.e., self-worth domain and relationship domain), and with regard to fulfilment of each specific basic needs (i.e., the PNQ-v2 subscales).

This research question is important because although popular lore (Gray, 1992) portrays men as having high needs for autonomy and women as having high needs for affiliation, the scientific research, as well as psychological theories on this topic, are largely inconsistent. For example, while some research findings support the claim for gender-based differences in the importance placed on various psychological needs (e.g., Cochran & Peplau, 1985; Harvey & Retter, 2002; Jordan, Kaplan, Miller, Stiver, & Surrey, 1991; Lang-Takac & Osterweil, 1992), several studies have failed to show that significant gender differences exist (e.g., Bar-Yam, 1991; Maccoby & Jacklin, 1974).

Empirical support for gender differences in levels of need fulfilment is also equivocal. While some studies have found that women experience higher levels of general need satisfaction than men (e.g., Weinstein & Ryan, 2010), several other studies have failed to find significant gender effects in need fulfilment (e.g., Bar-Yam, 1991; Cochran & Peplau, 1985). Nevertheless, there appears to be a general inclination for women to report higher levels of fulfilment with regard to relatedness types of needs and lower levels of fulfilment with regard to competence and autonomy types of needs (Luyckx, Vansteenkiste, Goossens, & Duriez, 2009; Sheldon & Elliot, 1999), which is consistent with the well-documented findings in the feminist literature that women are motivated to primarily strive for relatedness

whereas men are motivated to primarily strive for individualism (Gilbert, 1987; Gilligan, 1982; Kirsch & Kuiper, 2002; McMullen, 1999; Miller, 1976; Stoppard, 1999; Striver, 1991; Surrey, 1991).

It is likely that because men and women are exposed to different social environments which effect psychological needs by emphasizing or condoning particular experiences or goal-directed behaviours (Deci & Ryan, 2002), the extent to which each gender values various psychological needs and strive to fulfill them differs considerably. In fact, research has demonstrated that as a result of socialization, men are more likely to have difficulty acknowledging their relational needs and to be embarrassed by such needs than are women (Striver, 1991). On the other hand, women are more likely to perceive achievement situations as dangerous because of their potential to lead to isolation and alienation, thus threatening the fulfilment of their affiliation needs (Pollack & Gilligan, 1982).

### **Research Objectives and Hypotheses**

The purpose of the current study is twofold. Firstly, the study aims to replicate the psychometric properties of the PNQ with the revised version of the scale (i.e., PNQ-v2) in a different sample. To this end, the PNQ-v2's factorial composition, internal consistency, construct validity, and predictive utility was examined. It was expected that the PNQ-v2 items would confirm the three-level confirmatory model of needs, which was validated in previous research (hypothesis 1; Beausoleil & Santor, 2008) and that the three-level model of needs would provide a better fit for the data than would the two-level and one-level models (hypothesis 2). With regard to construct validity, it was hypothesized that the correlational findings of previous research with the PNQ (i.e., Beausoleil & Santor, 2008) would be replicated in the current sample. More specifically, it was expected that unmet psychological needs, as assessed by the lack of fulfilment index of the PNQ-v2, would be positively

correlated to depressive symptoms and anxiety (hypothesis 3a and 3b) and to overall physical symptoms (hypothesis 4). It was also hypothesized that the different subscales would correlate significantly with different measures of well-being and mental health, as was the case in the previous study (hypothesis 5). It was also expected that convergent validity for the PNQ-v2 would be demonstrated through its negative correlations with scores on another measure of need satisfaction included in the study (hypothesis 6). Furthermore, it was hypothesized that the PNQ-v2 would be as useful as the BNSG-S in predicting depressive symptoms (hypothesis 7)

Secondly, the study aimed to examine the effect of gender on psychological needs. More specifically, the study examined gender-based differences in levels of need fulfilment, and in the frequency with which individuals stated that the listed needs were unimportant to them. Consistent with past studies, it was hypothesized that women would report overall higher levels of general need fulfilment (hypothesis 8), lower levels of fulfilment for needs within the self-worth domain (hypothesis 9a), and higher levels of fulfilment for needs within the relationship domain than would men (hypothesis 9b). However, given the exploratory nature of the analyses performed with the various PNQ-v2 subscales, specific hypotheses for each subscales were not formulated.

Given that men are more frequently exposed to social conditions in which the expression of many psychological needs and their resulting goal-directed behaviours are condoned (Jack, 1991; Kirsch & Kuiper, 2002; Miller, 1976), it was also hypothesized that men would more frequently report the listed need as unimportant than would women (hypothesis 10). See table 14 for a review of all research hypotheses.

## Methods

### Participants

Consistent with the recommendation of a minimal sample size of 200 for confirmatory factor analysis (Hoelter, 1983), the sample consisted of 283 University of Ottawa undergraduate university students (147 males and 136 females) who were recruited through the School of Psychology's Integrated System of Participation in Research (ISPR). The age of participants ranged from 16 to 48 ( $M = 19.45$ ,  $SD = 3.73$ ). To be eligible for the study, participants had to be able to read and answer questions in English.

### Measures

**Psychological Needs.** General need fulfilment was assessed with the Psychological Need Questionnaire-Version 2 (PNQ-v2; See Appendix L). The PNQ-v2 is a 33-item self-report measure of lack of need fulfilment, which can yield scores on three levels of generality, including total lack of need fulfilment, lack of fulfilment within each need domain (i.e., self-worth domain, and relationship domain), and lack of fulfilment relative to each distinct need construct (i.e., subscales). Items were scaled on a five-point Likert-type scale with the following anchors: 0 (*not important to me / I do not need this*), 1 (*strongly disagree*), 2 (*disagree*), 3 (*agree*), and 4 (*strongly agree*). Potential scores for the PNQ-v2 ranged from 0 to 132 ( $M = 59.99$ ,  $SD = 16.96$ ), with high scores indicating an elevated level of unmet needs or poorer need fulfilment and low score indicating overall need fulfilment.

Preliminary assessments indicated that the PNQ has excellent psychometric properties (Cronbach's  $\alpha = .87$ ; Beausoleil & Santor, 2008). In addition, both the need domains and need subscales derived from the PNQ scores have been shown to be largely reliable (Cronbach's  $\alpha$  from .47 to .86; Beausoleil & Santor, 2008). Validity and reliability estimates for the revised version of the scale will be discussed in the results section.

In order to assess the PNQ-v2's convergent validity, basic psychological need satisfaction was also assessed with the 21-item Basic Need Satisfaction in General Scale (BNSG-S; Gagné, 2003). The BNSG-S measures self-reported levels of satisfaction on three basic needs, namely, autonomy (7 items), competence (6 items), and relatedness (8 items; see appendix M). Items are scaled on a 7-point Likert-type scale, ranging from 1 (*not at all true*) to 7 (*very true*), with higher scores indicating a higher level of need satisfaction.

Although total scores have been utilized and reported in research, with internal consistency estimates ranging from .84 to .90 (Gagné, 2003; Vansteenkiste, Lens, Soenens, & Luyckx, 2006; Wei, Phillip, Shaffer, Young, & Zakalik, 2005), the scale is assumed to measure three separate constructs (autonomy, competence, relatedness), making the use of BNSG-S total scores inappropriate (Johnston & Finney, 2010). With regard to the three subscales computed from the BNSG-S scores, researchers have reported internal consistency estimates ranging from .61 to .81 for autonomy, from .60 to .86 for competence, and from .61 to .90 for relatedness (Conroy & Coatsworth, 2007; Gagné, 2003; Niemiec, Ryan, & Deci 2009; Vansteenkiste et al., 2006; Wei et al., 2005). In the current sample, the Cronbach's  $\alpha$  for the autonomy subscale was .68, with a mean score of 4.71 ( $SD = .90$ ), the Cronbach's  $\alpha$  for the competence subscale was .75, with a mean score of 4.66 ( $SD = 1.08$ ), and the Cronbach's  $\alpha$  for the relatedness subscale was .83, with a mean score of 5.39 ( $SD = .97$ ).

**Depression.** Depressive symptomatology was assessed using the Center for Epidemiologic Studies Depression Scale-Revised (CESD-R; Santor & Coyne, 1997), which is a 20-item short version of the original CES-D (Radloff, 1977) that has been used in both adolescent and adult populations. The CESD-R assessed the frequency with which depressive symptoms such as mood, somatic complaints, interpersonal relationships, and motor functioning, were experienced in the last week (see appendix B). Items are scaled on

four-point scale ranging from 1 (*Rarely or None of the Time: less than once a week*) to 4 (*Most or All of the Time: 5-7 days a week*). Possible scores range from 20 to 80 and high scores indicate the presence of more depressive symptoms and of greater impairment.

The CESD-R is a well-established measure with excellent psychometric properties (Cronbach's  $\alpha = .87$ , Santor & Coyne, 1997). Scores on the CESD-R have been shown to correlate highly with the Beck Depression Inventory-II ( $R = .85$ , Santor, Zuroff, Ramsay, Cervantes, & Palacios, 1995), suggesting suitable convergent validity of the two scales. In the current sample, the Cronbach's  $\alpha$  for the scale was .90, indicating excellent reliability. The mean score was 39.32 ( $SD = 12.57$ ).

**Anxiety.** Anxiety symptoms were assessed by the 16-item self-report Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986), which is intended to assess anxiety sensitivity. More precisely, the ASI measures fear of anxiety-related sensations such as rapid heartbeat, shortness of breath, nervousness, and stomach growling. Items are scaled on a five-point likert-type scale ranging from 1 (*very little*) to 5 (*very much*), with higher scores being indicative of greater sensitivity to anxiety (see appendix E).

The ASI has demonstrated excellent psychometric properties in both clinical and nonclinical samples with internal consistency estimates ranging from  $\alpha = 0.82$  to  $\alpha = 0.91$  (Peterson & Heilbronner, 1987; Peterson & Reiss, 1992). Test-retest reliability was also shown to be high over a 3-year period ( $r = 0.71$ ; Maller & Reiss, 1992). In the current sample, the Cronbach's  $\alpha$  for the scale was .90, indicating excellent reliability. The mean score was 42.20 ( $SD = 13.96$ ).

**Physical symptoms.** Physical symptoms were measured using the Cohen-Hoberman Inventory of Physical Symptoms (CHIPS; Cohen & Hoberman, 1983), which consists of 33 common physical symptoms carefully selected to exclude symptoms of an obviously

psychological nature (e.g., felt nervous or depressed). The CHIPS however does include many physical symptoms that have been traditionally viewed as psychosomatic (e.g., headache, weight loss). Individuals are asked to rate their level of distress associated with each symptom during the past two weeks. Items are scaled on a three-point scale with the following anchors: 1 (*not at all*), 2 (*somewhat*), 3 (*quite a bit*). High scores indicate more frequent physical symptoms, greater distress, and poorer functioning (see appendix K).

The CHIPS has been shown to have good internal consistency (Cronbach's  $\alpha = .89$ ), adequate test-retest reliability (Cohen & Hoberman, 1983), and to predict the use of student health services in the 5-week period following completion of the scale (Cohen & Hoberman, 1983). In the current sample, the Cronbach's  $\alpha$  for the scale was .93, indicating excellent reliability. The sample mean was 60.07 ( $SD = 13.46$ ).

**Negative life events.** The number of negative life events experienced in the last year was assessed by the Negative Life Events Inventory (NLEI; Wills, McNamara, Vaccaro, & Hirky, 1996), which consists of a 20-item checklist of negative life events. Eleven of the events are related to family members (e.g., "Somebody in my family had a serious illness"), while the other nine are related to the individual (e.g., "I had a serious accident"). Given that the NLEI is based on previous inventories of adolescent life events (Newcomb & Harlow, 1986; Wills, Vaccaro, McNamara, 1992), it is appropriate for use with first-year university students. Items were scored on a dichotomous (*yes-no*) response scale, with higher scores indicating the occurrence of a greater number of negative life events in the past year. Possible scores ranged from 0 to 20 (see appendix D).

Estimates of reliability of .67 have been reported for the scale (Wills, 1986). In the current sample, the Cronbach's  $\alpha$  for the scale was .71, with a sample mean of 4.31 ( $SD = 2.98$ ).

**Depressive vulnerability characteristics.** The presence of two depressive vulnerability characteristics, namely dependency and self-criticism, were assessed with the 48-item Depressive Experiences Questionnaire- Revised (DEQ-R; Santor, Zuroff, & Fielding, 1997; see appendix C). The DEQ-R uses unit-weighted scoring rather than factor scoring and items are scaled on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). High scores are indicative of higher levels of self-criticism or dependency.

Good psychometric properties have been reported for the DEQ-R, both clinical and non-clinical populations (Cronbach's  $\alpha$  from .72 to .78, Santor, et al., 1997; Santor & Yazbek, 2006) and excellent test-retest reliability has been demonstrated, indicating that dependency and self-criticism are highly stable constructs (Zuroff, Moskowitz, Wielgus, Powers, & Franko, 1983). In the current sample, the Cronbach's  $\alpha$  for the scale was .82, indicating good reliability. The mean score was 199.69 ( $SD = 26.63$ ).

## Results

### Sample Characteristics

The sample consisted of 283 undergraduate university students (147 males and 136 females). The age of participants ranged from 16 to 48 ( $M = 19.45$ ,  $SD = 3.73$ ).

### Confirmatory Factor Analysis

In order to validate the factor structure of the revised version of the PNQ and its subscales, a confirmatory factor analysis (CFA) was conducted using maximum-likelihood estimation in AMOS 18 (Arbuckle, 2007).

**Assumptions.** Item completeness and item distribution were examined for the PNQ-v2. There were no missing values. Table 15 shows the statistics (mean, standard deviation, skewness, and kurtosis) of the PNQ-v2 items. Mahalanobis distances were examined to

identify possible outliers. A wide gap in Mahalanobis  $d^2$  values was observed between the first and second case, relative to all other identified cases. Therefore, the first case was considered to be a true outlier and deleted from the analyses. Given the nonnormality of the item distribution (Mardia's coefficient = 248.95), a standard bootstrapping procedure was conducted with a resampling of 1000 samples (Byrne, 2001). The results of the bootstrapping are displayed in Table 16. Bias-corrected confidence intervals can be interpreted in the usual way. Thus, if the interval does not include the value zero, the null hypothesis that the factor loadings are equal to zero in the population can be rejected (Byrne, 2001). Values that are replaced with dots (...) represent parameters that were constrained to a value of 1 for the purpose of model identification.

The bootstrap estimates of the standard errors for each factor loadings parameter, which are displayed in the first column of Table 16, ranged from .00 to 1.21, and were similar to those obtained in the original sample. Furthermore, the level of bias was low, indicating that the difference between the bootstrap mean estimates and the original estimates was minimal (Byrne, 2001), and the bias adjusted confidence intervals did not include the value zero, signifying that the estimated parameters can be assumed to be different from zero in the population.

The hypothesized three-level model illustrated in Figure 3 (Model C) was compared to two simpler models: a single factor model in which all items load onto the global need latent factor (Model A); and a two-level factor model in which items load onto their respective need domain, which in turn load onto the global need latent factor (Model B). Figure 4 depicts models A and B.

The fit indices used for model assessment were the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square

residuals (SRMR). CFI values above .95, RMSEA values below .05, and SRMR values below .09 indicate excellent fit, whereas CFI values above .90, RMSEA values below .08, and SRMR values below .10 indicate good fit (Byrne, 2001; Hu & Bentler, 1999). The chi-square, although greatly overestimated when there is violation of the assumption of normality (Byrne, 2001; Muthén & Kaplan, 1985), was also reported. A small and non-significant chi-square is optimal (Hinkin, 1998). However, some (e.g., Carmines & McIver, 1981) have proposed that a chi-square value of two or three times that of the degrees of freedom is acceptable.

Global indices of fit (Table 17) indicated that model A and model B did not fit the data. However, indices of fit suggest that the initial three-level model (model A) did fit the data ( $\chi^2 = 812.90$ ,  $p > .000$ ,  $df = 483$ , CFI = .85, RMSEA = .05, SRMR = .06). Although the CFI is not quite up to standard (>.90 - .95), it is considerably larger than in the other two models, and the other indices indicated excellent fit.

Modification indices suggested that a set of error terms for items within the relatedness, status, and autonomy subscales, as well as some error terms for subscales within each domain (i.e., status and fun, autonomy and fairness, and agency and stability) should be correlated to improve goodness of fit for the model. Global indices of fit, which were assessed after making such changes, suggested that the final three-level model provided a good fit for the data ( $\chi^2 = 749.74$ ,  $p > .000$ ,  $df = 477$ , CFI = .88, RMSEA = .05, SRMR = .06). Significant differences in  $\chi^2$ -values indicated that the modified model yielded a significantly superior fit compared to the unmodified model ( $p < .001$ ).

The hypothesized three-level model of the PNQ-v2 was further supported by the significant ( $p < .001$ ) loadings for all items on their intended latent factors (see last column of table 16) and lack of significant cross-loadings on other factors (Hinkin, 1998). Additional

evidence for the scale's internal structure was provided by the significant standardized factor loadings between all the subscales and their respective need domains, with the exception of the physical intimacy subscale, which did not load significantly onto the relationship domain (Table 18). In summary, the current study replicated the previously established factorial validity of the PNQ (Beausoleil & Santor, 2008) in a different sample, providing further evidence of the scale's excellent psychometric properties and structural validity.

**Internal consistency estimates of reliability.** An internal consistency estimate of reliability using Cronbach's alpha (Price & Mueller, 1986) was calculated for the PNQ. The coefficient alpha of .88 indicated very good reliability (DeVellis, 1991) and provided support for the use of total PNQ-v2 scores.

**Domain reliability.** The internal consistency estimates (Cronbach's alphas) for the self-worth domain was .80 and for the relationship domain was .80, indicating that in addition to using total PNQ-v2 scores, domain scores can be used reliably.

**Subscale reliability.** The internal consistency estimates (Cronbach's alphas) for the different subscales were: .58 (competence), .50 (autonomy), .59 (agency), .45 (stability), .46 (fairness), .57 (independence), .65 (relatedness), .65 (belongingness), .72 (intimacy), .50 (status), and .71 (fun). Although these values are not high, they are not surprising given that they are based on three-item subscales.

### **Convergent and Divergent Validity**

**Correlational data.** Patterns of correlations between the PNQ-v2 and various measures of well-being were also examined to further assess construct validity of the revised scale (see Table 19). Consistent with hypotheses, PNQ-v2 indices, domains and subscales were positively correlated to a variety of mental and physical symptoms. More specifically, high levels of depression, negative life events, and depressive vulnerability factors were

linked to high levels of total unmet needs as well as unmet needs on most PNQ-v2 subscales. However, contrary to hypotheses, results indicated that the anxiety sensitivity measure was not significantly correlated to any of the PNQ-v2 indices, domains, or subscales, with the exception of the status subscale.

Physical symptoms were also significantly positively related with total and domain-specific need fulfilment, indicating that in general, people who report having many unmet needs also tend to experience many physical ailments. The need subscales, however, differentiated themselves in terms of their relationship with physical complaints. While having unmet needs for relatedness, belongingness, physical intimacy, fairness, agency, and status was significantly associated with many physical problems, having unmet needs for stability, fun, competence, autonomy, and independence was not related to physical symptoms.

Of note is the physical intimacy subscale, which was not significantly correlated with most measures of well-being. However, intimacy scores did correlate with physical symptoms, suggesting that there is a relationship between having unmet needs for physical intimacy and experiencing several physical complaints.

***Unimportance frequency.*** In accordance with previous findings (e.g., Beausoleil & Santor, 2008), the extent to which people recognized the listed need as important was not correlated to most measures of well-being and mental health. However, individuals who frequently reported that needs were unimportant were significantly more likely to endorse symptoms of depression and report high levels of self-criticism.

Overall, the number of times people indicated that the listed need was unimportant to them ranged from 0 to 33 times, with a mean of 5.63 times ( $SD = 5.08$ ). While only 12.7% of the sample reported that none of the listed needs were unimportant to them, less than 10% of the sample rated more than 10 of the 33 listed needs as unimportant to them, suggesting

that overall, participants perceived most of the listed needs as important and necessary in their lives.

**Multiple regression analyses.** Multiple regression analyses were also conducted to evaluate the predictive utility of scores on the PNQ-v2 for various measures of well-being and mental health. Given that bivariate correlations between PNQ-v2 scores and the measures of well-being and mental health were already examined and interpreted, simple regression analyses between a single predictor and a single dependent variable were not conducted. However, multiple regression analyses were conducted to evaluate the predictive utility of the six self-worth subscale and the five relationship subscales for both depression and physical symptoms. Given the pattern of results with the measure of anxiety in the present study, and to minimize the number of unnecessary analyses performed, anxiety was not included as a dependent variable in the subscale analyses.

