

Self-criticism and personal standards dimensions of perfectionism and subjective
well-being over three years: The mediating role of basic psychological needs

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June, 2011

A thesis submitted to McGill University in partial fulfillment of the requirements
of the degree of Master of Science

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Acknowledgements

This master's thesis would not have been possible without the assistance and cooperation of several individuals. First and foremost, I would like to thank my supervisor, Dr. David Dunkley, for his unwavering support, guidance and advice throughout my Master's program. Without his invaluable comments, suggestions, and feedback, this thesis and other important academic undertakings would not have been possible. I would also like to thank my co-supervisor, Dr. Brett Thombs, for all his support in the research project over the past two years. As well, I would like to acknowledge the effort and time that Ellen Stephenson, Amber Shattler, Molly Moroz and Tobey Mandel has put into telephoning, interviewing and data entry throughout the study to enable a smooth running of the project. I also thank Magali Purcell Lalonde and Jody-Lynn Berg for their involvement in contacting participants, data collection, and data entry from October 2007 to August 2008. My gratitude also goes to the participants who dedicated their time and energy to this project over the years. Finally, I would like to acknowledge the Social Sciences and Humanities Research Council for their generous CGS Master's scholarship, which has enabled me to complete this project.

Contribution of Authors

The present study is a part of a larger ongoing longitudinal research project which examines the role of stress generation and reactivity processes in the relation between self-critical (SC) perfectionism and depressive symptoms in an adult community sample. The study was designed by the following principal investigator Dr. David Dunkley. Denise Ma, myself, coordinated the Year 2 and Year 3 follow-up study, followed up with participants, collected the data, performed data entry, data management, and statistical analyses. In order to examine the role of the basic psychological needs as mediators in the relation between SC and subjective well-being outcomes, Dr. Dunkley agreed for me to add a measure at Year 2 to assess the basic psychological needs and to use part of the data for my master's thesis. For this purpose, in addition to the above mentioned tasks, I performed the literature review and interpreted the statistical analyses in collaboration with Dr. Dunkley. Finally, I wrote this thesis, which was reviewed by Drs. David Dunkley and Brett Thombs.

Abstract

This study of community adults ($N = 164$) examined the role of basic psychological needs in the relation between self-criticism (SC) and personal standards (PS) dimensions of perfectionism and subjective well-being over three years. Participants completed in-lab questionnaires assessing dimensions of perfectionism, needs satisfaction, and subjective well-being at Time 1, Year 2, and Year 3, respectively. In contrast to PS, SC was related to lower satisfaction of needs for relatedness, competence, and autonomy at Year 2; and lower life satisfaction, vitality, and positive affect, and higher negative affect at Year 3. Path analyses demonstrated that all three needs at Year 2 mediated the relation between Time 1 SC and lower life satisfaction and vitality at Year 3. These findings demonstrate the importance of trying to increase the satisfaction of the basic psychological needs in order to increase subjective well-being and reduce vulnerability to depression in individuals with higher self-critical perfectionism.

Résumé

Cette étude d'adultes de la communauté ($N = 164$) a examiné le rôle des besoins psychologiques fondamentaux dans la relation entre l'autocritique (SC) et les standards personnelle (PS) dimensions du perfectionnisme et du bien-être subjectif au cours de trois ans. Les participants ont rempli des questionnaires dans notre laboratoire pour évaluer les dimensions du perfectionnisme, la satisfaction des besoins, et le bien-être subjectif au Temps 1, Année 2, et Année 3, respectivement. Contrairement aux standards personnelle (PS), l'autocritique (SC) était liée à une réduite de satisfaction des besoins pour le sentiment de rapport, la compétence et l'autonomie à l'Année 2; et une réduite dans la satisfaction de la vie, la vitalité et l'affect positif et une augmentation à l'affect négatif l'Année 3. Des analyses causales ont démontré que les trois besoins à l'Année 2 sont des médiateurs de la relation entre l'autocritique (SC) à Temps 1 et la diminution dans la satisfaction de vie et la vitalité à l'Année 3. Ces résultats démontrent l'importance d'essayer d'augmenter la satisfaction des besoins psychologiques fondamentaux afin d'augmenter le bien-être subjectif et de réduire la vulnérabilité à la dépression dans les individus ayant hauts niveaux d'autocritique perfectionnisme.