**Assumptions.** Analyses were performed using SPSS REGRESSION and SPSS EXPLORE for evaluation of assumptions. The number of missing values was low, ranging from 0% to .7% and was considered to be completely random (Little's MCAR test: chi-Square = 254.45,  $df = 725$ ,  $p = 1.00$ ; Tabachnick & Fidell, 2007). With the use of a  $p < .001$  criterion for Mahalanobis distance, five univariate outliers, two multivariate outliers, and one both univariate and multivariate outlier were identified. After examination of the possible reasons for the identified outliers, the case that was both a univariate and multivariate outlier was deleted and excluded from analyses whereas all others were maintained as part of the data set.

The values for some variables (i.e., negative life events, depression, physical symptoms) were slightly positively skewed, which was not surprising given the nature of

what was being assessed and that such variables are not expected to be normally distributed within non-clinical samples. According to Tabachnick and Fidell (2007), in samples of 200 or more, a variable with substantive skewness does not deviate from normality enough to make a substantial difference in the analyses. Following from this reasoning, in addition to the desired ease of interpretability of the results, transformations were not performed. All other variables had acceptable skewness and kurtosis values, indicating similarity to the normal curve (Tabachnick & Fidell, 2007).

Given the exploratory nature of the following analyses, alpha values were not adjusted for multiple analyses. Rather, in an effort to avoid overlooking significant effects or trends, the conventional alpha value of .05 was employed for all analyses.

***Predictive utility of need subscales.*** Four standard multiple regressions were conducted to examine the predictive utility of the various PNQ-v2 subscales for depression and physical symptoms.

***Self-worth subscales.*** A standard multiple regression was performed between depression as the dependent variable and competence, agency, stability, autonomy, fairness and independence as the independent variables.  $R$  for regression was significantly different from zero  $F(6, 275) = 7.64, p > .001$ , with  $R^2$  at .14. The adjusted  $R^2$  of .12 indicates that 12% of the variability in depressive symptoms is predicted by competence, agency, stability, autonomy, fairness and independence scores. In order to interpret the relative strength of the individual predictors, bivariate and partial correlations displayed in table 20 were examined. While all the bivariate correlations between the subscales and depression were significant, only the partial correlation between the agency subscale and depression was significant, indicating that only having an unmet need for agency predicts physical symptoms even after factoring out the effects of all other relationship need subscales. In fact, it alone accounted

for 10% ( $.322^2 = .10$ ) of the variance in the depression index, while the other subscales contributed only another 2% ( $12\% - 10\% = 2\%$ ). However, judgments about the relative importance of these predictors are difficult because they are correlated. The correlations among the self-worth need subscales ranged from .29 to .59.

Another standard multiple regression was performed between physical symptoms as the dependent variable and competence, agency, stability, autonomy, fairness and independence as the independent variables.  $R$  for regression was not significantly different from zero  $F(6, 273) = 2.05, p = .059$ , indicating that taken together, the self-worth subscales do not significantly predict physical symptoms.

*Relationship subscales.* A standard multiple regression was performed between depression as the dependent variable and relatedness, belongingness, physical intimacy, status, and fun as the independent variables.  $R$  for regression was significantly different from zero  $F(5, 276) = 13.50, p > .001$ , with  $R^2$  at .20. The adjusted  $R^2$  of .18 indicates that scores on the following subscales predict almost a fifth of the variability in depressive symptoms: relatedness, belongingness, physical intimacy, status, and fun. In order to interpret the relative strength of the individual predictors, bivariate and partial correlations, displayed in table 21, were examined. With the exception of the physical intimacy subscale, all bivariate correlations between the subscales and depression were significant. However, only the partial correlation between both the status and fun subscales and depression were significant, indicating that after factoring out the effects of all other relationship need subscales, having an unmet need for status or an unmet need for fun significantly predicts depressive symptoms. The unmet need for status accounted for 7% ( $.273^2 = .07$ ) of the variance in the depression index, while the unmet need for fun accounted for 15% ( $.385^2 = .15$ ) of the variance in depression scores. Of these two needs, an unmet need for fun appears to be most

strongly associated with depressive symptoms, as indicated by the strength of the bivariate and partial correlations. However, as was the case for the self-worth needs subscales, judgments about the relative importance of these predictors are difficult because they are correlated. The correlations among the relationship need subscales, excluding physical intimacy, which was not significantly correlated with any other, need subscale, ranged from .26 to .57.

Another standard multiple regression was performed between physical symptoms as the dependent variable and relatedness, belongingness, physical intimacy, status, and fun as the independent variables.  $R$  for regression was significantly different from zero  $F(5, 274) = 2.98, p = .012$ , with  $R^2$  at .05. The adjusted  $R^2$  of .03 indicates that scores on the following subscales predict 3% of the variability in depressive symptoms: relatedness, belongingness, physical intimacy, status, and fun. In order to interpret the relative strength of the individual predictors, bivariate and partial correlations, displayed in table 21, were examined. The bivariate correlations between all subscales and depression were significant, with the exception of the fun subscale. However, only the partial correlation between physical intimacy and depression was significant, indicating that only having an unmet need for physical intimacy predicts physical symptoms even after factoring out the effects of all other relationship need subscales. In fact, the unmet need for physical intimacy accounted for 2% ( $.135^2 = .02$ ) of the variance in physical symptoms scores while all the other subscales contributed only another 1% ( $3\% - 2\% = 1\%$ ). However, as previously mentioned, correlations among the subscales may lead to questionable judgments about the relative importance of each predictor.

**Convergent validity: Psychological Needs Questionnaire-Version 2 (PNQ-v2) versus Basic Need Satisfaction in General Scale (BNSG-S).** To further assess construct validity of the scale, the relationship between the various indices, domains, and subscales of the PNQ-v2 and the subscales of another reputable measure of psychological need fulfilment, the BNSG-S, were examined. The correlations displayed in Table 22 provide extensive support for the convergent validity of the PNQ-v2.

Firstly, the correlations between the various indices of both scales are for the most part negative, as they should be given that high scores on the PNQ-v2 represents a high level of unmet needs whereas high scores on the BNSG –S indicate high levels of need satisfaction. Moreover, the BNSG –S’s autonomy subscale is related to all of the PNQ-v2 indices, which is consistent with theory that describes autonomy as an overarching need necessary within all types of goal-directed behaviours, even those aimed at fulfilling other basic needs (Ryan, 1993).

While Deci and Ryan’s competence subscale significantly correlated with all of the PNQ-v2 need subscales within the self-worth domain, the BNSG relatedness subscale, although significantly related to the PNQ-v2 relationship domain, does not correlate with all of the PNQ-v2 subscales within the relationship domain. Such non-significant correlations between some of the PNQ-v2 subscales (e.g., physical intimacy, stability, fairness) and the BNSG relatedness subscale suggests that the PNQ-v2 may assess the fulfilment of important needs that are not captured by the BNSG relatedness subscale.

Also noteworthy is the lack of significant correlations between the PNQ-v2’s physical intimacy subscale and any other needs. Although unexpected, this result may be accounted for by the specific and unique nature of the items that compose the physical intimacy subscale, which may distinguish themselves from the other types of items included

in both the PNQ-v2 and the BNSG. Nevertheless, the pattern of correlations presented above support the validity of the PNQ-v2 global fulfilment score, as well as its domain and subscale scores.

In order to further assess the convergent validity of the PNQ-v2, hierarchical regression was employed to compare the predictive utility of the PNQ-v2 to that of the BNSG with regard to depressive symptoms. To this end, two separate hierarchical regressions were conducted: one in which PNQ-v2 scores were entered in step 1 and BNSG scores entered in step 2; and another in which BNSG scores were entered in step 1 and PNQ-v2 scores entered in step 2.

The first hierarchical regression aimed to determine if addition of information from the BNSG improved prediction of depressive symptoms beyond that afforded by information from the PNQ-v2. Table 23 displays the  $r$ -squared values ( $R^2$ ), the change  $r$ -squared values ( $\Delta R^2$ ), the unstandardized regression coefficients ( $B$ ) along with their standard errors ( $SE B$ ), and the standardized regression coefficients ( $\beta$ ) after entry of each IV.  $R$  was significantly different from zero after each step. After step 2,  $R^2 = .51$ ,  $F(4, 277) = 73.32$ ,  $p < .001$ . The adjusted  $R^2$  of .51 indicates that scores on the PNQ-v2 and the BNSG predict over half of the variability in depressive symptoms.

After step 1, with PNQ-v2 scores in the equation,  $R^2 = .17$ ,  $F_{inc}(1, 280) = 58.35$ ,  $p < .001$ . After step 2, with BNSG scores (i.e., autonomy, competence, and relatedness subscales) added to the prediction of depression,  $R^2 = .51$ ,  $F_{inc}(3, 277) = 64.98$ ,  $p < .001$ . Addition of the BNSG scores to the equation resulted in a significant increment in  $R^2$ .

This pattern of results suggests that although PNQ-v2 scores can predict 17% of the variability in depressive symptoms, BNSG scores add significantly to that prediction,

allowing for an extra 34% of the variance in depressive symptoms to be accounted for with the addition of this variable to the equation.

The second hierarchical regression aimed to determine if addition of information from the PNQ-v2 improved prediction of depressive symptoms beyond that afforded by information from the BNSG subscales (see bottom section of table 23). As in the previous regression,  $R$  was significantly different from zero after each step. After step 2,  $R^2 = .51$ ,  $F(4, 277) = 73.32$   $p < .001$ . The adjusted  $R^2$  of .51 indicates that scores on the BNSG and the PNQ-v2 predict over half of the variability in depressive symptoms.

After step 1, with BNSG scores (i.e., autonomy, competence, and relatedness subscales) in the equation,  $R^2 = .50$ ,  $F_{inc}(3, 278) = 93.59$ ,  $p < .001$ . After step 2, with PNQ-v2 scores added to the prediction of depression,  $R^2 = .51$ ,  $F_{inc}(1, 277) = 6.72$ ,  $p = .010$ .

Although the addition of the PNQ-v2 scores to the equation resulted in a significant increment in  $R^2$ , the addition of this variable contributed only modestly to the prediction of depression, allowing for an extra 1 % of the variance to be accounted for above and beyond that already accounted for by BNSG.

Taken together, the results of these two hierarchical regressions indicate that both measures of needs significantly predict depressive symptoms and that they each account for unique variability in depressive symptoms. Although neither scale adequately captures all of the variance accounted for by the other scale, the BNSG appears to be capturing a larger proportion of the variance in depressive symptoms than the PNQ-v2.

### **Universality of Needs**

One-way analyses of variance (MANOVA) were conducted to determine the effects of gender on the PNQ-v2 indices (i.e., total fulfilment and importance), on need domain scores, and on the PNQ-v2 subscale scores. Because the various PNQ-v2 indices are

subcomponents of each other and therefore highly correlated and redundant, four separate MANOVAs were conducted in which overall fulfilment scores, domain scores, and subscale score for each domain were included in separate analyses.

**Need fulfilment and importance.** The first MANOVA examined the effects of gender on total need fulfilment and need importance scores. Significant differences were found between genders, Wilk's  $\Lambda = .96$ ,  $F(2, 279) = 6.07$ ,  $p < .001$ . The multivariate  $\eta^2$  based on Wilk's  $\Lambda$  was .042. Table 24 contains the means and standard deviations on the dependent variables for both males and females. Follow-up analyses were conducted to evaluate pairwise differences among the means for each dependent variable. There was a significant difference between genders on total need fulfilment scores,  $F(1, 280) = 4.10$ ,  $p = .040$ ,  $\eta^2 = .014$ , in that women reported lower levels of overall fulfilment than did men. Results also revealed that men were significantly more likely than women to report that the listed needs were not important to them,  $F(1, 280) = 11.53$ ,  $p = .001$ ,  $\eta^2 = .04$ .

**Need domains.** The second MANOVA examined the effects of gender on the relationship and self-worth domain scores. For this analysis, the independent variable was gender and the dependent variables were total self-worth domain fulfilment scores and total relationship domain fulfilment scores. There were no significant differences in domain scores between men and women, Wilk's  $\Lambda = .98$ ,  $F(2, 279) = 2.22$ ,  $p = .110$ , suggesting that men and women do not differ with respect to their level of need fulfilment within the self-worth and relationship need domains.

**Need subscales.** To examine the effects of gender on subscale scores, two separate MANOVAs were conducted, one using the subscales within the relationship domain as the dependent variables and the other using the subscales within the self-worth domain as the dependent variables.

The third MANOVA examined the effects gender on scores for the PNQ-v2 subscales within the relationship domain. The independent variable was gender and the dependent variables were relatedness, belongingness, physical intimacy, stability, fairness, and fun. Significant differences were found between genders, Wilk's  $\Lambda = .95$ ,  $F(5, 276) = 2.91$ ,  $p = .010$ . The multivariate  $\eta^2$  based on Wilk's  $\Lambda$  was  $.05$ . Follow-up analyses indicated that there was a significant difference between genders on the relatedness subscale scores,  $F(1, 280) = 9.44$ ,  $p = .002$ ,  $\eta^2 = .033$ , in that women ( $M = 6.08$ ,  $SD = 2.44$ ) were less fulfilled with regard to their need for relatedness than were men ( $M = 5.16$ ,  $SD = 2.56$ ). However, men and women's scores did not differ on any other subscales within the relationship domain.

The fourth MANOVA was conducted to determine the effects of gender on scores for the various PNQ-v2 subscales within the self-worth domain. The independent was gender and the dependent variables were competence, agency, autonomy, status, and independence. Results indicated that men and women did not differ significantly with regard to their level of need fulfilment on the various subscales within the self-worth domain, Wilk's  $\Lambda = .98$ ,  $F(6, 275) = .99$ ,  $p = .431$ .

## Discussion

### PNQ-v2 Validity and Reliability

The first purpose of the study was to replicate the findings associated with the newly developed scale and to provide further support for the PNQ-v2 psychometric properties. Results of the current study were consistent with previous findings, providing evidence for the factorial validity of the PNQ-v2's hypothesized three-level multi-factor structure.

With the exception of the physical intimacy subscale, which did not load significantly onto the relationship domain, all other structural hypotheses were confirmed in the current

sample. The unique nature of the items which compose the physical intimacy subscale (i.e., *I am less turned on by my partner than I need to be; My partner is less turned on by me than I need him/her to be; I need to be closer and more connected to my partner than I currently am*) may help explain why this subscale was not related to the relationship domain latent variable. It is important to note however, that the physical intimacy subscale did not show evidence of cross loading onto other latent variables, nor did any of the items that composed the physical intimacy subscale.

Internal consistency estimates for the PNQ-v2 in the current sample confirmed previous research findings (Beausoleil & Santor, 2008), indicating that both total and domain scores of the PNQ-v2 can be used reliably. The internal consistency estimates of the subscales were also adequate given that they were composed of only three items each.

Furthermore, the scale's convergent and divergent validity was demonstrated through various significant meaningful correlations with a multitude of outcome variables. For example, as theory and previous research would predict, lack of total need fulfilment as well as lack of fulfilment on both need domains and on all PNQ-v2 subscales (with the exception of physical intimacy), was significantly associated with high levels of depression, several negative life events, and the presence of depressive vulnerability personality factors. These findings suggest that need fulfilment plays an important role in many factors associated with depression. Future research should continue to investigate the role of need fulfilment in such relationships. Furthermore, the partial correlations obtained in the study suggested that the fulfilment of certain needs (i.e., need for agency, status, and fun) might be particularly important in predicting depression scores. Future studies should aim to replicate such trends.

Given the documented link between unmet needs and symptoms of anxiety (Assor Alfi, Kaplan, Roth, & Katz, 2000; Baumeister & Leary, 1995; Cicchetti, 1991; Deci & Ryan,

2002), it was hypothesized that lack of need fulfilment and anxiety sensitivity would be significantly positively correlated. However, with the exception of the status subscale, anxiety sensitivity was not significantly correlated to any of the other PNQ-v2 indices, domains, or subscales in the current sample. Anxiety sensitivity refers to the fear of bodily sensations related to anxiety, such as sweating or heart racing, and is associated with the belief that such sensations have negative physical, psychological, or social consequences (Reiss, 1991; Reiss & McNally, 1985). Possible explanations for the lack of association between anxiety and unmet need in the current sample may include the nature of the sample, (i.e., university non-clinical sample) and the overall high level of reported anxiety sensitivity in the sample. The mean anxiety score of the sample was 43.20 ( $SD = 13.96$ ), which is similar to ASI scores found in clinical samples with panic disorder (Rapee, Brown, Antony, & Barlow, 1992). Although the scaling and scoring of the ASI were reviewed multiple times, no errors were detected. It is possible that the given sample was an extremely anxious subset of university students, but it is more likely that such high anxiety scores can be accounted for by self-report error. Nevertheless, as expected given the high comorbidity among anxiety and depression (Lewinsohn, Zinbarg, Seeley, Lewinsohn, & Sack, 1997), these two variables were significantly positively correlated ( $r = .16, p < .01$ ) in the current sample.

Possible explanations for the significant relationship between high levels of anxiety sensitivity and unmet status needs include the importance of social interactions and social acceptance inherent in both concepts. However, given the limitations of the anxiety scores in the current sample, future studies should aim to replicate these findings.

Correlation patterns also supported the hypothesis that needs are important in predicting physical symptoms. Total as well as domain-specific lack of need fulfilment scores were significantly positively correlated to physical symptoms, suggesting that in

general, people who report having several unmet needs are also likely to experience many physical ailments. However, the pattern of correlations for PNQ-v2 subscales indicated that while the fulfilment of certain basic needs is associated with bothersome physical symptoms, the fulfilment of other basic needs is not. For example, results indicated that the fulfilment of the need for physical intimacy was particularly important in predicting physical symptoms. Such findings are important because they provide preliminary support for the idea that the fulfilment of certain needs is more important in predicting certain types of negative outcomes than is the fulfilment of other needs. More research is needed in this area to confirm such trends.

As expected, the frequency with which individuals reported that needs were unimportant to them was not significantly correlated with negative life events, dependency, anxiety or physical symptoms. However, unimportance frequency was significantly related to depressive symptoms and to high levels of self-criticism. Given that depression is characterized by a diminished interest in things previously deemed important, it is not surprising that individuals who reported experiencing higher levels of depressive symptoms also reported that many needs were unimportant to them. Similarly, given that self-critics are highly preoccupied with personal achievements and with mastery (Blatt & Shichman, 1983), it is possible that they were more likely to deny the importance of all interpersonal needs. However, future research is needed to confirm these hypotheses.

Although many individuals reported that some of the listed needs were unimportant to them, findings suggested that overall, participants perceived most of the listed needs as important and necessary in their lives, thus providing credibility both for the universality of need importance and for the existence of perceived individual differences in need strength.

Furthermore, contrary to what was predicted, the physical intimacy subscale was not

significantly correlated with most of the measures of well-being and mental health. Research on sexual encounters in university populations may help to explain these unexpected findings. Hooking up refers to a sexual encounter ranging from kissing to intercourse that occurs on one occasion and does not necessarily lead to future encounters or to committed relationships (Glenn & Marquardt, 2001; Owen, Rhoades, Stanley, & Fincham, 2010; Paul, McManus, & Hayes, 2000). Research has reported prevalence rates ranging from 50% to 75% for hooking up encounters in university samples (Owen & Fincham, 2011). Contrary to what is expected with regard to physical intimacy in the context of romantic relationships whereby satisfaction with sexual relations is associated with positive outcomes such as relationship satisfaction, stability, love, and commitment (Sprecher, 2002), young adults who hook up are more likely to report lower levels of psychological well-being (Fielder & Carey, 2009; Grello, Welsh, & Harper, 2006; Owen et al., 2010; Paul et al., 2000).

Although physical intimacy in the current project was intended to refer to physical intimacy within the context of a romantic relationship, two of the physical intimacy items on the PNQ-v2 involved physical attraction (i.e., *I am less turned on by my partner than I need to be; My partner is less turned on by me than I need him/her to be*). Therefore, participants may have responded to these items in relation to their hook up encounters and casual sexual partners. This may help explain why the physical intimacy subscale did not load significantly onto the relationship domain latent factor. In addition, while the fulfilment of physical intimacy needs within the context of a committed romantic relationship is expected to be related to positive psychological outcomes, the fulfilment of physical intimacy needs within the context of casual hook up encounters is not necessarily related to positive outcomes, and in fact, may be related to negative outcomes (Fielder & Carey, 2009; Grello, et al., 2006; Owen et al., 2010; Paul et al., 2000). Further research is required to better understand

physical intimacy need fulfilment in the context of hook up encounters. Furthermore, future research examining the relationship between physical intimacy need fulfilment in the context of committed relationships and various psychological and physical outcomes variables should be examined in non-student samples.

**Convergent validity.** Convergent validity was assessed through the examination of correlational patterns between the PNQ-v2 and the BNSG-S subscales. As expected, scores on the PNQ-v2 were, for the most part, significantly negatively correlated to scores on the various BNSG-S subscales. More specifically, all PNQ-v2 total, domain, and subscale scores were significantly associated with the BNSG-S's autonomy and competence subscales. However, the BNSG-S relatedness subscale was not significantly associated with all of the PNQ-v2 subscales, suggesting that the PNQ-v2 may include important interpersonal needs that are not captured by the BNSG relatedness subscale.

In addition, the results of the hierarchical regressions, which compared the predictive utility of the PNQ-v2 to that of the BNSG-S with regard to depressive symptoms, indicated that each scale accounted for unique variability in depressive symptoms. Although neither scale adequately captured all of the variance accounted for by the other scale, the BNSG-S appeared to capture a larger proportion of the variance in depressive symptoms than the PNQ-v2. Possible explanations for these results include the high level of similarity in the structure and content of BNSG-S and CESD items. For example, the CESD assessed the interpersonal difficulties typical in episodes of depression with items such as *People were unfriendly* and *I felt people disliked me*. Similarly, the BNSG-S assessed satisfaction of the need for relatedness with items such as *People are generally pretty friendly towards me* and *The people I interact with regularly do not seem to like me much*. On the other hand, the PNQ-v2 assessed lack of fulfilment of the need for relatedness with the following items: *I*

*have less people in my life that I can trust than I need to have and I need to feel more like others will be there for me in a tough situation.* Given the significant overlap in item content and structure between the CESD and the BNSG-S, it is not surprising that scores on the BNSG-S accounted for a larger proportion of the variance in depression scores than did scores on the PNQ-v2. Although the PNQ-v2 explicitly asks individuals to rate need deficit statements and therefore has higher face validity, it is less likely to correlate with outcome variables because of similarities in the way items are structured or formulated. Future studies should aim to interpret results of this nature carefully, so as to not overestimate the theoretically expected relationships between need fulfilment and various external variables.

In addition, although the BNSG-S has been used in several studies to assess general need fulfilment, recent work (Johnston & Finney, 2010) has demonstrated that the hypothesized three-factor model of the scale is not supported, that a large amount of variance in the scale remains unexplained, and that when an external factor is added to the model, fit increased (Johnston & Finney, 2010). It is possible that the external factor inadvertently measured by the BNSG-S includes general psychological dysfunction, or more specifically, depression itself. As recommended by Johnston and Finney (2010), future research is required to better understand the structure and utility of the BNSG-S.

### **Gender Differences in Need Fulfilment**

The second purpose of the study was to examine whether men and women differed with regard to their level of need fulfilment. Although findings on the topic of gender differences in general need fulfilment are mixed, we hypothesized based on conceptual grounds that women would be more fulfilled than men. However, contrary to hypotheses, women reported lower levels of overall need fulfilment than did men in the current sample, suggesting that female university students have a higher number of unmet psychological

needs than do male university students. It is possible that these unexpected findings are explained by the university sample recruited for this study, which may not have been typical or representative, but rather, may have been unique in some unmeasured way. Future studies should aim to further examine gender differences in need fulfilment, both in university and in community samples.

In line with previous studies (e.g., Luyckx, et al., 2009; Sheldon & Elliot, 1999), we also examined gender differences in levels of domain-specific need fulfilment. Specifically, we expected that women would report lower need fulfilment within the self-worth domain and higher need fulfilment within the relationship domain than men. However, no significant difference in domain scores was found between men and women in the current study. Again, it is possible that such findings were effected by the unique nature of the university sample utilized here, which may differ significantly in terms of gender-based need fulfilment from community samples.

Similarly, men and women's scores did not differ on any of the need subscales, with the exception of the relatedness subscale, on which women reported being less fulfilled than men. Such findings suggest that female university students are more likely to perceive themselves as having fewer trustworthy and supportive people in their lives than they need to have than are male university students. It is possible that women experience the beginning of a university program as a collapse in previously established interpersonal social support networks, whereas men view it as a chance to expand their circle of friends. However, research is needed to examine such hypotheses.

Findings also indicated that, as expected, men were significantly more likely than women to report that the listed needs were not important to them, which is consistent with research showing that men are more frequently exposed to social conditions which condone

the expression of many psychological needs (Jack, 1991; Kirsch & Kuiper, 2002; Miller, 1976). Such findings imply that although psychological needs are important for well-being regardless of gender, men may have a difficult time acknowledging and expressing such needs.

### **Implications, Research Limitations, and Future Directions**

As previously discussed, the PNQ-v2 has been shown to be a reliable and valid measure of need fulfilment. Given that no other widely accepted scale with good psychometric properties existed and that research on psychological needs is contingent on the measures used to operationalize need fulfilment, establishing such a reliable measure of needs was imperative.

The development of a quality scale to assess need fulfilment has several important implications. First, a valid and reliable scale of need fulfilment has practical use in that it can help to identify individuals whose basic needs are not being met and who, therefore, may need intervention or support to overcome such deficits. For example, the PNQ-v2 could be used as a screening tool in medical offices or in psychological clinics to identify individuals at risk for mental and physical symptoms due to their unmet needs. Secondly, the PNQ-v2 may be useful in monitoring progress in therapy and may help to inform changes throughout the course of treatment. For example, if an individual engaged in therapy for depression complains of feeling incompetent and of not having an adequate amount of meaningful interpersonal interactions or relationships, the PNQ-v2 could help monitor whether interventions designed to address such issues are actually effective in doing so for this particular individual.

Moreover, a valid and reliable measure of need fulfilment, such as the PNQ-v2, may help to evaluate the effectiveness of programs, treatments, or services intended to increase

the fulfilment of needs. One of the goals in couples therapy for instance, is to have partners recognize each other's needs and to find more useful and productive ways to help fulfil them. A measure of need fulfilment may help inform couples' sessions and assess the effectiveness of specific interventions or homework assignments.

Findings of the current study also suggest that although basic needs are considered to be innate, universal, and necessary for optimal well-being and life satisfaction, gender may alter how such needs are expressed and satisfied, accounting for individual differences. Gaining a better understanding of gender differences in perceived need importance and fulfilment has important implications because it would allow for the refinement of need theories, as well as an increase in clinician understanding of individual need differences in patients, thereby increasing their likelihood of providing effective therapy.

An important limitation of the current project includes the student sample. Although university students provide a convenient sample appropriate for scale construction (Pernice, van der Veer, Ommundsen, & Larsen, 2008), utilizing such a sample may lead to limited generalizability and therefore requires cautious interpretation of results. Future studies should aim to investigate similar questions to that of the current study in community-based samples.

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Table 14

*Study 2a Research Hypotheses and Confirmation Status*

#	Description	Confirmed	
		Yes	No
1	PNQ-v2 items confirm the 3-level model of needs	√	
2	Three-level confirmatory factor model will fit data best	√	
3a	PNQ-v2 + correlated with depression	√	
3b	PNQ-v2 + correlated with anxiety		√
4	PNQ-v2 + correlated with physical symptoms	√	
5	Different subscales will correlate with different measures	√	
6	PNQ-v2 - correlated with BNSG-S	√	
7	PNQ-v2 as useful as BNSG-S in predicting depression	√	
8	Women report higher overall need fulfilment than men		√
9a	Women report lower SW need fulfilment than men		√
9b	Women report higher REL need fulfilment than men		√
10	Men more frequently rate needs as unimportant	√	

*Note.* + indicates a hypothesized positive correlation and – indicates a hypothesized negative correlation.

Table 15

*Descriptive Statistics of the PNQ-v2 Items*

Item	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
1	1.83	1.10	.09	-.56
2	1.87	1.07	.08	-.56
3	1.82	1.15	.02	-.82
4	2.24	1.22	-.46	-.74
5	1.07	1.13	.83	-.21
6	1.37	1.13	.17	-.99
7	1.61	1.08	-.11	-.83
8	1.94	1.13	-.11	-.66
9	1.66	.96	-.15	-.50
10	2.10	1.19	-.23	-.79
11	2.35	1.29	-.47	-.79
12	1.98	1.16	-.16	-.72
13	2.50	1.27	-.70	-.53
14	1.71	1.13	.04	-.76
15	1.88	1.09	-.03	-.56
16	1.32	1.29	.48	-1.00
17	1.61	1.14	-.03	-1.03
18	1.92	1.22	-.15	-.87
19	2.09	1.14	-.39	-.68
20	1.70	1.01	.08	-.54
21	1.75	.99	.05	-.30
22	2.05	1.15	-.09	-.75
23	1.78	1.07	.03	-.53
24	1.81	1.09	.01	-.59
25	2.00	1.15	-.10	-.78
26	1.97	1.13	-.14	-.79
27	1.09	1.09	.74	-.26
28	1.76	1.16	-.08	-.93
29	1.59	1.03	.04	-.71
30	1.83	1.09	-.26	-.83
31	1.74	1.00	.01	-.17
32	1.86	1.00	-.22	-.41
33	2.18	1.24	-.26	-.94

Note: *N* = 283. *SE* of skewness = .15; *SE* of kurtosis = .29.

Table 16

*Standard Errors of the Bootstrap Factors, Mean of the Estimated Nonstandardized Parameters, Adjusted 95% Confidence Intervals of the Parameters, and Standardized Factor Loadings for the PNQ Items*

Parameters	SE	SE-SE	Mean	Bias	SE-Bias	LL	HL	p	Loadings
Relatedness 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.55
Relatedness 2	.25	.01	1.41	.02	.01	1.06	2.07	.001	.72
Relatedness 3	.22	.01	1.13	.03	.01	.80	1.65	.002	.62
Belongingness 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.65
Belongingness 2	.10	.00	.88	.00	.00	.67	1.09	.002	.59
Belongingness 3	.11	.00	.96	.00	.00	.75	1.20	.002	.62
Intimacy 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.61
Intimacy 2	.21	.01	1.34	.02	.01	1.00	1.80	.002	.70
Intimacy 3	.19	.00	1.18	.02	.01	.88	1.57	.003	.77
Status 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.47
Status 2	.56	.01	1.64	.11	.02	1.04	3.09	.002	.67
Status 3	1.21	.03	2.45	.26	.04	1.23	5.05	.002	.31
Fun 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.64
Fun 2	.12	.00	.98	.01	.00	.80	1.25	.002	.70
Fun 3	.12	.00	1.03	.01	.00	.81	1.26	.003	.69
Competence 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.52
Competence 2	.26	.01	1.36	.02	.01	.92	1.92	.002	.59
Competence 3	.17	.00	1.16	.01	.01	.88	1.56	.002	.60
Autonomy 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.56
Autonomy 2	.13	.00	.74	.02	.00	.48	.97	.003	.48
Autonomy 3	.12	.00	.71	.01	.00	.48	.95	.002	.46
Agency 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.60
Agency 2	.13	.00	1.00	.01	.00	.80	1.30	.002	.66
Agency 3	.14	.00	.73	.00	.00	.51	1.04	.002	.47
Stability 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.43
Stability 2	.36	.01	1.62	.06	.01	1.12	2.47	.002	.60
Stability 3	.26	.01	.91	.03	.01	.49	1.49	.002	.40
Fairness 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.49
Fairness 2	.23	.01	1.18	.03	.01	.81	1.66	.003	.55
Fairness 3	.18	.00	.80	.01	.01	.47	1.17	.002	.37
Independence 1	.00	.00	1.00	.00	.00	1.00	1.00	...	.60

Independence 2	.13	.00	.89	.00	.00	.65	1.15	.002	.53
Independence 3	.16	.00	.86	.01	.01	.58	1.18	.002	.54

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*Note.* *SE* = standard error; *LL* = lower limit; *HL* = higher limit, *CR* = critical ratio. Factor loadings are those of the items on their respective factors. All loadings were significant ( $p < .001$ ).

Table 17

*Fit Indices for Three-Level, Two-Level, and One-Level CFA Models*

Model	$\chi^2$	<i>df</i>	<i>p</i> ( $\chi^2$ )	<i>CFI</i>	<i>RMSEA</i>	<i>SRMR</i>
Model A	1144.06	496	<.000	.707	.068	.088
Model B	1068.21	494	<.000	.741	.064	.069
Model C	812.90	483	<.000	.853	.049	.058
Modified	749.74	477	<.000	.878	.045	.056

*Note.* *N* = 282. CFA = Confirmatory Factor Analysis; *CFI* = Comparative Fit Index; *RMSEA* = Root Mean Squared Error of Approximation; *SRMR* = Standardized Root Mean Residual.

Table 18

*Standardized Factor Loadings of the Need Subscales on their Respective Need Domains*

Need Subscale	Self-Worth Domain	Interpersonal Domain
Relatedness	-	.91*
Belongingness	-	.86*
Intimacy	-	-.07
Status	-	.78*
Fun	-	.82*
Competence	.93*	-
Agency	.88*	-
Autonomy	1.04*	-
Stability	.75*	-
Fairness	.87*	-
Independence	.83*	-

*Note.* \* loadings significant at the  $p < .001$  level.

Table 19

*Correlation between the PNQ-v2 Indices, Domains, and Subscales and Measures of Well-Being*

	Depression	Events	Dependency	Self-criticism	Anxiety	Physical symptoms
Fulfilment	.41**	.23**	.36**	.45**	.09	.18**
Unimportance Freq.	.17**	.08	-.06	.15*	.06	.09
REL Domain	.40**	.21**	.31**	.41**	.06	.20**
Relatedness	.33**	.14*	.33**	.32**	.02	.15*
Belongingness	.31**	.15**	.24**	.33**	.05	.12*
Phys. Intimacy	-.02	-.01	-.03	-.03	.01	.14*
Stability	.24**	.14*	.21**	.25**	.03	.09
Fairness	.24**	.23**	.20**	.26**	.00	.16**
Fun	.39**	.15*	.23**	.41**	.11	.09
SW Domain	.36**	.21**	.34**	.40**	.10	.13*
Competence	.25**	.19**	.28**	.31**	.02	.08
Agency	.32**	.20**	.23**	.36**	.05	.13*
Autonomy	.29**	.17**	.24**	.30**	.10	.04
Status	.27**	.13*	.29**	.25**	.17**	.17**
Independence	.19**	.10	.22**	.27**	.04	.07

*Note.* REL = Relationship, SW = Self-worth, Freq. = frequency.

\*\* correlation significant at the 0.01 level (2-tailed). \* correlation significant at the 0.05 level (2-tailed).

Table 20

*Bivariate and Partial Correlations of the Self-Worth Subscale Fulfilment Scores with Depression*

IV	<i>Bivariate</i>	<i>Partial</i>
Competence	.25**	.02
Agency	.32**	.17**
Stability	.23**	.11
Autonomy	.29**	.08
Fairness	.24**	.07
Independence	.19**	-.03

*Note.* \*  $p < .05$ . \*\*  $p < .01$ .

Table 21

*Bivariate and Partial Correlations of the Relationship Subscale Fulfilment Scores with Two Measures of Well-Being*

IV	Depression		Physical Symptoms	
	<i>Bivariate</i>	<i>Partial</i>	<i>Bivariate</i>	<i>Partial</i>
Relatedness	.34**	.09	.14*	.07
Belongingness	.31**	.07	.12*	.01
Intimacy	-.01	-.02	.13*	.14*
Status	.27**	.13*	.16**	.10
Fun	.39**	.23**	.10	.01

*Note.* \*  $p < .05$ . \*\*  $p < .01$ .

Table 22

*Correlation between the PNQ-v2 Subscales and the BNSG-S Need Subscales*

	BNSG-S Autonomy	BNSG-S Competence	BNSG-S Relatedness
Fulfilment	-.39**	-.43**	-.19**
Unimportance Freq.	-.24**	-.26**	-.43**
REL Domain	-.37**	-.38**	-.22**
Relatedness	-.30**	-.30**	<b>-.15*</b>
Belongingness	-.33**	-.34**	-.27**
Phys. Intimacy	.01	.07	-.04
Stability	-.18**	-.23**	-.06
Fairness	-.29**	-.25**	-.10
Fun	-.31**	-.39**	-.20**
SW Domain	-.34**	-.41**	-.11
Competence	-.22**	<b>-.32**</b>	-.01
Agency	-.24**	-.37**	-.12*
Autonomy	<b>-.35**</b>	-.33**	-.12*
Status	-.24**	-.25**	-.14*
Independence	-.20**	-.26**	-.03

*Note.* REL = Relationship, SW = Self-worth, Freq. = frequency

\*\*Correlation is significant at the 0.01 level (2-tailed). \*Correlation is significant at the 0.05 level (2-tailed).

Table 23

*Hierarchical Regressions Comparing the Predictive Utility of the PNQ-v2 and the BNSG-S*

	$\Delta R^2$	<i>B</i>	<i>SE B</i>	$\beta$
Step 1	.17**			
PNQ-v2		.31	.04	.42**
Step 2	.34**			
BNSG Autonomy		-3.81	.86	-.27**
BNSG Competence		-4.60	.70	-.40**
BNSG Relatedness		-.88	.73	-.07
Total $R^2$	.51			
Step 1	.50**			
BNSG Autonomy		-4.25	.86	-.30**
BNSG Competence		-5.13	.67	-.44**
BNSG Relatedness		-.61	.73	-.05
Step 2				
PNQ-v2		.09	.04	.12*
Total $R^2$	.51			

*Note.*  $N = 282$ .\*  $p < .05$ . \*\*  $p < .001$ .

Table 24

*Means and Standard Deviations on the Dependent Variables for Both Genders*

	Males		Females	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Fulfilment	58.07	17.95	62.14	15.64
Unimportance Freq.	6.56	5.90	4.54	3.76

*Note.* *M* = mean, *SD* = standard deviation, *N* males = 146, *N* females = 136.

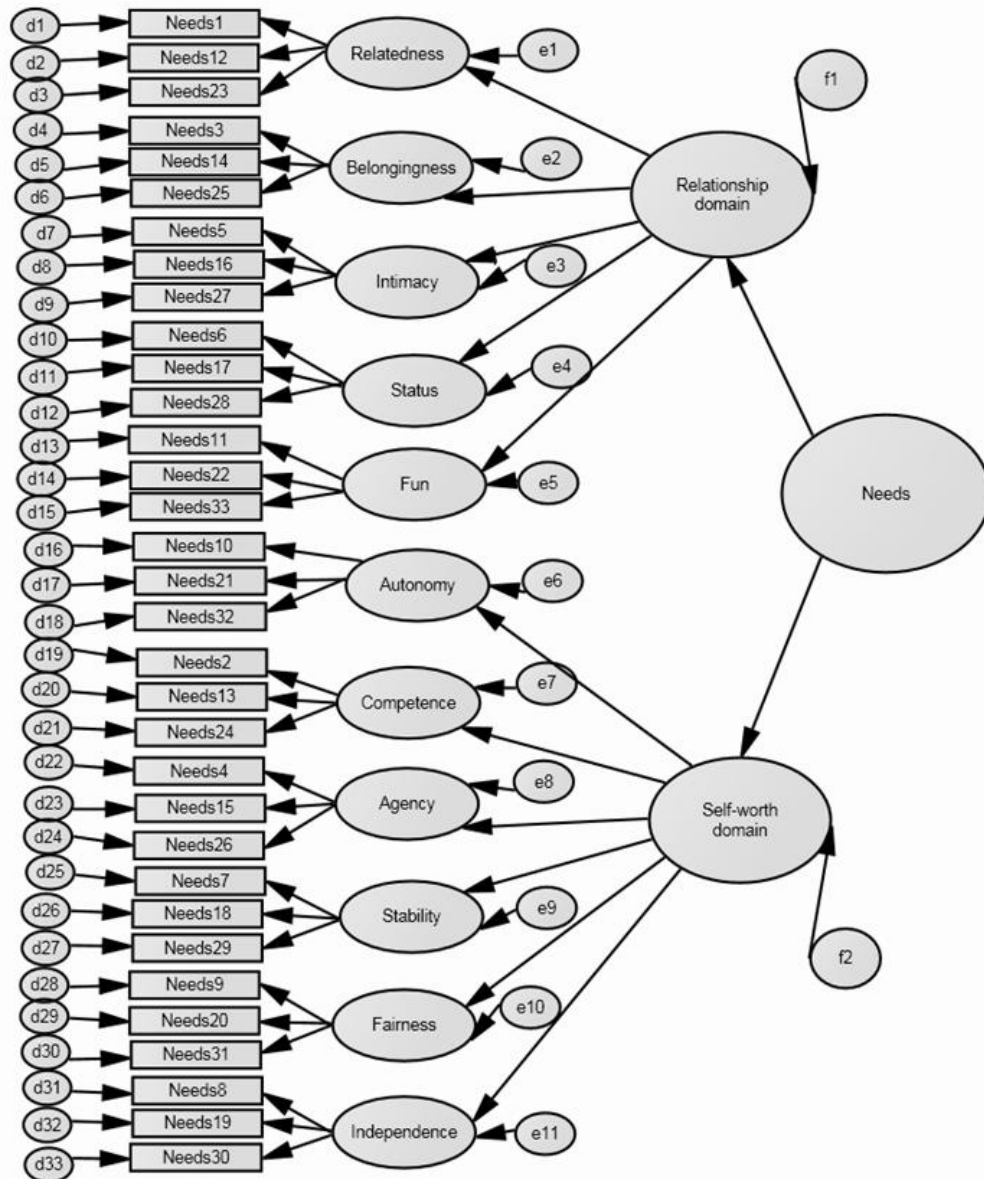


Figure 3. Three-level hypothesized needs model (model C) based on PNQ-v2. Rectangles represent observed variable (i.e., PNQ-v2 items) and ovals represent latent factors and error terms (labeled d1-d33, e1-e11, and f1-f2). Single-headed arrows indicate the path between the hypothesized latent variables and from the latent variables to the PNQ-v2 items.