Introduction

Perfectionism has emerged as an important cognitive-personality factor associated with a wide range of psychopathology including eating disorders (e.g., Bulik et al., 2003), social phobia (e.g., Juster et al., 1996; Shumaker & Rodebaugh, 2009), obsessive-compulsive disorder (e.g., Frost & Steketee, 1997; Moretz & McKay, 2009), suicidal ideation (e.g., Hewitt, Flett & Weber, 1994), and depression (e.g., Hewitt, Flett & Ediger, 1996; see Bardone-Cone et al., 2007; Egan, Wade, & Shafran, 2011; Flett & Hewitt, 2002; Shafran & Mansell, 2001, for reviews). Over the past two decades, a great deal of attention has focused on perfectionism as a vulnerability to depression (e.g., Brewin & Fifth-Cozens, 1997; Cox, Clara, & Enns, 2009; Dunkley, Sanislow, Grilo, & McGlashan, 2006; Enns & Cox, 2005; Hewitt et al., 1996). Further, research has also shown that pre-treatment perfectionism has a negative impact on therapeutic process and outcome that persists up to eighteen months and longer (e.g., Blatt, Zuroff, Bondi, Sanislow, & Pilkonis, 1998; Blatt, Quinlan, Pilkonis, & Shea, 1995; Zuroff et al., 2000; see Blatt & Zuroff, 2005, for a review).

Given the above, it is important to examine further the explanatory mechanisms in the link between perfectionism and depressive symptoms in order to prevent the onset of symptomatology in individuals with higher levels of perfectionism from occurring in the first place. Depression has been conceptualized as a disorder consisting of high levels of chronic negative affect, feelings of hopelessness and worthlessness, coupled with a lack of adaptive coping strategies and compensatory positive experiences to assuage these

feelings of dysphoria (Beck & Alford, 2009; Gross & Munoz, 1995; Moulds, Kandris, Starr, & Wong, 2006). To date, the majority of the research has focused extensively on explaining negative outcomes and the maintenance of negative affect in depression (e.g. Chang & Sanna, 2001; Dunkley & Blankstein, 2000; Dunkley, Blankstein, & Zuroff, 2003; Dunkley, Sanislow et al., 2006; O'Connor, O'Connor & Marshall, 2007). However, little is known about the role of positive affect and its adaptational significance in increasing subjective well-being to halt rumination and other maladaptive response styles to prevent the downward spiral into full clinical depression (see Folkman & Moskowitz, 2000, for a review). Furthermore, previous research has shown that subjective well-being protects against the negative impacts of stressful life events and the onset of psychological (i.e. depression, anxiety symptoms) and behavioural problems (Park, 2004). This further demonstrates the importance of examining the specific mechanisms underlying the relation between perfectionism and positive aspects of functioning and outcomes.

The current study used a three-wave longitudinal design to examine the relation between self-critical and personal standards dimensions of perfectionism and positive indicators of subjective well-being three years later. Basic psychological needs of relatedness, competence and autonomy were assessed at year two as plausible mediators to help explain this relationship. The main objectives of the present study were to: (1) examine the relations between self-criticism (SC) and personal standards (PS) dimensions of perfectionism, and indicators of subjective well-being over three years; (2) examine how the need

for relatedness might mediate the relation between SC and lower levels of competence and autonomy two years later; and (3) examine how the satisfaction of the basic psychological needs for relatedness, competence, and autonomy may mediate the relation between perfectionism and lower subjective well-being over three years.