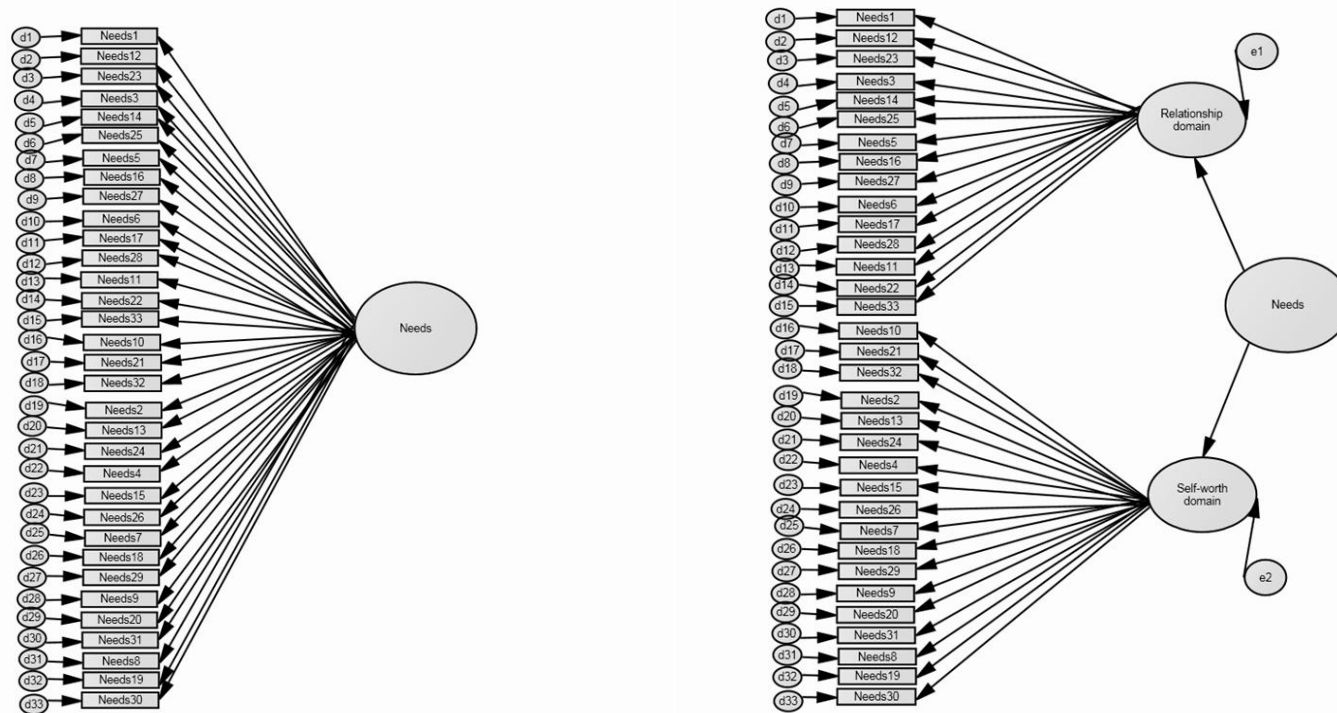


Figure 4. Models A and B examined via Confirmatory Factor Analysis in AMOS 18. Model A (left) represents the 1-level model of needs whereas model B (right) represents the 2-level model of needs. Rectangles represent observed variable (i.e., PNQ-v2 items) and ovals represent latent factors and error terms (labeled d1-d33 and f1-f2). Single-headed arrows indicate the path between the hypothesized latent variables and the PNQ-v2 items.

**CHAPTER 5: Study 2b****The Moderating Role of Need Fulfilment in Gender and Well-Being and in Events,  
Personality Characteristics, and Depression**

The lack of psychological need fulfilment has repeatedly been demonstrated to be associated with poorer overall well-being, as well as with decreased mental and physical health (see Deci & Ryan, 2000 for review). More recently, psychological needs have been proposed to act as moderator and mediator variables in various well-documented relationships. In fact, psychological need fulfilment has been proposed to be a mechanism through which several well-established associations can be better understood.

Although the relation between gender and various negative psychological outcomes is well-established (e.g., Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993; Stewart, Taylor, & Baker, 1997), the mechanisms behind these associations are still not entirely understood. The current study will examine whether need fulfilment can help explain the relationship between gender and different indicators of well-being.

Similarly, researchers in the depressive vulnerability field have proposed several different models to help explain why negative life events and certain personality characteristics are associated with depression. Some (e.g., Santor, 2003) have proposed that life events and personality characteristics are linked to depression by means of their impact on need fulfilment, a premise that will also be investigated in the current study.

**Gender and Well-Being**

Beginning in early puberty and continuing throughout adulthood, there is evidence of a gender-based discrepancy in depression rates, such that women are twice as likely to report symptoms of depression and to be diagnosed with clinical depression than are men (Diaz-

Granados, et al., 2006; Kessler et al., 1993; Nolen-Hoeksema & Girgus, 1994; Silberg et al., 1999; Twenge & Nolen-Hoeksema, 2002). Research has also demonstrated that women more frequently suffer from anxiety than do men, with a ratio of 2:1 (Kessler et al., 1993; Nolen-Hoeksema, 1990, 1995). In fact, women tend to not only express more anxiety symptoms, but are also more likely to perceive a dangerous situation as a personal threat (Armstrong & Khawaja, 2002). Furthermore, research has demonstrated that women tend to express greater concern and articulate more distress than men over inexplicable physical symptoms (Stewart et al., 1997).

Some have attributed the aforementioned gender-based differences in symptomatology to the differing socialization of men and women (e.g., Stewart et al., 1997). For example, whereas girls are more likely to be socialized to be relationship-focused, boys are socialized to strive for things that are highly valued in Western industrialized nations, such as agency, independence, mastery, and personal control, thereby making them more successful by Western standards (Jack, 1991; Kirsch & Kuiper, 2002; Miller, 1976). In addition, boys are socialized to suppress and deny certain types of pain and to associate pain with embarrassment (Helgeson & Novak, 2006).

Differences in coping styles have also been suggested to explain gender differences in symptoms. For example, when depressed, women tend to seek more support from others, remain less physically active, and ruminate more on their symptoms than men (Nolen-Hoeksema, 1987). On the other hand, men tend to engage in distraction and increased physical activity in the presence of negative symptoms (Nolen-Hoeksema, 1987).

Socialization as well as preferences in coping styles are likely to differentially support the fulfilment of basic psychological needs. Following from this reasoning, it is

possible that gender differences in measures of well-being and mental health can be explained by variations in levels of need fulfilment. In fact, it has been shown that depression in both men and women is associated with conflicts around the expression and fulfilment of the needs for dependency and individualization (Gammel & Stoppard, 1999; McMullen, 1999; Striver, 1991). Thus, the moderator role of need fulfilment in the relation between gender and mental and physical health will be tested in the current study.

### **Events, Personality Characteristics, and Depression**

**Negative life events.** There is an extensive amount of research linking stressful life experiences to depression (see Kessler, 1997 for review). Although negative life events have been traditionally classified based on their descriptive features as being either self-related (e.g., failure events) or interpersonal in nature (e.g., rejection event; Segal, Shaw, Vella, & Katz, 1992; Zuroff & Mongrain, 1987), others have proposed classifying events based on the psychological needs they threaten or fulfill (Brown, & Harris, 1978). Overall, the literature on stressful life events indicates that exposure to stressful life events is associated with the subsequent onset of episodes of major depression and the magnitude of this link varies depending on how events are measured, with stronger associations found when measures that incorporate contextual information of the events are used rather than simple checklists (Kessler, 1997). In addition, there appears to be a dose-response relationship between events and depression, in that more severe events are more strongly associated with depressive symptom (Kessler, 1997). It is possible that the impact that negative events have on psychological needs is responsible for many of these findings. For example, severe events are likely to have a greater impact on need fulfilment than minor events and therefore may be

more likely to lead to depression. Consequently, the current study will examine whether the link between events and depression is moderated by need fulfilment.

**Personality vulnerability characteristics.** Both Beck (1983) and Blatt (1974) proposed theories of depression in which the presence of specific personality constructs increased one's likelihood of experiencing depressive symptoms. Although they were referred to with differing terminology, both theorists proposed the existence of a personality characteristic associated with relatedness and another associated with individualism. The personality construct of relatedness or dependency is characterized by an extremely high need for affiliation, a preoccupation with interpersonal trust and intimacy, and an excessive fear of being abandoned (Blatt, 1974; Zuroff & Mongrain, 1987). On the other hand, the personality construct of individualism or self-criticism is associated with an exaggerated need for independence, autonomy, and achievement, as well as with excessive negative self-evaluations (Zuroff & Mongrain, 1987). The personality constructs of dependency and self-criticism are believed to make individuals more vulnerable to experiencing depression.

**Conventional depressive vulnerability models.** Knowledge about negative life events and personality characteristics has typically been combined to form stress-diathesis depressive vulnerability models. Stressful life events have been thought to activate underlying personality vulnerabilities and influence the way in which individuals adapt and respond to such events, thus making certain individuals more prone to depression (Santor, 2003). More specifically, traditional depressive vulnerability models suggest that an individual high on a particular vulnerability characteristic (i.e., dependency or self-criticism), who experiences an event which is consistent with that vulnerability (e.g., interpersonal rejection or achievement failure), is more likely to experience symptoms of depression

(Santor, 2003). One line of research has begun to expand upon such conventional models of depression by suggesting that unmet psychological needs moderate the relationship between negative life events or hassles, depressive vulnerability characteristics, and depressive symptoms (Kopala Sibley & Santor, 2007; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Santor & Kopala Sibley, 2007). The current study aimed to replicate such findings.

### **Research Objectives and Hypotheses**

The first goal of the current study was to examine the extent to which need fulfilment moderated the relationship between gender and various outcome variables, namely depression, anxiety, and physical symptoms. It was hypothesized that need fulfilment would moderate the relationship between gender and depression, anxiety, and physical symptoms (hypothesis 1a, 1b, 1c).

The second research objective was to assess the moderator role of need fulfilment, not only in the relationship between negative life events and depressive symptoms, but also in the relationship between dependency and self-criticism and depressive symptoms. Psychological needs were expected to moderate the association between negative life events and mood (hypothesis 2). Furthermore, the relationship between both personality vulnerability characteristics and depression were expected to be moderated by fulfilment of the needs in their associated domain. More specifically, need fulfilment within the self-worth domain was expected to moderate the relation between self-criticism and depression (hypothesis 3a) and need fulfilment within the relationship domain was expected to moderate the link between dependency and depression (hypothesis 3b). See table 25 for a review of all study 2b research hypotheses.

### **Methods**

The present study is an extension of a previously described study (Beausoleil & Santor, 2009) that utilized the same sample of participants, the same measures, and the same methodological procedures. Consequently, the methods section will not be repeated here. Please refer to the methods section of study 2a (Beausoleil & Santor, 2009) for further detail.

### **Results**

Linear regression analyses were conducted to evaluate whether need fulfilment moderated the relationship between gender and various outcomes variables, between negative life events and depression, and between depressive vulnerability factors and depression.

### **Assumptions**

Analyses were performed using SPSS REGRESSION and SPSS EXPLORE for evaluation of assumptions. The number of missing values was low, ranging from 0% to .7% and was considered to be completely random (Little's MCAR test: chi-Square = 254.45,  $df = 725$ ,  $p = 1.00$ ; Tabachnick & Fidell, 2007). With the use of a  $p < .001$  criterion for Mahalanobis distance, five univariate outliers, two multivariate outliers, and one both univariate and multivariate outlier were identified. After examination of the possible reasons for the identified outliers, the case that was both a univariate and multivariate outlier was deleted and excluded from analyses whereas all others were maintained as part of the data set.

The values for some variables (i.e., negative life events, depression, physical symptoms) were slightly positively skewed, which was not surprising given the nature of what was being assessed and that such variables are not expected to be normally distributed

within a non-clinical sample. According to Tabachnick and Fidell (2007), in samples of 200 or more, a variable with substantive skewness does not deviate from normality enough to make a substantial difference in the analyses. Following from this reasoning, in addition to the desired ease of interpretability of the results, transformations were not performed. All other variables had acceptable skewness and kurtosis values, indicating similarity to the normal curve (Tabachnick & Fidell, 2007).

**Correction for multiple analyses.** Given the exploratory nature of the following analyses, alpha values were not adjusted for multiple analyses. Rather, in an effort to avoid overlooking significant effects or trends, the conventional alpha value of .05 was employed for all analyses.

**Mean centering.** Although it is conventional to center continuous independent variables in moderated regression, many researchers have questioned the utility of this approach (Cohen, 1978; Cronbach, 1987; Kromrey & Foster-Johnson, 1998; Mossholder, Kemery, & Bedeian, 1990). Given the evidence provided by such researchers and the exploratory nature of the following moderation analyses, the continuous independent variables were not centred.

### **Gender and Outcomes Variables**

The current study examined whether scores on the various outcome variables were significantly different in men and women. In addition, the study assessed whether need fulfilment moderated the relationship between gender and mental and physical symptoms.

Correlational data revealed that, contrary to hypotheses, gender was not significantly related to depression or anxiety in the current sample. However, gender was significantly associated with physical symptoms ( $r = .12, p < .05$ ). The direction of the relationship

indicated that, consistent with past findings, women were more likely to report higher levels of distressing physical symptoms than men. In addition, gender was not related to self-criticism but was positively correlated to dependency ( $r = .34, p < .01$ ) and negative life events ( $r = .13, p < .05$ ), such that women were more likely to report higher levels of dependency and more frequent negative life events.

**Gender and physical symptoms.** In accordance with the non-significant correlations between gender and both depression and anxiety, moderated regressions were not conducted with these dependent variables. Nonetheless, hierarchical regression (McClelland & Judd, 1993) was employed to examine the extent to which need fulfilment moderated the relationship between gender and physical symptoms. Table 26 displays the r-squared values ( $R^2$ ), the change r-squared values ( $\Delta R^2$ ), the unstandardized regression coefficients ( $B$ ) along with their standard errors ( $SE B$ ), and the standardized regression coefficients ( $\beta$ ) after entry of each IV as well as their interaction term.  $R$  was significantly different from zero after each step. After step 3,  $R^2 = .04, F(3, 276) = 3.99, p = .008$ . The adjusted  $R^2$  of .03 indicated that 3% of the variability in physical symptoms is predicted by gender and need fulfilment, as well as their interaction.

After step 1, with gender in the equation,  $R^2 = .01, F_{inc}(1, 278) = 4.00, p = .046$ . After step 2, with need fulfilment added to the prediction of physical symptoms,  $R^2 = .04, F_{inc}(1, 277) = 7.90, p = .005$ , indicating that the addition of need fulfilment to the equation resulted in a significant increment in  $R^2$ . After step 3, with the interaction term added to the prediction of physical symptoms,  $R^2 = .04, F_{inc}(1, 276) = .001, p > .05$ . The addition of the interaction term did not reliably improve  $R^2$ .

The pattern of results suggests that although 1% of the variability in physical symptoms can be predicted by gender, need fulfilment adds significantly to that prediction, allowing for an extra 3 % of the variance in physical symptoms to be accounted for with the addition of this variable to the equation.

Another hierarchical regression in which the order of the predictor variables was reversed was conducted (see bottom section of table 26).  $R$  was significantly different from zero after each step.

After step 1, with need fulfilment in the equation,  $R^2 = .03$ ,  $F_{inc}(1, 278) = 9.17$ ,  $p = .003$ . After step 2, with gender added to the prediction of physical symptoms,  $R^2 = .04$ ,  $F_{inc}(1, 277) = 2.77$ ,  $p = .097$ , indicating that the addition of gender to the equation did not result in a significant increment in  $R^2$ . After step 3, with the interaction term added to the prediction of physical symptoms,  $R^2 = .04$ ,  $F_{inc}(1, 276) = .001$ ,  $p > .05$ . The addition of the interaction term did not reliably improve  $R^2$ , indicating that moderation is not taking place.

The pattern of results suggests that when the effects of need fulfilment on physical symptoms are accounted for, gender no longer significantly predicts physical symptoms. In other words, the impact of need fulfilment on physical symptoms accounts for the observed relationship between gender and physical symptoms, suggestive of possible mediation (Tabachnick & Fidell, 2007).

### **Negative Life Events and Depression**

Hierarchical regression (McClelland & Judd, 1993) was employed to determine if addition of information regarding need fulfilment improved prediction of depressive symptoms beyond that afforded by number of negative life events experienced. Because of the non-significant correlation between gender and depression, gender was not controlled for

in the following set of analyses. Table 27 displays the r-squared values ( $R^2$ ), the change r-squared values ( $\Delta R^2$ ), the unstandardized regression coefficients ( $B$ ) along with their standard errors ( $SE B$ ), and the standardized regression coefficients ( $\beta$ ) after entry of each IV as well as their interaction term.  $R$  was significantly different from zero after each step. After step 3,  $R^2 = .23$ ,  $F(3, 278) = 27.96$ ,  $p < .001$ . The adjusted  $R^2$  of .22 indicates that almost a quarter of the variability in depressive symptoms is predicted by life events and need fulfilment, as well as their interaction.

After step 1, with negative life events in the equation,  $R^2 = .10$ ,  $F_{inc}(1, 280) = 31.78$ ,  $p < .001$ . After step 2, with need fulfilment added to the prediction of depression,  $R^2 = .22$ ,  $F_{inc}(1, 279) = 42.90$ ,  $p < .001$ . Addition of need fulfilment to the equation resulted in a significant increment in  $R^2$ . After step 3, with the interaction term added to the prediction of depression,  $R^2 = .23$ ,  $F_{inc}(1, 278) = 3.68$ ,  $p = .056$ . The addition of the interaction term did not reliably improve  $R^2$ . However, the  $p$  value of .056 suggests that there may be a trend for psychological need moderation in the relationship between negative life events and depressive symptoms.

The pattern of results suggests that although 10% of the variability in depressive symptoms can be predicted by number of negative life events experienced in the last year, need fulfilment adds significantly to that prediction, allowing for an extra 12 % of the variance in depressive symptoms to be accounted for with the addition of this variable to the equation.

### Personality Characteristics and Depression

Two separate hierarchical regressions were employed to determine if the addition of information regarding domain-specific need fulfilment improved the prediction of depressive symptoms beyond that afforded by its associated depressive vulnerability characteristic.

**Self-worth needs, self-criticism, and depression.** The first hierarchical regression examined whether the addition of need fulfilment within the self-worth domain improved prediction of depressive symptoms beyond that afforded by self-criticism scores. Table 28 displays the r-squared values ( $R^2$ ), the change r-squared values ( $\Delta R^2$ ), the unstandardized regression coefficients ( $B$ ) along with their standard errors ( $SE B$ ), and the standardized regression coefficients ( $\beta$ ) after entry of each IV as well as their interaction term.  $R$  was significantly different from zero after each step. After step 3,  $R^2 = .39$ ,  $F(3, 278) = 59.80$ ,  $p < .001$ . The adjusted  $R^2$  of .39 indicates that almost 40% of the variability in depressive symptoms is predicted by self-criticism, need fulfilment within the self-worth domain, and the interaction of the two.

After step 1, with self-criticism in the equation,  $R^2 = .37$ ,  $F_{inc}(1, 280) = 162.96$ ,  $p < .001$ . After step 2, with need fulfilment within the self-worth domain added to the prediction of depression,  $R^2 = .38$ ,  $F_{inc}(1, 279) = 7.08$ ,  $p < .001$ . Addition of need fulfilment within the self-worth domain to the equation results in a significant increment in  $R^2$ . After step 3, with the interaction term added to the prediction of depression,  $R^2 = .39$ ,  $F_{inc}(1, 278) = 3.98$ ,  $p < .05$ . The addition of the interaction term resulted in a significant increment in  $R^2$ , indicating that need fulfilment within the self-worth domain does in fact moderate the relationship between self-criticism and depression. The interaction is plotted in figure 5.

This pattern of results suggests that although 37% of the variability in depressive symptoms can be predicted by the depressive vulnerability characteristic of self-criticism, need fulfilment in its associated domain (i.e., in the self-worth domain) contributes modestly to that prediction, allowing for an extra 1 % of the variance in depressive symptoms to be accounted for with the addition of need fulfilment to the equation. Furthermore, the significant interaction between the two variables (see figure 5) indicates that need fulfilment within the self-worth domain affects the strength of the relationship between self-criticism and depression. More specifically, individuals who are very critical of themselves are more likely to experience high levels of depression if their self-worth needs are unmet than if they are met. On the other hand, at low levels of self-criticism, need fulfilment does not appear to significantly alter the relationship between self-criticism and depression.

**Relationship needs, dependency, and depression.** The second hierarchical regression examined whether the addition of need fulfilment within the interpersonal domain improved prediction of depressive symptoms beyond that afforded by dependency scores. Table 29 displays the r-squared values ( $R^2$ ), the change r-squared values ( $\Delta R^2$ ), the unstandardized regression coefficients ( $B$ ) along with their standard errors ( $SE B$ ), and the standardized regression coefficients ( $\beta$ ) after entry of each IV as well as their interaction term.  $R$  was significantly different from zero after each step. After step 3,  $R^2 = .25$ ,  $F(3, 278) = 30.18$   $p < .001$ . The adjusted  $R^2$  of .24 indicates that almost a quarter of the variability in depressive symptoms is predicted by dependency, need fulfilment within the relationship domain, and the interaction of the two.

After step 1, with dependency in the equation,  $R^2 = .13$ ,  $F_{inc}(1, 280) = 41.52$ ,  $p < .001$ . After step 2, with need fulfilment within the relationship domain added to the

prediction of depression,  $R^2 = .22$ ,  $F_{inc}(1, 279) = 39.32$ ,  $p < .001$ . Addition of need fulfilment within the relationship domain to the equation results in a significant increment in  $R^2$ . After step 3, with the interaction term added to the prediction of depression,  $R^2 = .25$ ,  $F_{inc}(1, 278) = 30.18$ ,  $p < .001$ . The addition of the interaction term resulted in a significant increment in  $R^2$ , indicating that need fulfilment within the interpersonal domain does in fact moderate the relationship between dependency and depression. The interaction is plotted in figure 6.

This pattern of results suggests that although 13% of the variability in depressive symptoms can be predicted by the depressive vulnerability characteristic of dependency, need fulfilment in its associated domain (i.e., in the relationship domain) adds significantly to that prediction, allowing for an extra 9 % of the variance in depressive symptoms to be accounted for with the addition of need fulfilment to the equation.

Furthermore, the significant interaction between the two variables (see figure 6) indicates that need fulfilment within the relationship domain affects the strength of the relationship between dependency and depression. More specifically, individuals who are very dependent on others are more likely to experience high levels of depression if their relationship needs are unmet than if they are met. At low levels of dependency, the strength of need fulfilment as a moderator appears to be more modest.

## Discussion

### Gender and Various Outcome Variables

The current study examined whether men and women differed in their self-reported rates of depression, anxiety, and physical symptoms. Correlational data revealed that gender was not significantly related to depression or anxiety in the current sample. Although a

gender difference in the number of depressive and anxiety symptoms is generally reported in the literature, this gender difference is not typically observed in university student samples (Hyde, 1984; Nolen-Hoeksema, 1990; Oliver & Burkham, 1979). Therefore, the findings in the current study are consistent with past research using university-based samples.

Although some studies have indicated that the number of negative life events experienced does not differ between genders (Kessler, 1979; Watson & Tellegen, 1985; Wilhelm, Parker & Dewhurst, 1998), other have indicated that girls and women report experiencing more stressful life events than boys and men (Denton, Prus, & Walters, 2004; Hankin & Abramson, 1999). Results of the present study indicated that women reported experiencing a higher number of negative life events than men. It is possible that men and women have differential recall accuracy or differential willingness to disclose stressful experiences in different contexts, which may help to explain the mixed research findings. Another possibility is that the stressors typically experienced by university students (e.g., moving away from home, difficulties of adaptation to university life, academic pressure), may differentially affect men and women and the available coping resources or protective factors (e.g., mastery, self-esteem, and social support) may differ by gender (e.g., Stroebe & Stroebe, 1983), all of which may impact the likelihood of reporting stressful life events.

Furthermore, although gender was not related to self-criticism, it was positively correlated to dependency such that women reported higher levels of dependency. Such results are consistent with the documented finding that women are more interpersonally dependent than men (Sanathara, Gardner, Prescott, & Kendler, 2003).

Correlational data also indicated that as expected (e.g., Stewart et al., 1997), women were significantly more likely to endorse distressing physical symptoms than were men. In

addition, results of the regression analyses also indicated that although need fulfilment does not moderate the relationship between gender and physical symptoms, need fulfilment accounts for a larger proportion of the variance in physical symptoms than does gender. Moreover, when the effects of need fulfilment on physical symptoms were accounted for, gender no longer significantly predicted physical symptoms, which provides preliminary support (Tabachnick & Fidell, 2007) for the idea that need fulfilment may mediate the relationship between gender and physical symptoms. Such findings have important implications for the interpretation of gender differences in reported physical complaints. Perhaps women's higher level of physical symptoms in the current sample can be accounted for by their lower level of overall need fulfilment. Future studies should perform more rigorous mediation analyses with data from community samples to examine whether need fulfilment does in fact mediate the relationship between gender and physical complaints.

### **Negative Life Events and Depression**

Findings of the present study also suggested that although need fulfilment did not moderate the relationship between life events and depression, need fulfilment added significantly to the prediction of depression scores, even after having accounted for the effects of negative life events. Such results suggest that although negative life events are useful in predicting depressive symptoms, they only account for part of the explanation of why depressive symptoms occur. In other words, these findings highlight the importance of need fulfilment over and above the presence of negative life events for the onset of depressive symptoms. Consistent with past studies (e.g., Kopala-Sibley & Santor, 2007), the outcomes of the current study provide support for the notion that the way in which events are experienced and interpreted, and how they may thwart need fulfilment, constitutes an

important factor in determining whether depressive symptoms occur. Given such findings, it is reasonable to assume that the conventional model of depressive vulnerability be revised, and the way in which clinicians work with depressed individuals be altered, so that more focused attention is paid to unfulfilled needs, which may be precipitating or maintaining the depressive symptoms.

### **Personality Characteristics and Depression**

The current study also established that need fulfilment plays an important role in depression, even after accounting for depressive vulnerability characteristics. In addition, findings of the current study indicated that need fulfilment within the self-worth domain moderated the relationship between self-criticism and depression, and that that need fulfilment within the interpersonal domain moderated the relationship between dependency and depression. In other words, need fulfilment within each domain impacted the strength of the relationship between its associated vulnerability characteristics and depression. More specifically, having unmet self-worth needs intensified the relationship between self-criticism and depression, such that self-critical individuals whose self-worth needs were unfulfilled were more likely to experience higher levels of depression than were self-critical individuals whose self-worth needs were satisfied. Similarly, having unmet relationship needs intensified the relationship between dependency and depression, such that highly dependent individuals whose relationship needs were unfulfilled were more likely to experience higher levels of depression than were highly dependent individuals whose relationship needs were satisfied. Such results have important implications for the accurate identification of populations most at risk of experiencing episodes of depression. Although depressive vulnerability characteristics are important in predicting depression, it is when they

are coupled with high levels of unmet needs in their associated domain that they represent the highest risk. These results are also consistent with what the new model of needs presented herein would predict.

### **Research Limitations**

An important limitation of the current study includes that the construct of dependency as measured by the DEQ-R may confound unhealthy and healthy forms of dependency (McBride & Bagby, 2006). Some researchers have suggested that construct of dependency can be divided into two distinct factors, namely connectedness, which corresponds to adaptive dependency and is not associated with depression, and neediness, which corresponds to maladaptive dependency and is related to various forms of psychopathology including depression (Rude & Burnham, 1995). Future studies should examine whether need fulfilment moderates the relationship between neediness and depression.

In addition, given the exploratory nature of the analyses in the given project, alpha values were not corrected for multiple analyses, but rather, the conventional alpha value of .05 was employed for all analyses. Therefore, another limitation of the current study involves the increased risk of occurrences of type I errors, whereby a false positive result occurs (i.e., statistically significant results are detected when in fact no true relationship/difference exists in the population). Consequently, statistically significant results in the current sample should be interpreted with care and efforts should be made to replicate such results in other samples utilizing more rigorous analytic methods.

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Table 25

*Study 2b Research Hypotheses and Confirmation Status*

#	Description	Confirmed	
		Yes	No
1a	Fulfilment moderates relation between gender & depression		?
1b	Fulfilment moderates relation of gender & anxiety		?
1c	Fulfilment moderates relation of gender & physical symptoms		√
2	Fulfilment moderates relation of events & depression		√
3a	SW fulfilment moderates relation of self-criticism & depression	√	
3b	REL fulfilment moderates relation of dependency & depression	√	

*Note.* SW = self-worth domain, REL = relationship domain. ? = hypotheses that were unable to be tested.

Table 26

*Hierarchical Regressions Examining the Moderator Role of Need Fulfilment in the Relationship between Gender and Physical Symptoms*

	$\Delta R^2$	<i>B</i>	SE <i>B</i>	$\beta$
Step 1	.01*			
Gender		3.20	1.60	.12*
Step 2	.03*			
Need fulfilment		.13	.05	.17*
Step 3	.00			
Gender X Need fulfilment		-.00	.10	-.01
Total $R^2$	.04			
Step 1	.03*			
Need fulfilment		.14	.05	.18*
Step 2	.01			
Gender		2.65	1.60	.10
Step 3	.00			
Gender X Need fulfilment		-.00	.10	-.01
Total $R^2$	.04			

Note.  $N = 282$ .

\*  $p < .05$ . \*\*  $p < .001$ .

Table 27

*Hierarchical Regressions Examining the Moderator Role of Need Fulfilment in the Relationship between Negative Life Events and Depression*

	$\Delta R^2$	<i>B</i>	SE <i>B</i>	$\beta$
Step 1	.10**			
Events		1.40	.25	.32**
Step 2	.12**			
Need fulfilment		.27	.04	.36**
Step 3	.01			
Events X Need fulfilment		.02	.01	.37
Total $R^2$	.23			

*Note.*  $N = 282$ .

\*  $p < .05$ . \*\*  $p < .001$ .

Table 28

*Hierarchical Regressions Examining the Moderator Role of Self-Worth Need Fulfilment in the Relationship between Self-Criticism and Depression*

	$\Delta R^2$	<i>B</i>	SE <i>B</i>	$\beta$
Step 1	.37**			
Self-criticism		.41	.03	.61**
Step 2	.02*			
SW fulfilment		.19	.07	.14*
Step 3	.01*			
Self-criticism X SW fulfilment		.01	.00	.78*
Total $R^2$	.39			

Note.  $N = 282$ .

\*  $p < .05$ . \*\*  $p < .001$ .

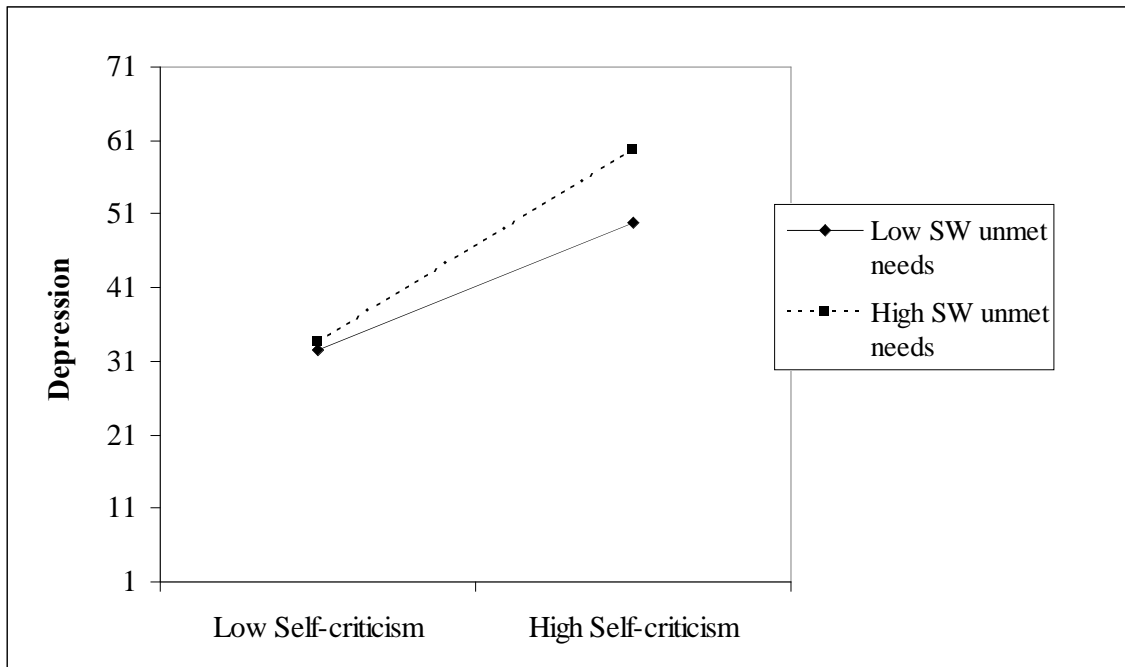
Table 29

*Hierarchical Regressions Examining the Moderator Role of Relationship Need Fulfilment in the Relationship between Dependency and Depression*

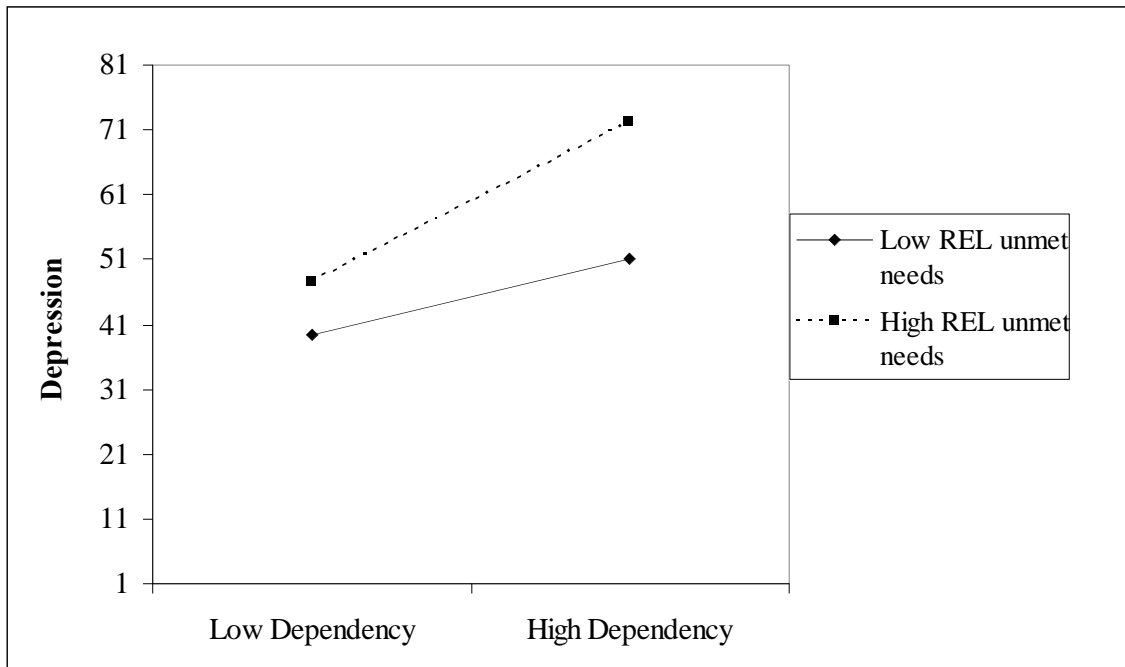
	$\Delta R^2$	<i>B</i>	SE <i>B</i>	$\beta$
Step 1	.13**			
Dependency		.26	.04	.36**
Step 2	.09**			
REL fulfilment		.42	.07	.32**
Step 3	.03*			
Dependency X REL fulfilment		.01	.00	1.30*
Total $R^2$	.25			

*Note.*  $N = 282$ .

\*  $p < .05$ . \*\*  $p < .001$ .



*Figure 5.* Interaction between unmet needs in the self-worth domain and self-criticism scores. SW represents the self-worth domain.



*Figure 6.* Interaction between unmet needs in the relationship domain and dependency scores. REL represents the relationship domain.

## CHAPTER 6

### Global Discussion

#### Overview of Research Findings

The principal objective of this dissertation was to develop and validate a questionnaire that assesses basic psychological need fulfilment. Accordingly, the Psychological Need Questionnaire (PNQ) was created and evidence of its excellent psychometric properties was provided via data from two separate samples. Overall, the PNQ demonstrated great factorial composition, internal consistency, construct validity, and predictive utility.

Several sources of evidence were provided for the factorial validity of the PNQ's hypothesized three-level multi-factor structure, which suggests that psychological needs can be structured and organized in a meaningful manner. More specifically, findings suggested that psychological needs can be categorized as falling within one of two distinct need domains, which are consistent with Bakan's original division of communion and agency (1966). In addition, contrary to the belief proposed within Self-Determination Theory that there are only *three* basic needs (Deci & Ryan, 2000), research findings of the current project support the existence of *several* distinct needs which are fundamental to mental and physical health.

Data from both samples provided support for the use of the PNQ's total scores, as well as its domain and subscale scores, indicating that the scale can be used reliably as a measure of general need fulfilment, as a measure of need fulfilment within either need domain, or as a measure of fulfilment for a particular need. Given the previously mentioned lack of available comprehensive and empirically sound measures of psychological need

fulfilment, the current project's contributions to the literature are significant. In fact, the PNQ may provide researchers in the field with an empirically valid and reliable tool to assess need fulfilment, therefore allowing them to continue expanding knowledge and understanding of the mechanisms responsible for the relationship between need fulfilment and various forms of well-being and health.

**Construct validity.** As expected, data from both samples was consistent with previous research (see Deci & Ryan, 2000 for review) indicating that unmet psychological needs are associated with a variety of negative mental and physical outcomes. More specifically, lack of need fulfilment was related to higher levels of self-reported depression, anxiety, anger, negative life events, and depressive vulnerability personality factors, as well as to poorer self-esteem, lower relationship quality and relationship satisfaction, and lower satisfaction with social support.

The subscales of the PNQ also exhibited differential relationships with external variables, which is consistent with the assumption that certain needs play a particularly important role for specific types of well-being. For example, results indicated that the fulfilment of the need for physical intimacy was particularly important in predicting physical symptoms. However, more research is needed in this area to confirm whether the fulfilment of particular needs is associated with specific and unique outcomes. The PNQ also exhibited excellent convergent validity through its correlations with another widely used measure of psychological needs, the Basic Need Satisfaction in General Scale (BNSG-S; Gagné, 2003). Each scale was useful in predicting depressive symptoms and accounted for unique variability in depressive scores.

***Duration of lack of need fulfilment.*** In addition, as predicted by the needs model presented herein, longer periods of time where needs went unmet were associated with poorer mental and physical outcomes. In fact, the duration of the lack of need fulfilment predicted symptoms of depression, even after accounting for the effects of need fulfilment itself. Such findings imply that chronic lack of need fulfilment is most distressing and more likely to be related to negative outcomes. Therefore, individuals with a longstanding history of unmet needs may constitute the group at highest risk of developing psychological symptoms. Such results are consistent with findings indicating that a longstanding inability to fulfil one's needs is related to more severe and longer-lasting negative consequences (Deci & Ryan, 2002).

***Need importance.*** Analyses conducted as part of this dissertation revealed that although many individuals describe *some* needs as unimportant, overall, they perceived *most* needs as essential and necessary in their lives. In accordance with SDT's claim that individual differences in need strength are relatively unimportant (Deci & Ryan, 2000), results of both studies also demonstrated that the extent to which individuals recognized psychological needs as important to them was unrelated to the outcomes associated with the lack of need fulfilment.

Although few other studies have examined the role of perceived need importance, Schuler, Sheldon, and Frohlich (2010) examined whether individual differences in need strength, as assessed via projective methods (i.e., Thematic Apperception Test; Murray, 1943), impacted the relationship between need satisfaction and resulting motivation. Results indicated that implicit need for achievement moderated the relationship between satisfaction of the need for competence and various measures of motivation. In other words, individuals

who valued the need for achievement, benefitted more from feeling competent, than individuals who did not value the need for achievement. Although this study examined similar research questions and proposed comparable hypotheses to those in this dissertation, significant methodological differences may account for the dissimilar findings. While Schuler and colleagues (2010) measured need strength indirectly by inferring it from projective assessment tools, the current project explicitly assessed individuals' differences in need importance through self-reported questionnaires. Future studies should continue to examine the impact of individual differences in need strength and/or perceived importance on need fulfilment. Even though the current project established that perceived need importance is not associated with negative outcomes and does not amplify the relationship between need fulfilment and various measures of health and well-being, individual differences in need importance may provide further insight into the mechanisms involved in determining whether a need is fulfilled or thwarted.

**Gender differences in need fulfilment.** The given project unveiled important findings concerning gender differences in need fulfilment. Although no gender-based difference in need domain scores were found, women reported lower levels of overall need fulfilment than men. Such findings might be explained by differentiated gender-based socialization, whereby men are more likely than women to be socialized to minimize or deny certain needs (Striver, 1991). Following from this reasoning, it is not surprising that women in the current sample were also more likely than men to perceive psychological needs as important. Additionally, scores did not differ based on gender for any of the need subscales, with the exception of the relatedness subscale, on which women reported being less fulfilled than men. Perhaps because women's identity is so highly related to their interpersonal

relationships (Chodorow, 1978; Gilligan, 1982; Jordan et al., 1991; Miller, 1976, 1984), they are more likely to be aware of and unsatisfied with unfulfilled relatedness needs, thus reporting lower levels of overall fulfilment in this area. Overall, such findings suggest that men and women differ with regard to their perceived general and specific need fulfilment. Given the documented association between unmet needs and various negative outcomes, such gender differences in fulfilment may help to explain why certain psychological conditions affect men and women at different rates. Questions of this nature should be examined in future community-based studies.