The following paper is organized into several sections: First, a literature review on the conceptualizations of perfectionism will be presented, outlining its evolution from a unidimensional to a multidimensional construct, and highlighting the distinctions between the two higher order factors of SC and PS perfectionism. Second, a review of the literature on self-determination theory and subjective well-being will situate the current study within the context of the “positive psychology” movement (see Seligman, 2002; Seligman & Csikszentmihalyi, 2000). Third, mediational pathways between self-criticism and subjective well-being will be discussed, focusing on the theoretical evidence for considering the three basic psychological needs for relatedness, competence and autonomy as good potential mediators to explain this relationship. Fourth, the methods and results of the present study will be presented, followed by a discussion of the key findings. Last, conclusions from the study will be presented.

The Impact of Perfectionism on Subjective Well-Being

Dimensions of Perfectionism

Blatt (1974; Blatt, D’Afflitti, & Quinlan, 1976) first proposed the specific cognitive-personality vulnerability factor of self-criticism, which reflects a negative dimension of perfectionism. Self-criticism involves constant self-scrutiny and harsh self-evaluation, in addition to chronic concerns about others’ approval, criticism, and possible rejection (Blatt & Zuroff, 1992; Blatt, 1995). Self-critics are preoccupied by a powerful need to avoid all failures and are constantly trying to maintain a seamless façade of perfection to the outside world at all costs (see Blatt, 1995 for a review). The excessively high self-standards characteristically pursued by perfectionistic individuals are thought to increase the frequency and magnitude of failure experiences, which amplify feelings of self-blame and self-criticism, leading to increased distress and depressive symptoms (Beck, 1967, 1983; Blatt & Zuroff, 1992; Kanfer & Hagerman, 1981). Initially, Burns (1980) posited perfectionism as a unidimensional negative trait characterized by the setting of excessive high standards and an “all or nothing” dichotomous thinking towards all their experiences (Barrow & Moore, 1983; Burns, 1980). Specifically, Burns believed that the black-and-white thinking of “either I am perfect or else I am a total failure” causes perfectionists to dread mistakes and overreact to them (Burns, 1980, p. 39), casting doubts about the overall quality of their performances.

More recent research within the past decade has conceptualized perfectionism as a complex and multidimensional construct, consisting of not only negative dimensions but also positive aspects as well (see Dunkley, Blankstein, Masheb, & Grilo, 2006; Flett & Hewitt, 2002). Hamachek (1978) originally distinguished between both normal and neurotic components of perfectionism. According to Hamachek (1978), normal perfectionists set high standards for themselves yet “feel free to be less precise as the situation permits” (Hamachek, 1978, p. 27), allowing room for flexibility and mistakes that do not amount to total failure. On the other hand, neurotic perfectionism, though also characterized by high standards, allows little space for making mistakes. Instead, it fuels the belief that nothing is ever done thoroughly or well enough according to standards (Hamachek, 1978).

Expanding upon Hamachek’s original theory of perfectionism, different theorists have posited specific dimensions of perfectionism, primarily involving achievement and social concerns to be the most relevant to depression (Frost, Marten, Lahart & Rosenblate, 1990; Hewitt & Flett, 1991; Slaney, Rice, Mobley, Trippi, & Ashby, 2001). More recent conceptualizations of perfectionism belonging to that of Frost and colleagues (Frost et al., 1990), Hewitt and Flett (1991), and Slaney and colleagues (Slaney et al., 2001) have garnered the most attention and interest in the current literature concerning the multidimensional nature of perfectionism. Similar to Hamachek’s (1978) view, Frost et al. (1990) emphasized that “the setting of and striving for high standards is certainly not in and of itself pathological...the psychological problems associated with