**Moderator role of needs.** Given the importance of need fulfilment for various indicators of well-being (Assor, Alfi, Kaplan, Roth, & Katz, 2000; Cicchetti, 1991; Crocker, et al., 2003; Crocker & Knight 2005; Deci & Ryan, 2002), it was hypothesized that need fulfilment would act as a moderator variable in previously well-established relationships.

**Gender.** Although need fulfilment did not moderate the relationship between gender and physical symptoms, results of study 2b provided preliminary support (Tabachnick & Fidell, 2007) for the idea that need fulfilment may mediate the relationship between gender and physical symptoms, thus accounting for the link between these two variables. Given the differences in domain-specific need fulfilment between men and women observed in study 2a and documented in the literature (Jack, 1991; Kirsch & Kuiper, 2002; Miller, 1976), such findings are consistent with expectations. Nevertheless, more research is needed to investigate whether this finding is replicable in a more representative community sample and whether it can be generalized to other psychological problems such as depression and anxiety.

*Negative life events and personality characteristics.* Results of the current project also supported the notion that need fulfilment has an important part to play in predicting depression over and above that of negative life events. These findings suggest that negative events influence well-being by means of their impact on need fulfilment, which is consistent with research conclusions in the field of life events that indicate that the context associated with a negative event (e.g., amount of loss, amount of threat, degree of controllability, consequences of the event) is particularly important in predicting distress (Thoits, 1983).

In addition, need fulfilment was found to significantly predict depression after accounting for the presence of dependency and self-criticism, thereby demonstrating that lack of need fulfilment plays a critical role in inducing and perhaps maintaining depressive symptoms. Moreover, need fulfilment acted as a moderator in the relationship between each vulnerability characteristic and depression, thus altering the strength of the relationship between the two variables. More specifically, self-critical individuals who had unmet self-worth needs were more likely to experience higher levels of depression than were self-critical individuals who had their self-worth needs satisfied and highly dependent individuals who had unmet relationship needs were more likely to experience higher levels of depression than were highly dependent individuals who had their relationship needs satisfied.

### **Research Implications**

**Implications for need measurement and research.** A valid and reliable measure of psychological need fulfilment is essential for the advancement of research and for the trustworthy interpretation of results from empirical studies. What is clear both from the results of the current studies and from the literature, is that psychological needs are important for optimal well-being and health. However, much remains unknown about psychological

needs. The accurate testing of theoretical hypotheses and the interpretation of results are contingent on the measure used. Therefore, given the significant limitations of the currently available scales of need satisfaction, this project has made a meaningful and practical contribution to the literature by providing researchers in the field with an alternative, empirically based and validated measure of need fulfilment. It is hoped that the PNQ will be studied extensively and utilized in various fields of research, thus increasing our knowledge on the topic of basic human psychological needs.

**Implications for need theories.** The results provided within this dissertation also have significant theoretical implications. Data from both samples provided support for many aspects of the newly proposed needs model. For example, the current research confirmed that psychological needs are essential for optimal well-being and overall health, thus providing further support for SDT's conceptualization of needs as essential nutrients for human growth and integrity (Ryan, 1995). Furthermore, as espoused by the model presented in this document, findings of the current project indicated that SDT's conceptualization of basic psychological needs may in fact be oversimplified, with too few factors to capture enough of the meaningful differences among psychological needs. Conversely, the current project has identified a more comprehensive list of empirically derived need factors that are necessary for both mental and physical health. Other researchers are encouraged to attempt to replicate these need factors so that a list of basic psychological needs can be agreed upon, thereby unifying the field. Analyses conducted as part of this project also provided clarity regarding how psychological needs may best be structured and hierarchically organized. Contrary to previously invalidated attempts at structuring and organizing needs (e.g., Maslow, 1954; 1970), support was provided here for a three-level multi-factor structure of needs, whereby

needs are classified in one of two distinct need domains, which are consistent with Bakan's original division of communion and agency (1966). Furthermore, data demonstrated that each need domain can further be subdivided into various need factors, each representing a distinct basic human need.

Other conclusions reached within the current project, which represent significant knowledge gain, involve the indices that should be included in need fulfilment scales as well as a the best method to operationalize psychological needs. Although the findings of the studies presented here were unable to confirm the hypothesis that perceived need importance alters the relationship between need fulfilment and well-being outcome measures, the need importance index provided a useful reference point to qualify the meaning of responses on the need fulfilment index. Furthermore, time associated with need fulfilment proved to be a useful measurement index.

This dissertation also provided further support for the notion that need satisfaction is not only associated with psychological well-being (Ryan & Deci, 2000; Ryan, et al., 2008), but is also related to optimal physical health (Baumeister & Leary, 1995; Crocker, 2002; Holahan & Spence, 1980; Roos & Cohen, 1987). Future studies should continue to explore the impact of unmet psychological needs on physical ailments and symptoms.

**Practical and clinical implications.** The practical and clinical implications of this series of studies are numerous. First, a valid and reliable questionnaire that assesses need fulfilment may be used as a screening tool in medical offices of psychological clinics to identify individuals at higher risk of experiencing psychological and physical symptoms associated with unmet needs. Early identification of such individuals and intervention targeted at helping them better fulfil their needs may lead to fewer people experiencing

common psychological problems such as depression, anxiety, and distressing physical symptoms. In addition, given the dose-response relationship between duration of unmet needs and the severity of various negative outcomes, early identification of individuals may help to prevent chronic lack of need fulfilment and its associated more serious negative outcomes.

The present study also underscored the gender differences both in perceived general need fulfilment and in willingness to recognize certain needs as important. Thus, men and women may benefit from different types of interventions aimed at increasing need fulfilment. The PNQ may be utilised to help therapist assess both need fulfilment and perceived need importance in men and women and to alter their therapeutic strategies in accordance to the findings. In addition to increasing knowledge of gender differences in needs, the PNQ may help to improve clinicians' understanding of individual need differences in all patients, thereby increasing the likelihood of successfully adapting treatment strategies and techniques to meet each patient's unique needs.

Furthermore, the PNQ allows for monitoring of progress in therapy and to help to inform changes throughout the course of treatment. For example, the PNQ-v2 may help to monitor the effectiveness of specific therapeutic interventions or strategies at various points throughout treatment. This line of research may encourage altering the focus of certain types of therapy or counselling to helping individuals learn how to better satisfy their basic psychological needs rather than focusing solely on changing maladaptive coping strategies. This idea is undoubtedly related to the mediating and moderating role that need fulfilment plays in various well-researched relationships. For example, recent work (Wei, et al., 2005) has demonstrated that psychological needs mediate the relationship between attachment and

various indices of stress such as shame, depression and loneliness, and has suggested that many maladaptive coping tendencies (e.g. maladaptive perfectionism, or self-concealment) may develop as attempts to satisfy unfulfilled needs. Therefore, targeting maladaptive coping strategies in therapy without effectively addressing the underlying reasons for these strategies (e.g., unmet needs) may not be sufficient (Wei, et al., 2005). Directly targeting individuals' unmet needs in therapy may also prove to be much less time consuming than attempting to alter attachment styles or other types of relatively stable characteristics such as personality traits.

As mentioned above, results of the present study indicated that need fulfilment moderated the relationship between depressive vulnerability characteristics and depressive symptoms. Following the reasoning outlined above, it is possible that the maladaptive strategies involved in both self-criticism and dependency are aimed at fulfilling unmet needs. For example, it is possible that individuals who are highly self-critical do not feel competent or are dissatisfied with other people's opinion of them (i.e., need for status) and therefore continuously strive to accomplish and achieve. Similarly, it is possible that interpersonally needy individuals do not have their needs for relatedness or belongingness met and therefore continuously strive to engage others in interpersonal relationships and interactions. Examining the purpose and role of maladaptive strategies inherent in self-criticism and dependency and how they may relate to need fulfilment would be a fruitful avenue for future inquiry. Nevertheless, results of the present studies imply that highly self-critical individuals or highly dependent individuals can decrease their likelihood of suffering from depressive symptoms by learning more adaptive ways of fulfilling their needs.

Lastly, the PNQ may also help to evaluate programs and services intended to increase need fulfilment, whether such services are within the school system (e.g., Individualized Education Plans), part of government agencies (e.g., employee support services), or within the community (e.g., services or programs offered through community centres).

### **Research Limitations**

**Methodological limitations.** As previously mentioned, one of the significant limitations of the studies presented here includes the sample composed of university students. Although these samples provided useful information for the development and validation of the scale, the functioning of the PNQ with non-college populations is unknown and requires further study. Consequently, generalizations to other populations should err on the side of caution. Replication of these results in other samples, locations, cultures, ethnic and racial groups, and with various socio-economic backgrounds is desirable.

Furthermore, scores obtained on a measure of anxiety sensitivity in the second sample recruited as part of this project were inconsistent with what is typically observed in similar university-based non-clinical populations. In fact, the anxiety scores obtained in the current project were surprising given that they were similar to those found in clinical samples with panic disorder (Rapee, Brown, Antony, & Barlow, 1992). Therefore, the validity of the data obtained from this measure was considered questionable, which prevented the statistical analysis of hypotheses involving anxiety as a variable. Possible explanations for this statistical anomaly include an unrepresentative highly anxious sample, self-report error, and measurement error. Future studies should aim to re-examine the proposed hypotheses related to anxiety in a different sample, and perhaps with multiple measures of anxiety.

The current studies also employed correlation analyses and provided support for the new model of needs by means of cross-sectional associations, thereby compromising the ability to make causal inferences about need fulfilment. Although possible causal relationships are proposed within this document, several other causal explanations are plausible. In fact, the causal association presented herein could be reversed, whereby higher levels of psychological symptoms are likely to lead to people's lower need satisfaction ratings. Moreover, another unmeasured third variable may contribute or account entirely for the correlation between need fulfilment and psychological and physical symptoms. As such, future studies should examine whether there is causal relation between unmet need and mental and physical symptoms through longitudinal, cross-lagged, or experimental studies.

In addition, the current study relied on self-report data and failed to control for the accuracy in reporting of need fulfilment, negative life events, personality characteristics, all of which may be significantly altered if the individual is suffering from depression or other outcome variables. The present studies failed to control for the potential bias introduced by these possibilities. In addition, the current study did not include a measure of impression management. Future studies might compare self-ratings of need fulfilment to partner-ratings or might include observational data from objective trained raters in order to decrease the effects of self-report biases.

Another important limitation of the current study involves the exploratory nature of the analyses and the uncorrected alpha values employed, which increased the risk of type I errors. Therefore, replication of results is necessary. Future studies should examine similar concepts in a more statistically rigorous manner and in more representative samples.

**Conceptual limitations.** Another limitation of the current project involves specificity of measurement. According to Vallerand's (1997, 2001) hierarchical theory of motivation, the PNQ operates at a general level of specificity and other levels were not addressed in the current project. An interesting avenue for future research may involve examining the fulfilment of the basic needs identified within the current project in various contexts and at different levels of specificity. Although Vallerand's model implies that different scales must be created to assess motivation or need fulfilment at different levels of specificity, particular contexts could be explicitly assigned to the PNQ and the items answered accordingly. For example, context descriptions such as "at school", "in my career", or "in my romantic relationship," could be added to the beginning of each PNQ item to assess need fulfilment within a designed context. Similarly, the PNQ could be used to assess situational (or state) need fulfilment with regard to a specific activity at a specific time by adding a description such as, "in this particular situation," at the beginning of each fulfilment item. Employing the PNQ in such ways to examine the impact of need fulfilment at numerous levels of specificity constitute a fruitful avenue for future inquiry.

### **Future Directions**

Although the studies included in this dissertation produced a valid and reliable measure of need fulfilment and provided useful information about various aspects of basic human needs, much more work is needed.

First, replication of findings in cross-sectional samples from community settings as well as from health clinics would constitute fruitful avenues of inquiry. The use of such samples is imperative because individuals in these settings are likely to be experiencing both physical and psychological symptoms, allowing for a broader and more ecologically valid

analysis of the effects of unmet psychological needs on physical and mental health. In addition, more rigorous analyses of gender differences in need fulfilment should be conducted with community samples to examine whether the gender-based differences observed in university samples hold true in more generalizable samples.

Furthermore, longitudinal studies aimed at examining how changes in need fulfilment fluctuate in conjunction with changes in psychological and physical symptoms would provide useful information about how need fulfilment changes over time. This line of research may provide additional insight about the mechanism involved in increasing need fulfilment. Comparing need fulfilment changes in samples of individuals undergoing treatment or therapy to those who are not may be particularly informative.

Examining the effects of age on need fulfilment may also prove to be an interesting avenue for future research. Although the studies presented herein did not sample an adequate range of ages to allow for age analyses, it is possible that findings related to need fulfilment would differ in various age groups. For example, perhaps older individuals are more or less likely to be satisfied with their overall level of psychological need fulfilment. Similarly, perhaps older individuals' satisfaction with need fulfilment in one domain is likely to differ from that of younger individuals at different life stages. In addition, following the logic presented above regarding gender differences for various indicators of wellbeing, it is possible that need fulfilment could help explain the relationships between age and certain psychological symptoms. Future studies should aim to examine such hypotheses.

Other avenues might involve clinical studies to examine the effectiveness of the PNQ in assessing progress in therapy or program evaluation studies to evaluate the usefulness of programs or services designed to increase need fulfilment.

More recent research has demonstrated that balance in the fulfilment of the need for autonomy, competence, and relatedness also plays an important role in predicting well-being (Sheldon & Niemiec, 2006; Milyavskaya et al., 2009). More specifically, research has indicated that people who experience balanced need fulfilment report higher levels of well-being than those with the same overall amount of need fulfilment but with more variability (i.e., some needs are highly unmet while others are very well satisfied). Future research with the PNQ should incorporate such findings and aim to examine whether balance between the eleven basic needs identified in the current project also impacts well-being.

**PNQ-v3.** Since this series of studies was conducted, the PNQ was revised and another version was created, namely the PNQ-v3 (see appendix N). Feedback from clinicians and researchers interested in using the PNQ with their clients and participants fuelled the decision to reintroduce the assessment of need importance in the latest version of the scale. In addition, wording was simplified and the structure of the scale was reorganized to allow users the choice in completing only one or both parts of the scale (i.e., need importance and need fulfilment).

The PNQ-v3 was also translated into the French language (see appendix O) to allow for the examination of need fulfilment in French speaking populations. The French version of the scale will allow for the examination of possible cultural differences in perceived need importance and need fulfilment levels between primarily French speaking populations and primarily English speaking populations. However, more work is required to ensure the validity and reliability of the translated version of the scale.

### **Conclusion and Summary**

Results from this series of studies on psychological needs move us closer to a more complete understanding of basic human needs and point to interesting directions for future research. Need fulfilment is undeniably important for overall well-being and optimal health. The current project expanded upon work previously completed and added significantly to the literature by demonstrating that psychological needs can be organized and structured in a meaningful manner, that several needs, rather than only three as suggested by SDT, are essential for well-being, that needs can be assessed in a comprehensive yet brief manner using a valid and reliable self-report questionnaire (i.e., PNQ), and that need fulfilment can help explain various previously established relationships. Future studies should examine questions and hypotheses similar to those presented herein in both community sample and various clinical populations.

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<sup>1</sup> Please note that the references for each manuscript article (i.e., chapter 3, 4, and 5) are presented at the end of their respective sections and therefore will not be repeated here. References for study 1 can be found on page 95, for study 2a on page 151, and for study 2b on page 192.

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### Appendix A: Psychological Needs Questionnaire (PNQ)

Instructions: Please indicate the extent to which you agree with the following statements.

#### Interpersonal Needs

1a. I need to be emotionally close and connected to my partner.

1	2	3	4	5
strongly disagree	disagree	neither agree nor disagree	agree	strongly agree

1b. I am less emotionally close and connected to my partner than I need to be.

1	2	3	4	5
strongly disagree	disagree	neither agree nor disagree	agree	strongly agree

if score of 1 or 2: I have been as emotionally close and connected to my partner as I need to be for the past:

1	2	3	4	5
less than 2 weeks	1 to 3 months	4 to 6 months	7 to 12 months	more than 1 year

if score of 4 or 5: I have been less emotionally close and connected to my partner than I need to be for the past:

1	2	3	4	5
less than 2 weeks	1 to 3 months	4 to 6 months	7 to 12 months	more than 1 year

2a. I need to be physically close and connected to my partner.

2b. I am less physically close and connected to my partner than I need to be.

if score of 1 or 2: I have been as physically close and connected to my partner as I need to be for the past:

if score of 4 or 5: I have been less physically close and connected to my partner than I need to be for the past:

3a. I need to feel turned on by my partner.

3b. I feel less turned on by my partner than I need to feel.

1, 2 I have felt as turned on by my partner than I need to feel for the past:

4, 5 I have felt less turned on by my partner than I need to feel for the past:

4a. I need to feel that my partner is turned on by me.

4b. I feel that my partner is less turned on by me than I need him/her to be.

1, 2 I have felt that my partner is as turned on by me than I need him/her to be for the past:

4, 5 I have felt that my partner is less turned on by me than I need him/her to be for the past:

5a. I need to be committed to others.

5b. I am less committed to others than I need to be.

1, 2 I have been as committed to others as I need to be for the past:

4, 5 I have been less committed to others than I need to be for the past:

6a. I need my partner to make me feel special and cherished.

6b. My partner makes me feel less special and cherished than I need to be.

1, 2 My partner has made me feel as special and cherished as I need him/her to for the past:

4, 5 My partner has made me feel less special and cherished as I need him/her to for the past:

7a. I need to feel safe with others.

7b. I feel less safe with others than I need to feel.

1, 2 I have felt as safe with others as I need to feel for the past:

4, 5 I have felt less safe with others than I need to feel for the past:

8a. I need to have people who support me and are on my side.

8b. I have less people who support me and are on my side and than I need to have.

1, 2 I have felt that people support me and are on my side as much as I need them to be for the past:

4, 5 I have felt that people support me and are on my side less than I need them to be for the past:

9a. I need to know that I am the most important person in someone else life.

9b. I feel that I am less important to others than I need to be.

1, 2 I have felt that I am as important to others as I need to be for the past:

4, 5 I have felt that I am less important to others than I need to be for the past:

10a. I need to have others who are involved and participate in my day to day life.

10b. I feel that others are less involved and participate less in my day to day life than I need them to.

1, 2 I have felt that others are as involved in my day to day life as I need them to be for the past:

4, 5 I have felt that others are less involved in my day to day life than I need them to be for the past:

11a. I need to be self-sufficient.

11b. I am less self-sufficient than I need to be.

1, 2 I have been as self-sufficient as I need to be for the past:

4, 5 I have been less self-sufficient than I need to be for the past:

12a. I need to feel that I fit in.

12b. I feel that I fit in less than I need to.

1, 2 I have felt that I fit in as much as I need to for the past:

4, 5 I have felt that I fit in less than I need to for the past:

13a. I need to be respected by others.

13b. I am less respected by others than I need to be.

1, 2 I have been as respected by others as I need to be for the past:

4, 5 I have been less respected by others than I need to be for the past:

14a. I need to belong to a group.

14b. I feel that I belong less to a group than I need to.

1, 2 I have felt that I belong to a group as much as I need to for the past:

4, 5 I have felt that I belong to a group less than I need to for the past:

15a. I need to feel that others will love me and will be there for me in a tough situation.

15b. I feel like others will love me less than I need them to and will not always be there for me in a tough situation.

1, 2 I have felt that others will love me as much as I need them to and will be there for me in a tough situation for the past:

4, 5 I have felt that others will love me less than I need them to and will not always be there for me in a tough situation for the past:

16a. I need to have others I can trust.

16b. I trust others less than I need to.

1, 2 I have had others I can trust as much as I need to for the past:

4, 5 I have trusted others less than I need to for the past:

17a. I need to have others who can reassure me that things will be okay.

17b. Others can reassure me less that things will be okay than I need them to.

1, 2 I have had others who can reassure me that things will be okay as much as I need them to for the past:

4, 5 Others have reassured me less that things will be okay than I need them to for the past:

18a. I need to be needed by others.

18b. I am less needed by others than I need to be.

1, 2 I have been as needed by others as I need to be for the past:

4, 5 I have been less needed by others than I need to be for the past:

19a. I need to be liked by others.

19b. I am less liked by others than I need to be.

1, 2 I have been as liked by others as I need to be for the past:

4, 5 I have been less liked by others than I need to be for the past:

20a. I need to be loved by others.

20b. I am less loved by others than I need to be.

1, 2 I have been as loved by others as I need to be for the past:

4, 5 I have been less loved by others than I need to be for the past:

21a. I need to feel that I am important to others.

21b. I feel that I am less important to others than I need to be.

1, 2 I have felt that I am as important to others as I need to be for the past:

4, 5 I have felt that I am less important to others than I need to be for the past:

22a. I need to feel that I am treated fairly by others.