perfectionism are probably more closely associated with the critical evaluation tendencies ” associated with a concern with mistakes (p. 450). Frost et al. (1990) identified several intrapersonal facets of perfectionism, including personal standards (i.e., the setting of very high standards, and the excessive importance placed on these high standards for self-evaluation), concern over mistakes (i.e., emphasizing negative responses to mistakes, incorporating the tendency to equate mistakes as personal failure, and believing that these mistakes will cost them the respect of others), doubts about actions (i.e., feeling that projects or tasks are not satisfactorily completed), organization (i.e., importance of and preference for order and organization), parental expectations (i.e., belief that one’s parents set very high standards and goals for the self), and parental criticism (i.e., being punished for not doing things perfectly, conditional performance-based approval and feeling that parental expectations and standards could never be met).

From a different perspective, Hewitt and Flett (1991) posited that perfectionism consisted of not only intrapersonal facets (i.e., self-oriented perfectionism) but also interpersonal aspects (i.e., socially prescribed perfectionism), which may contribute to adjustment difficulties. Self-oriented perfectionism is defined as the tendency to set and strive for exacting high standards for the self, and stringently evaluating and censuring one’s own behaviours. It also includes a strong motivational component to strive for perfection in one’s pursuits in addition to avoiding failures at all costs. The socially prescribed perfectionism dimension is conceptualized as the perceived

need to attain unrealistically high standards and meet the excessively high expectations of significant others. Because these individuals are concerned with meeting others' standards, Hewitt and Flett (1991) posited that they should show more fear of negative evaluations and place greater importance on obtaining positive attention while avoiding the disapproval of others.

More recently, Slaney and colleagues (2001) distinguished between the adaptive "positive strivings" or personal high standards component of perfectionism, in contrast to the maladaptive negative self-evaluations dimensions of perfectionism. Slaney and Ashby (1996) argued that the feelings of distress associated with perfectionism may originate in a perceived discrepancy between high personal standards for performance, and the perceptions of how successfully those standards are met in actual performance. Similar to Frost and colleagues (1990), Slaney and colleagues (2001) also posit that personal standards in and of themselves are not maladaptive, but it is the perceived discrepancy between standards and performance that might be at the core of maladaptive perfectionism.

Although researchers have attempted to distinguish between the adaptive and maladaptive facets of perfectionism (Frost et al., 1990; Hamacheck, 1978; Slaney et al., 2001), more consensus has been established regarding the distinction between personal standards (PS) and self-critical (SC) evaluative concerns dimensions of perfectionism (e.g. Alden et al., 2002; Dunkley et al., 2000; Dunkley, Blankstein et al., 2006; Dunkley, Sanislow, et al., 2006; Slaney et al., 2001; Stoeber & Otto, 2006). Evidence and support for these two

dimensions of PS and SC dimensions has been present in the past conceptualizations of perfectionism. PS perfectionism involves the setting of high standards and goals for oneself, which is an integral component of the definition of perfectionism, but not necessarily maladaptive or pathological in and of itself (see Frost et al., 1990; Shafran, Cooper & Fairburn, 2002). In contrast to PS, SC perfectionism is more maladaptive in that it involves constant and harsh self-scrutiny, overly critical self-evaluations, an inability to derive satisfaction from successful performance, and chronic concerns about others' approval, criticism and potential rejection (Blatt & Zuroff, 1992; Dunkley, Zuroff & Blankstein, 2003).

Furthermore, although there are notable differences amongst the measures derived from the various theoretical frameworks, recent studies have also shown significant overlap between Frost et al.'s (1990) Multidimensional Perfectionism Scale (FMPS), Hewitt & Flett's (1991) Multidimensional Perfectionism Scale (HMPS), the Almost Perfect Scale-Revised (APS-R; Slaney, Rice, Mobley, Trippi, & Ashby, 2001), the Depressive Experiences Questionnaire (DEQ; Blatt et al., 1976), and the Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978). Factor analytic studies of these measures have consistently yielded two distinct higher-order latent factors of perfectionism (e.g. Blankstein & Dunkley, 2002; Cox, Enns, & Clara, 2002; Dunkley, Blankstein, & Berg, in press; Dunkley, Blankstein, Zuroff et al., 2006; Frost, Heimberg, Holt, Mattia, & Neubauer, 1993; Powers, Zuroff, & Topicu, 2004; see Dunkley,

Blankstein, Masheb, et al., 2006; Stoeber & Otto, 2006, for reviews), which coincide with the PS and SC dimensions.