22b. I am treated less fairly by others than I need to be.

1, 2 I have felt that I have been treated as fairly by others as I need to be for the past:

4, 5 I feel that I have been treated less fairly by others than I need to be for the past:

23a. I need to feel that I have as many opportunities as other.

23b. I feel that I have less opportunities than others.

1, 2 I have felt that I have had as many opportunities as I need to have for the past:

4, 5 I have felt that I have had less opportunities than I need to have for the past:

24a. I need to have stability and consistency in my relationships with others.

24b. I have less stability and consistency in my relationships with others than I need to have.

1, 2 I have had as much stability and consistency in my relationships with others as I need to have for the past:

4, 5 I have had less stability and consistency in my relationships with others than I need to have for the past:

25a. I need to feel that the consequences of my actions are logical and predictable.

25b. I feel that the consequences of my actions are less logical and predictable than I need them to be.

1, 2 I have felt that the consequences of my actions are as logical and predictable as need them to be for the past:

4, 5 I have felt that the consequences of my actions are less logical and predictable than I need them to be for the past:

### **Self-Worth Needs**

1a. I need to feel competent.

1b. I feel less competent than I need to feel.

1, 2 I have felt as competent as I need to be for the past:

4, 5 I have felt less competent than I need to feel for the past:

2a. I need to feel confident.

2b. I feel less confident than I need to feel.

1, 2 I have felt as confident as I need to be for the past:

4, 5 I have felt less confident than I need to feel for the past:

3a. I need to feel that I am successful.

3b. I feel that I am less successful than I need to be.

1, 2 I have felt that I am as successful as I need to be for the past:

4, 5 I have felt that I am less successful than I need to be for the past:

4a. I need to feel that I am accomplished.

4b. I feel that I am less accomplished than I need to be.

1, 2 I have felt that I am as accomplished as I need to be for the past:

4, 5 I have felt that I am less accomplished than I need to be for the past:

5a. I need to feel that I am intelligent.

5b. I feel that I am less intelligent than I need to be.

1, 2 I have felt that I am as intelligent as I need to be for the past:

4, 5 I have felt that I am less intelligent than I need to be for the past:

6a. I need to feel like I am number one.

6b. I feel like I am not number one.

1, 2 I have felt like I am number one for the past:

4, 5 I have felt like I am not number one for the past:

7a. I need to be admired by others.

7b. I am less admired by others than I need to be.

1, 2 I have been as admired by others as I need to be for the past:

4, 5 I have been less admired by others than I need to be for the past:

8a. I need to feel that I am important.

8b. I feel that I am less important than I need to be.

1, 2 I have felt that I am as important as I need to be for the past:

4, 5 I have felt that I am less important than I need to be for the past:

9a. I need others to ask for my opinion.

9b. Others ask for my opinion less than I need them to.

1, 2 Others have asked for my opinion as much as I need them to for the past:

4, 5 Others have asked for my opinion less than I need them to for the past:

10a. I need others to follow my advice.

10b. Others follow my advice less than I need them to.

1, 2 Others have followed my advice as much as I need them to for the past:

4, 5 Others have followed my advice less than I need them to for the past:

11a. I need to be appreciated by others.

11b. I am less appreciated by others than I need to be.

1, 2 I have been as appreciated by others as I need to be for the past:

4, 5 I have been appreciated by others less than I need to be for the past:

12a. I need to feel that my life is meaningful.

12b. I feel that my life is less meaningful than I need it to be.

1, 2 I have felt that my life is as meaningful as I need it to be for the past:

4, 5 I have felt that my life is less meaningful than I need it to be for the past:

13a. I need to be independent.

13b. I am less independent than I need to be.

1, 2 I have been as independent as I need to be for the past:

4, 5 I have been less independent than I need to be for the past:

14a. I need to have a clear sense of who I am.

14b. I have a less clear sense of who I am than I need to have.

1, 2 My sense of who I am has been as clear as I need it to be for the past:

4, 5 My sense of who I am has been less clear than I need it to be for the past:

15a. I need to have a clear sense of where I am going.

15b. I have a less clear sense of where I am going than I need to have.

1, 2 My sense of where I am going has been as clear as I need it to be for the past:

4, 5 My sense of where I am going has been less clear than I need it to be for the past:

16a. I need to feel that I am working towards a goal.

16b. I feel that my life is less goal-oriented than I need it to be.

1, 2 I have felt that my life is as goal-oriented as I need it to be for the past:

4, 5 I have felt that my life is less goal-oriented than I need it to be for the past:

17a. I need to have stability in my life.

17b. I have less stability in my life than I need to have.

1, 2 I have had as much stability in my life as I need to have for the past:

4, 5 I have had less stability in my life than I need to have for the past:

18a. I need to feel that I have control over what happens to me.

18b. I feel that I have less control over what happens to me than I need to have.

1, 2 I have felt that I have as much control over what happens to me as I need to have for the past:

4, 5 I have felt that I have less control over what happens to me than I need to have for the past:

19a. I need to feel that my life has a purpose.

19b. I feel that my life is less purposeful than I need it to be.

1, 2 I have felt that my life is as purposeful as I need it to be for the past:

4, 5 I have felt that my life is less purposeful than I need it to be for the past:

**Appendix B: Centre for Epidemiologic Studies Depression Scale-Revised (CESD-R)**

Now we would like you to answer some questions about how you have been feeling recently. Here are a series of statements describing different feelings you may have felt, as well as different things you may have done. There are four numbers beside each statement, "1 2 3 4". Using the scale below, we would like you to circle the number which best describes how often you felt or behaved this way--DURING THE PAST WEEK.

- 1 = Rarely or none of the time (**less than once a week**)
- 2 = Some or a little of the time (**1-2 days a week**)
- 3 = Occasionally or a moderate amount of time (**3-4 days**)
- 4 = Most or all of the time (**5-7 days in the week**)

DURING THE PAST WEEK

1. I was bothered by things that usually don't bother me
2. I did not feel like eating; my appetite was poor
3. I felt that I could not shake off the blues even with the help from my family or friends
4. I felt that I was just as good as other people
5. I had trouble keeping my mind on what I was doing
6. I felt depressed
7. I felt that everything I did was an effort
8. I felt hopeful about the future
9. I thought my life had been a failure
10. I felt fearful
11. My sleep was restless
12. I was happy
13. I talked less than usual
14. I felt lonely
15. People were unfriendly
16. I enjoyed life
17. I had crying spells
18. I felt sad
19. I felt people disliked me
20. I could not get going

### Appendix C: Depressive Experiences Questionnaire- Revised (DEQ-R)

Listed below are a number of statements concerning personal characteristics and traits. Read each item and decide whether you agree or disagree, in general, and to what extent. If you **strongly agree**, circle "7". If you **strongly disagree**, circle "1". If you feel you are somewhere in between, circle any one of the numbers between 1 and 7. If you are **not certain or don't know**, circle "4".

	1 .....	2 .....	3 .....	4 .....	5 .....	6 .....	7	
	Strongly Disagree	Disagree	Not certain Don't know	Agree	Strongly Agree			
1.	Without support from others who are close to me, I would be helpless.						1	2 3 4 5 6 7
2.	I tend to be satisfied with my current plans and goals, rather than striving for higher goals.						1	2 3 4 5 6 7
3.	When I am closely involved with someone, I never feel jealous.						1	2 3 4 5 6 7
4.	I often find that I don't live up to my own standards or ideals.						1	2 3 4 5 6 7
5.	The lack of permanence in human relationships doesn't bother me.						1	2 3 4 5 6 7
6.	If I fail to live up to expectations, I feel unworthy.						1	2 3 4 5 6 7
7.	Many times I feel helpless.						1	2 3 4 5 6 7
8.	I seldom worry about being criticized for things I have said or done.						1	2 3 4 5 6 7
9.	There is a considerable difference between how I am now and how I would like to be.						1	2 3 4 5 6 7
10.	I enjoy sharp competition with others.						1	2 3 4 5 6 7
11.	There are times when I feel "empty" inside.						1	2 3 4 5 6 7
12.	I tend not to be satisfied with what I have.						1	2 3 4 5 6 7
13.	I don't care whether or not I live up to what other people expect of me.						1	2 3 4 5 6 7
14.	I become frightened when I feel alone.						1	2 3 4 5 6 7
15.	I would feel like I'd be losing an important part of myself if I lost a very close friend.						1	2 3 4 5 6 7





### Appendix D: Negative Life Events Inventory (NLEI)

Instructions: Here are some things that may happen in people's lives. Read each one and check a space, Yes or No, to show whether this happened for you during the past year.

DURING THE PAST YEAR:	Yes	No
1. My family moved to a new home or apartment.	_____	_____
2. Somebody in my family had a serious illness.	_____	_____
3. My parents got separated or divorced.	_____	_____
4. I got disciplined or suspended from school.	_____	_____
5. My parents argued a lot.	_____	_____
6. Somebody in my family had a serious accident.	_____	_____
7. I had a lot of arguments with my parents.	_____	_____
8. My father/mother lost his/her job.	_____	_____
9. I had a serious illness.	_____	_____
10. I got a new stepfather/stepmother.	_____	_____
11. I broke up with my boy/girl friend.	_____	_____
12. I got bad grades in school.	_____	_____
13. I got into trouble with the police.	_____	_____
14. My parents had problems with money.	_____	_____
15. I had a serious accident.	_____	_____
16. I didn't get into a group or team that I wanted to be in.	_____	_____
17. I had trouble with my weight or physical appearance.	_____	_____
18. Someone in my family was arrested.	_____	_____
19. A new person joined our household (a child, a grandparent, stepbrother or sister, or other).	_____	_____
20. Some people that I used to be friends with don't pay attention to me anymore.	_____	_____

**Appendix E: Anxiety Sensitivity Index (ASI)**

Instructions: Respond to each item by circling one of the five corresponding phrases. Circle the phrase which best represents the extent to which you agree with the item. If any of the items concern something that is not part of your experience (e.g., "It scares me when I feel shaky" for someone who has never trembled or had the "shakes"), answer on the basis of how you think you would feel if you had such an experience. Be careful to make only one choice for each item and please answer all items.

1. It is important for me not to appear nervous.

Very Little    A Little                      Some            Much            Very Much

2. When I cannot keep my mind on a task, I worry that I might be going crazy.

Very Little    A Little                      Some            Much            Very Much

3. It scares me when I feel "shaky" (trembling).

Very Little    A Little                      Some            Much            Very Much

4. It scares me when I feel faint.

Very Little    A Little                      Some            Much            Very Much

5. It is important to me to stay in control of my emotions.

Very Little    A Little                      Some            Much            Very Much

6. It scares me when my heart beats rapidly.

Very Little    A Little                      Some            Much            Very Much

7. It embarrasses me when my stomach growls.

Very Little    A Little                      Some            Much            Very Much

8. It scares me when I am nauseous.

Very Little    A Little                      Some            Much            Very Much

9. When I notice that my heart is beating rapidly, I worry that I might have a heart attack.

Very Little    A Little                      Some              Much              Very Much

10. It scares me when I become short of breath.

Very Little    A Little                      Some              Much              Very Much

11. When my stomach is upset, I worry that I might be seriously ill.

Very Little    A Little                      Some              Much              Very Much

12. It scares me when I am unable to keep my mind on a task.

Very Little    A Little                      Some              Much              Very Much

13. Other people notice when I feel shaky.

Very Little    A Little                      Some              Much              Very Much

14. Unusual body sensations scare me.

Very Little    A Little                      Some              Much              Very Much

15. When I am nervous, I worry that I might be mentally ill.

Very Little    A Little                      Some              Much              Very Much

16. It scares me when I am nervous.

Very Little    A Little                      Some              Much              Very Much

### Appendix F: State-Trait Anger Scale (STAS)

**Part 1 - Directions:** A number of statements that people use to describe themselves are given below. Read each statement and then circle the number that indicates how you feel **right now**. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to best describe your **present** feelings. Use the following scale to record your answers:

**1 = NOT AT ALL**  
**2 = SOMEWHAT**  
**3 = MODERATELY SO**  
**4 = VERY MUCH SO**

1. I am furious	1	2	3	4
2. I am annoyed	1	2	3	4
3. I feel like banging on the table	1	2	3	4
4. I feel angry	1	2	3	4
5. I feel aggravated	1	2	3	4
6. I feel irritated	1	2	3	4
7. I feel like yelling at somebody	1	2	3	4
8. I feel like breaking things	1	2	3	4
9. I am resentful	1	2	3	4
10. I am mad	1	2	3	4
11. I feel like I'm about to explode	1	2	3	4
12. I feel frustrated	1	2	3	4
13. I feel like hitting someone	1	2	3	4
14. I am burned up	1	2	3	4
15. I feel like swearing	1	2	3	4

**Part 2 - Directions:** Now read each of the remaining statements below and circle the number that indicates how you **generally** feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems

to best describe how you **generally** feel. Use the following scale to record your answers:

- 1 = ALMOST NEVER**  
**2 = SOMETIMES**  
**3 = OFTEN**  
**4 = ALMOST ALWAYS**

16. I am quick tempered	1	2	3	4
17. I get annoyed when I am singled out for correction	1	2	3	4
18. I am a hot headed person	1	2	3	4
19. I have a fiery temper	1	2	3	4
20. I feel angry	1	2	3	4
21. I feel irritated	1	2	3	4
22. I get angry when I'm slowed down by others' mistakes	1	2	3	4
23. I feel annoyed when I am not given recognition for doing good work	1	2	3	4
24. I fly off the handle	1	2	3	4
25. When I get mad, I say nasty things	1	2	3	4
26. People who think they are always right irritate me	1	2	3	4
27. When I get frustrated, I feel like hitting someone	1	2	3	4
28. I feel infuriated when I do a good job and get a poor evaluation	1	2	3	4
29. It makes my blood boil when I am pressured	1	2	3	4
30. It makes me furious when I am criticized in front of others	1	2	3	4

**Appendix G: Rosenberg Self-Esteem Scale (SES)**

Instructions: Here are some statements about how people may feel about themselves. Read each item and decide whether you agree or disagree and to what extent. If you **strongly agree**, circle "1"; if you **strongly disagree**, circle "3". If you are **uncertain or don't know** how you feel, circle "2". Use whatever number correctly describes how much you agree or disagree with the statements.

1 = Strongly Agree  
2 = Uncertain/Don't know  
3 = Strongly Disagree

1. On the whole, I am satisfied with myself.
2. At times I think I am no good at all.
3. I feel that I have a number of good qualities.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I certainly feel useless at times.
7. I feel that I am a person of worth, at least on an equal plane with others.
8. I wish I could have more respect for myself.
9. All in all, I am inclined to feel that I am a failure.
10. I take a positive attitude towards myself.

### Appendix H: Relationship Assessment Scale (RAS)

1. How well does your partner meet your needs?  
A B C D E  
Poorly Average Extremely Well
2. In general, how satisfied are you with your relationship?  
A B C D E  
Unsatisfied Average Extremely Satisfied
3. How good is your relationship compared to most?  
A B C D E  
Poor Average Excellent
4. How often do you wish you hadn't gotten in this relationship?  
A B C D E  
Never Average Very often
5. To what extent has your relationship met your original expectations?  
A B C D E  
Hardly at all Average Completely
6. How much do you love your partner?  
A B C D E  
Not much Average Very much
7. How many problems are there in your relationship?  
A B C D E  
Very few Average Very many

Description: This is a 7-item instrument designed to measure satisfaction in relationships. It is not limited to marital relationships. Scores for items 4 and 7 are reversed.

Scoring: After reverse scoring items 4 and 7, all of the scores are totaled. Scores can range from 7 (low satisfaction) to 35 (high satisfaction).

Source: Hendrick, S.S. (1988). A generic measure of relationship satisfaction, *Journal of Marriage and the Family*, 50, 93-98. Instrument reprinted by permission of the National Council on Family Relations.

### Appendix I: Dyadic Adjustment Scale (DAS)

Most people have disagreements in their relationships. Please indicate below the approximate extent of agreement or disagreement between you and your partner for each item on the following list.

1. Handling family matters
2. Matters of recreation
3. Religious matters
4. Demonstrations of affection
5. Friends
6. Sex relations
7. Conventionality (correct or proper behavior)
8. Philosophy of life
9. Ways of dealing with parents or in-laws
10. Aims, goals, and things believed important
11. Amount of time spent together
12. Making major decisions
13. Household tasks
14. Leisure time interests and activities
15. Career decisions

How often:

16. How often do you discuss or have you considered divorce, separation, or terminating your relationship?
17. How often do you or your mate leave the house after a fight?
18. In general, how often do you think that things between you and your partner are going well?
19. Do you confide in your partner?
22. How often do you and your partner "get on each other's nerves?"
21. How often do you and your partner quarrel?
20. Do you ever regret that you married your partner (or lived together)?
23. Do you kiss your partner?
24. Do you and your partner engage in outside interests together?

How often do you:

25. Have an interesting chat?
26. Laugh together?
27. Calmly discuss something?
28. Work together on a project?

Indicate if the items below were problems in your relationship during the past FEW WEEKS by selecting the circle for YES or NO.

29. Being too tired for sex
30. Not showing love

31. Please fill in one circle that best describes the degree of happiness in your relationship.

Very unhappy    Somewhat unhappy    Fairly happy    Mostly happy    Very happy

32. Which one of the following statements best describes how you feel about the future of your relationship (*please fill in the circle for the most appropriate statement*)?

I want desperately for my relationship to succeed, and **would go to almost any length** to see that it does.

I want very much for my relationship to succeed, and **will do all I can** to see that it does.

I want very much for my relationship to succeed, and **will do my fair share** to see that it does.

It would be nice if my relationship succeeded, but **I can't do much more than I'm doing now** to help it succeed.

My relationship can never succeed, and **there is no more that I can do** to keep the relationship going.

## Appendix J: Social Support Questionnaire- Short Form, Revised (SSQS-R)

The following questions ask about the people who provide you with help or support. Each question has two parts. In the first part of the question list all the people you know, excluding yourself, who you can count on for help or support in the manner described in each of the questions. For each person you list, give both the person's initials and tell us how they are related to you (your spouse, brother, friend, etc.). In the second part of the question you will be asked how satisfied or dissatisfied you are, in general, with the support you receive from the people you listed.

You may find that for some of the questions that no one is providing you with any help or support. If you have had no support, select the option "No one", and then complete the second part of the question and tell us how satisfied or dissatisfied you are.

1. (a) Who do you know who you can trust with information that could get you in trouble? Write the initials of these people in the spaces provided below and tell us how these people are related to you.

"No one" .....

- |          |          |          |
|----------|----------|----------|
| 1) _____ | 4) _____ | 7) _____ |
| 2) _____ | 5) _____ | 8) _____ |
| 3) _____ | 6) _____ | 9) _____ |

(b) How satisfied are you with this manner of support? Circle one of the following.

- |                      |                         |
|----------------------|-------------------------|
| 6 very satisfied     | 3 a little dissatisfied |
| 5 fairly satisfied   | 2 fairly dissatisfied   |
| 4 a little satisfied | 1 very dissatisfied     |

2. (a) Who can you really count on to help you feel more relaxed when you are under pressure? Write the initials of these people in the spaces provided below and tell us how these people are related to you.

"No one" .....

- |          |          |          |
|----------|----------|----------|
| 1) _____ | 4) _____ | 7) _____ |
| 2) _____ | 5) _____ | 8) _____ |
| 3) _____ | 6) _____ | 9) _____ |

(b) How satisfied are you with this manner of support? Circle one of the following.

- |                      |                         |
|----------------------|-------------------------|
| 6 very satisfied     | 3 a little dissatisfied |
| 5 fairly satisfied   | 2 fairly dissatisfied   |
| 4 a little satisfied | 1 very dissatisfied     |

3. (a) Who accepts you totally, including both your worst and your best points? Write the initials of these people in the spaces provided below and tell us how these people are related to you.

"No one" ..... []

- |          |          |          |
|----------|----------|----------|
| 1) _____ | 4) _____ | 7) _____ |
| 2) _____ | 5) _____ | 8) _____ |
| 3) _____ | 6) _____ | 9) _____ |

(b) How satisfied are you with this manner of support? Circle one of the following.

- |                      |                         |
|----------------------|-------------------------|
| 6 very satisfied     | 3 a little dissatisfied |
| 5 fairly satisfied   | 2 fairly dissatisfied   |
| 4 a little satisfied | 1 very dissatisfied     |

4. (a) Who can you really count on to care about you, regardless of what is happening to you? Write the initials of these people in the spaces provided below and tell us how these people are related to you.

"No one" ..... []

- |          |          |          |
|----------|----------|----------|
| 1) _____ | 4) _____ | 7) _____ |
| 2) _____ | 5) _____ | 8) _____ |
| 3) _____ | 6) _____ | 9) _____ |

(b) How satisfied are you with this manner of support? Circle one of the following.

- |                      |                         |
|----------------------|-------------------------|
| 6 very satisfied     | 3 a little dissatisfied |
| 5 fairly satisfied   | 2 fairly dissatisfied   |
| 4 a little satisfied | 1 very dissatisfied     |

5. (a) Who can you really count on to help you feel better when you are feeling generally down-in-the-dumps? Write the initials of these people in the spaces provided below and tell us how these people are related to you.

"No one" ..... []

- |          |          |          |
|----------|----------|----------|
| 1) _____ | 4) _____ | 7) _____ |
| 2) _____ | 5) _____ | 8) _____ |
| 3) _____ | 6) _____ | 9) _____ |

(b) How satisfied are you with this manner of support? Circle one of the following.

- |                      |                         |
|----------------------|-------------------------|
| 6 very satisfied     | 3 a little dissatisfied |
| 5 fairly satisfied   | 2 fairly dissatisfied   |
| 4 a little satisfied | 1 very dissatisfied     |

6. (a) Who can you count to console you when you are very upset? Write the initials of these people in the spaces provided below and tell us how these people are related to you.

"No one" ..... []

- |          |          |          |
|----------|----------|----------|
| 1) _____ | 4) _____ | 7) _____ |
| 2) _____ | 5) _____ | 8) _____ |
| 3) _____ | 6) _____ | 9) _____ |

(b) How satisfied are you with this manner of support? Circle one of the following.

- |                      |                         |
|----------------------|-------------------------|
| 6 very satisfied     | 3 a little dissatisfied |
| 5 fairly satisfied   | 2 fairly dissatisfied   |
| 4 a little satisfied | 1 very dissatisfied     |

### Appendix K: Cohen-Hoberman Inventory of Physical Symptoms (CHIPS)

Each of the statements describes a different physical problem that you may have experienced in the past 2 weeks. Please tell us much that problem has bothered or distressed you during the **PAST TWO WEEKS, INCLUDING TODAY**. Circle only one. If you have not been bothered at all, circle "Not at all". If the problem has bothered you quite a bit, circle "Quite a bit". If you have been bothered somewhat but not a great deal, circle "Somewhat". Use whatever is appropriate to describe the way you felt.

#### **During the PAST TWO WEEKS have you had:**

Problems sleeping	Not at all	Somewhat	Quite a bit
Weight change (gained or lost more the 5 lbs.)	Not at all	Somewhat	Quite a bit
Back pain	Not at all	Somewhat	Quite a bit
Constipation	Not at all	Somewhat	Quite a bit
Dizziness	Not at all	Somewhat	Quite a bit
Diarrhea	Not at all	Somewhat	Quite a bit
Faintness	Not at all	Somewhat	Quite a bit
Constant fatigue	Not at all	Somewhat	Quite a bit
Headache	Not at all	Somewhat	Quite a bit
Migraine headache	Not at all	Somewhat	Quite a bit
Nausea and/or vomiting	Not at all	Somewhat	Quite a bit
Acid stomach or indigestion	Not at all	Somewhat	Quite a bit
Stomach pain	Not at all	Somewhat	Quite a bit
Hot or cold spells	Not at all	Somewhat	Quite a bit
Hands trembling	Not at all	Somewhat	Quite a bit
Suddenly felt hot or cold	Not at all	Somewhat	Quite a bit
Heart pounding or racing	Not at all	Somewhat	Quite a bit
Poor appetite	Not at all	Somewhat	Quite a bit
Shortness of breath when not exercising or working hard	Not at all	Somewhat	Quite a bit
Felt weak all over	Not at all	Somewhat	Quite a bit
Numbness or tingling in parts of your body	Not at all	Somewhat	Quite a bit
Pains in Heart or chest	Not at all	Somewhat	Quite a bit
Feeling low in energy	Not at all	Somewhat	Quite a bit
Stuffy head or nose	Not at all	Somewhat	Quite a bit
Blurred vision	Not at all	Somewhat	Quite a bit
Muscle tension or soreness	Not at all	Somewhat	Quite a bit
Muscle cramps	Not at all	Somewhat	Quite a bit
Severe aches and pains	Not at all	Somewhat	Quite a bit
Bruises	Not at all	Somewhat	Quite a bit
Nosebleed	Not at all	Somewhat	Quite a bit
Pulled or strained muscles	Not at all	Somewhat	Quite a bit
Pulled or strained joints	Not at all	Somewhat	Quite a bit
Cold or cough	Not at all	Somewhat	Quite a bit
Bladder infection	Not at all	Somewhat	Quite a bit
Problems urinating	Not at all	Somewhat	Quite a bit
Teeth or gum problems	Not at all	Somewhat	Quite a bit
Ear aches	Not at all	Somewhat	Quite a bit
High blood pressure	Not at all	Somewhat	Quite a bit
Circulation trouble in arms or legs	Not at all	Somewhat	Quite a bit
Arthritis	Not at all	Somewhat	Quite a bit

Other (describe _____)	Asthma	Not at all	Somewhat	Quite a bit
		Not at all	Somewhat	Quite a bit

### Appendix L: Psychological Needs Questionnaire-Version 2 (PNQ-v2)

**Instructions:** Below is a list of psychological needs that are important to many people. Please indicate how well each need has been met in your own life. If you agree with the statement select "**3: agree**" or "**4: strongly agree**." If the statement is not true of you and your life, select "**1: strongly disagree**" or "**2: strongly disagree**". If the statement describes a need that is not important to you or that you do not need in your life, select "**5: not important to me/I do not need this.**"

5 = **Not important to me/ I do not need this**

4 = **Strongly agree**

3 = **Agree**

2 = **Disagree**

1 = **Strongly disagree**

- |  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| 1. I have less people in my life that I can trust than I need to have.                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 2. I am less intelligent than I need to be.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 3. I need to be liked by others more than I am right now.                                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 4. I need to have a better sense of where I am going than I have right now.                | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 5. I am less turned on by my partner than I need to be.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 6. I need others to follow my advice more than they do right now.                          | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 7. The consequences of my actions are less logical and predictable than I need them to be. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 8. I am less self-sufficient than I need to be.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 9. I am treated less fairly by other than I need to be.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 10. I need to have more control over what happens to me than I have right now.             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 11. I need to have more fun in my life.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 12. I need to achieve more than I do now.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 13. I need to feel more like others will be there for me in a tough situation.             | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 14. I need to be more accomplished than I am today.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

- |  |                       |                       |                       |                       |                       |
|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 15. I fit in less than I need to.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 16. My life is less purposeful than I need it to be.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 17. I need to be closer and more connected to my partner than I currently am.                            | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 18. I need others to ask for my opinion more than they do right now.                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 19. I need to have more stability and consistency in my relationships with others than I have right now. | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 20. I need to be more independent than I am now.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 21. I feel that I have fewer opportunities than others.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 22. I have fewer choices in life than I need to have.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 23. My days are less enjoyable than I need them to be.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 24. I need to avoid failure more than I do now.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 25. I need to have more people who support me and are on my side than I have now                         | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 26. I am less competent than I need to be.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 27. I need to feel that I belong more to a group than I presently do.                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 28. My life is less goal-oriented than I need it to be.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 29. My partner is less turned on by me than I need him/her to be.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 30. I need others to admire me more than they do.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 31. I need my life to be more predictable.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 32. I am forced to depend on others more than I like.  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 33. I usually do not get what I deserve.   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |
| 34. I have less of a say in choices and decisions than I need to have.                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
|  | 1                     | 2                     | 3                     | 4                     | 5                     |

35. I need to have more things to look forward to than I have right now.
- 1 2 3 4 5
36. I am less successful than I need to be.
- 1 2 3 4 5

### Appendix M: Basic Need Satisfaction in General Scale (BNSG-S)

Please read each of the following items carefully, thinking about how it relates to your life, and then indicate how true it is for you. Use the following scale to respond:

1	2	3	4	5	6	7
not at all			somewhat			very
true			true			true

1. I feel like I am free to decide for myself how to live my life.
2. I really like the people I interact with.
3. Often, I do not feel very competent.
4. I feel pressured in my life.
5. People I know tell me I am good at what I do.
6. I get along with people I come into contact with.
7. I pretty much keep to myself and don't have a lot of social contacts.
8. I generally feel free to express my ideas and opinions.
9. I consider the people I regularly interact with to be my friends.
10. I have been able to learn interesting new skills recently.
11. In my daily life, I frequently have to do what I am told.
12. People in my life care about me.
13. Most days I feel a sense of accomplishment from what I do.
14. People I interact with on a daily basis tend to take my feelings into consideration.
15. In my life I do not get much of a chance to show how capable I am.
16. There are not many people that I am close to.
17. I feel like I can pretty much be myself in my daily situations.
18. The people I interact with regularly do not seem to like me much.
19. I often do not feel very capable.

20. There is not much opportunity for me to decide for myself how to do things in my daily life.
21. People are generally pretty friendly towards me.

**Scoring information.** Form three subscale scores, one for the degree to which the person experiences satisfaction of each of the three needs. To do that, you must first reverse score all items that are worded in a negative way (i.e., the items shown below with (R) following the items number). To reverse score an item, simply subtract the item response from 8. Thus, for example, a 2 would be converted to a 6. Once you have reverse scored the items, simply average the items on the relevant subscale. They are:

Autonomy: 1, 4(R), 8, 11(R), 14, 17, 20(R)

Competence: 3(R), 5, 10, 13, 15(R), 19(R)

Relatedness: 2, 6, 7(R), 9, 12, 16(R), 18(R), 21

### Appendix N: Psychological Needs Questionnaire-Version 3 (PNQ-v3)

**Instructions:** This questionnaire assesses psychological needs. You will be asked to rate the level of importance of each need, as well as whether you are getting enough of each need in your life.

**PART 1:** Below is a list of psychological needs that are important to many people. In the column "**Level of importance**", please indicate the extent to which the listed need is important to you and your life.

- 1: Very unimportant
- 2: Unimportant
- 3: Important
- 4: Very important

NEED	Level of importance			
1. To have people in my life that I can trust	1	2	3	4
2. To be intelligent	1	2	3	4
3. To be liked by others	1	2	3	4
4. To have a good sense of where I am going	1	2	3	4
5. To be turned on by my partner	1	2	3	4
6. To have others follow my advice	1	2	3	4
7. To have the consequences of my actions be logical and predictable	1	2	3	4
8. To be self sufficient	1	2	3	4
9. To be treated fairly by others	1	2	3	4
10. To have control over what happens to me	1	2	3	4
11. To have fun in my life	1	2	3	4
12. To achieve many things	1	2	3	4
13. To feel like others will be there for me in a tough situation	1	2	3	4
14. To be an accomplished individual	1	2	3	4
15. To fit in	1	2	3	4
16. To have a purposeful life	1	2	3	4
17. To be close and connected to my partner	1	2	3	4
18. To have others ask for my opinion	1	2	3	4
19. To have stability and consistency in my relationships	1	2	3	4
20. To be independent	1	2	3	4
21. To have as many opportunities as others	1	2	3	4
22. To have choices in life	1	2	3	4
23. To enjoy my daily life	1	2	3	4
24. To avoid failure	1	2	3	4
25. To have people who support me and are on my side	1	2	3	4
26. To be competent	1	2	3	4
27. To feel that I belong to a group	1	2	3	4
28. To have a life that is goal-oriented	1	2	3	4
29. To have my partner be turned on by me	1	2	3	4
30. To have others admire me	1	2	3	4
31. To have predictability in my life	1	2	3	4
32. To not be forced to depend on others	1	2	3	4
33. To get what I deserve	1	2	3	4
34. To have a say in choices and decisions that affect my life	1	2	3	4
35. To have things to look forward to	1	2	3	4
36. To be successful	1	2	3	4

**PART 2:** In the column, "**Fulfilment of need**" please indicate if you require more of the listed need in your life. If you are missing this need or if you are not completely satisfied with the quality or quantity of this need in your life, circle "**4: Strongly agree**" or "**3: Agree**". If you are satisfied with the quality and quantity of this need in your life, circle "**2: Disagree**" or "**1: Strongly disagree.**"

- 1: Strongly disagree
- 2: Disagree
- 3: Agree
- 4: Strongly agree

<b>I NEED...</b>	<b>Fulfilment of need</b>			
1. To have more people in my life that I can trust	1	2	3	4
2. To be more intelligent	1	2	3	4
3. To be more liked by others	1	2	3	4
4. To have a better sense of where I am going	1	2	3	4
5. To be more turned on by my partner	1	2	3	4
6. To have others follow my advice more	1	2	3	4
7. To have the consequences of my actions be more logical and predictable	1	2	3	4
8. To be more self sufficient	1	2	3	4
9. To be treated more fairly by others	1	2	3	4
10. To have more control over what happens to me	1	2	3	4
11. To have more fun in my life	1	2	3	4
12. To achieve many more things	1	2	3	4
13. To feel more like others will be there for me in a tough situation	1	2	3	4
14. To be a more accomplished individual	1	2	3	4
15. To fit in more	1	2	3	4
16. To have a more purposeful life	1	2	3	4
17. To be more close and connected to my partner	1	2	3	4
18. To have others ask for my opinion more	1	2	3	4
19. To have more stability and consistency in my relationships	1	2	3	4
20. To be more independent	1	2	3	4
21. To have as many opportunities as others	1	2	3	4
22. To have more choices in life	1	2	3	4
23. To enjoy my daily life more	1	2	3	4
24. To avoid failure more	1	2	3	4
25. To have more people who support me and are on my side	1	2	3	4
26. To be more competent	1	2	3	4
27. To feel that I belong to a group more than I do	1	2	3	4
28. To have a life that is more goal-oriented	1	2	3	4
29. To have my partner be more turned on by me	1	2	3	4
30. To have others admire me more	1	2	3	4
31. To have more predictability in my life	1	2	3	4
32. To not be forced to depend on others	1	2	3	4
33. To get more of what I deserve	1	2	3	4
34. To have more of a say in choices and decisions that affect my life	1	2	3	4
35. To have more things to look forward to	1	2	3	4
36. To be more successful	1	2	3	4

## Appendix O: Mesure des besoins psychologiques

**Directives:** Ce questionnaire évalue des besoins psychologiques. Dans **Partie 1**, on vous demande d'indiquer à quel point le besoin est important pour vous. Dans **Partie 2** (sur la prochaine page), on vous demande d'indiquer à quel point ces besoins sont satisfaits dans votre vie.

**PARTIE 1:** Ci-dessous est une liste de besoins psychologiques qui sont importants pour plusieurs personnes. Indiquer à quel point chaque besoin est important pour vous et votre vie en choisissant une des options suivantes:

API = Absolument pas important

PI = Peu important

I = Important

TI = Très important

	Niveau d'importance du besoin			
1. Avoir des gens dans ma vie en qui j'ai confiance	API	PI	I	TI
2. Être perçu comme intelligent(e)	API	PI	I	TI
3. Être aimé(e) par les autres	API	PI	I	TI
4. Avoir un sens de direction dans ma vie	API	PI	I	TI
5. Être excité(e) sexuellement par mon partenaire	API	PI	I	TI
6. Avoir des gens qui écoutent mes conseils	API	PI	I	TI
7. Avoir des conséquences logiques et prévisibles pour mes actions	API	PI	I	TI
8. Être autosuffisant(e)	API	PI	I	TI
9. Me faire traiter avec impartialité par les autres	API	PI	I	TI
10. Avoir contrôle de ce qui m'arrive	API	PI	I	TI
11. Avoir du plaisir dans ma vie	API	PI	I	TI
12. Accomplir plusieurs choses	API	PI	I	TI
13. Avoir quelqu'un qui sera là pour moi en temps de difficultés	API	PI	I	TI
14. Être une personne accomplie	API	PI	I	TI
15. Avoir sa place parmi les autres	API	PI	I	TI
16. Avoir une vie avec buts et objectifs	API	PI	I	TI
17. Être intime et connecté(e) avec mon partenaire	API	PI	I	TI
18. Avoir des gens qui demandent mon opinion	API	PI	I	TI
19. Avoir des relations stables et consistantes	API	PI	I	TI
20. Être indépendant(e)	API	PI	I	TI
21. Avoir autant d'opportunités que les autres	API	PI	I	TI
22. Avoir des choix dans ma vie	API	PI	I	TI
23. Prendre plaisir de ma vie quotidienne	API	PI	I	TI
24. Éviter les échecs	API	PI	I	TI
25. Avoir des gens qui me soutiennent et qui sont de mon côté	API	PI	I	TI
26. Être compétent(e)	API	PI	I	TI
27. Me sentir comme j'appartiens à un groupe	API	PI	I	TI
28. Avoir une vie orientée vers des résultats	API	PI	I	TI
29. Avoir un partenaire qui est excité(e) sexuellement par moi	API	PI	I	TI
30. Être admiré(e) par les autres	API	PI	I	TI
31. Avoir de la prévisibilité dans ma vie	API	PI	I	TI
32. Ne pas être forcé de me fier ou de dépendre sur les autres	API	PI	I	TI
33. Avoir ce que je mérite	API	PI	I	TI
34. Avoir une voix dans les décisions qui affectent ma vie	API	PI	I	TI
35. Avoir de quoi à anticiper dans la vie	API	PI	I	TI
36. Connaître du succès et de la réussite	API	PI	I	TI

**PARTIE 2:** De temps en temps, chacun de nous a besoin quelque chose de plus dans notre vie. S'il vous plaît lire chaque énoncé et indiquer si vous nécessitez plus de ce besoin dans votre vie. Par exemple, si vous avez besoin d'avoir plus de gens dans votre vie en qui vous pouvez faire confiance, indiquez-le en choisissant soit Absolument D'accord ou D'accord. Cependant, si vous êtes satisfait avec la qualité et quantité de ce besoin dans votre vie, choisissez Pas D'accord ou Complètement Pas D'accord.

AD = Absolument d'accord  
 D = D'accord  
 PD = Pas d'accord  
 CPD = Complètement pas d'accord

1. J'ai besoin de plus de gens dans ma vie en qui j'ai confiance	AD D PD CPD
2. J'ai besoin d'être perçu comme plus intelligent(e)	AD D PD CPD
3. J'ai besoin d'être plus aimé(e) par les autres	AD D PD CPD
4. J'ai besoin d'avoir un meilleur sens de direction dans ma vie	AD D PD CPD
5. J'ai besoin d'être plus excité(e) sexuellement par mon partenaire	AD D PD CPD
6. J'ai besoin d'avoir plus de gens qui écoutent mes conseils	AD D PD CPD
7. J'ai besoin d'avoir des conséquences plus logiques et prévisibles pour mes actions	AD D PD CPD
8. J'ai besoin d'être plus autosuffisant(e)	AD D PD CPD
9. J'ai besoin de me faire traiter avec plus d'impartialité	AD D PD CPD
10. J'ai besoin d'avoir plus de contrôle de ce qui m'arrive	AD D PD CPD
11. J'ai besoin d'avoir plus de plaisir dans ma vie	AD D PD CPD
12. J'ai besoin d'accomplir plus de choses dans ma vie	AD D PD CPD
13. J'ai besoin d'avoir plus de gens qui seront là pour moi en temps de difficultés	AD D PD CPD
14. J'ai besoin d'être une personne plus accomplie que je le suis	AD D PD CPD
15. J'ai besoin d'avoir une meilleur place parmi les autres	AD D PD CPD
16. J'ai besoin d'avoir une vie avec plus de buts et objectifs	AD D PD CPD
17. J'ai besoin d'être plus intime et connecté(e) avec mon partenaire	AD D PD CPD
18. J'ai besoin d'avoir plus de gens qui demandent mon opinion	AD D PD CPD
19. J'ai besoin d'avoir des relations plus stables et consistantes	AD D PD CPD
20. J'ai besoin d'être plus indépendant(e)	AD D PD CPD
21. J'ai besoin d'avoir autant d'opportunités que les autres, mais je ne l'ai pas	AD D PD CPD
22. J'ai besoin d'avoir plus de choix dans ma vie	AD D PD CPD
23. J'ai besoin d'avoir plus de plaisir dans ma vie quotidienne	AD D PD CPD
24. J'ai besoin d'éviter plus les échecs	AD D PD CPD
25. J'ai besoin d'avoir plus de gens qui me soutiennent et qui sont de mon côté	AD D PD CPD
26. J'ai besoin d'être plus compétent(e)	AD D PD CPD
27. J'ai besoin de me sentir comme j'appartiens plus à un groupe	AD D PD CPD
28. J'ai besoin d'avoir une vie plus orientée vers des résultats	AD D PD CPD
29. J'ai besoin d'avoir un partenaire qui est plus excité(e) sexuellement par moi	AD D PD CPD
30. J'ai besoin d'être plus admiré(e) par les autres	AD D PD CPD
31. J'ai besoin d'avoir plus de prévisibilité dans ma vie	AD D PD CPD
32. J'ai besoin d'être moins obligé de dépendre sur les autres	AD D PD CPD
33. J'ai besoin d'avoir plus de ce que je mérite	AD D PD CPD
34. J'ai besoin d'avoir une plus grande voix dans les décisions qui affectent ma vie	AD D PD CPD

35. J'ai besoin d'avoir plus de choses à anticiper dans la vie	AD	D	PD	CPD
36. J'ai besoin de connaître plus de succès et de réussite	AD	D	PD	CPD