Specifically, studies have shown that the FMPS personal standards and HMPS self-oriented subscales load onto the PS factor. In contrast, the FMPS concern over mistakes and HMPS socially prescribed perfectionism load onto the maladaptive SC factor (e.g., Bieling, Israeli, & Antony, 2004; Frost et al., 1993; see Stoeber & Otto, 2006 for a review). Studies have also shown that the APS-R high standards subscale, FMPS personal standards, and HMPS self-oriented perfectionism load onto a PS factor, whereas the APS-R discrepancy, FMPS concern over mistakes and HMPS socially prescribed perfectionism load onto the SC factor (Blankstein, Dunkley, & Wilson, 2008; Dunkley, Blankstein, et al., in press; Suddarth & Slaney, 2001). Furthermore, the DEQ self-criticism scale reflects the same latent construct as the HMPS socially prescribed perfectionism (e.g., Dunkley & Blankstein, 2000; Dunkley, Blankstein, Zuroff et al., 2006), FMPS concern over mistakes (Dunkley et al., 2003; Powers et al., 2004), and the APS-R discrepancy subscale (Dunkley, Ma, Lee, & Preacher, 2011). Lastly, the DAS perfectionism scale has been shown to be more closely related to SC than PS measures (Dunkley & Kyparissis, 2008; Powers et al., 2004), and to load onto the SC latent factor along with HMPS socially prescribed perfectionism, FMPS concern over mistakes, DEQ self-criticism and APS-R scales (e.g., Dunkley et al., 2011). Overall, these studies show that PS is reflected by FMPS personal standards, HMPS self-oriented perfectionism, and APS-R high standards, while

SC is reflected by DEQ self-criticism, DAS perfectionism, FMPS concern over mistakes, HMPS socially prescribed perfectionism, and APS-R discrepancy.

Empirically, SC has been consistently associated with higher negative affect and depressive symptoms (e.g. Dunkley & Blankstein, 2000; Enns & Cox, 1999; Sherry, Hewitt, Flett, & Harvey, 2003) over a period of one year or more (e.g., Brewin & Fifth-Cozens, 1997; Dunkley, Sanislow et al., 2006), and inversely associated with indicators of subjective well-being (e.g., positive affect, life satisfaction) over periods of up to several years (Dunkley, Sanislow, Grilo & McGlashan, 2009; Dunkley et al., 2003; Zuroff, Koestner, & Powers, 1994). In contrast, PS measures have had weak or negligible relations with depressive symptoms, negative affect, and positive affect, especially in nonclinical samples (e.g. Dunkley & Blankstein, 2000; Dunkley, Blankstein, Halsall, Williams & Winkworth, 2000; Dunkley, Zuroff, & Blankstein, 2006; Enns & Cox, 1999; Flett, Hewitt, Garshowtiz, & Martin, 1997; Frost et al., 1993; Stober, 1998).

Daily Stress and Avoidant Coping as Mediators: A Review

In order to understand why SC perfectionists experience distress, it is important to examine plausible mediators that may explain this relationship in order to target these explanatory variables in the prevention against negative outcomes. To date, several mediational studies in the literature examining the link between perfectionism and negative outcomes (i.e. depression) have focused on cognitive appraisals, daily stress and coping as critical mediators (Dunkley et al., 2000; 2003; Dunkley, Sanislow et al., 2006; Dunn, Whelton, & Sharpe,

2006). In Dunkley et al.'s (2000) study, a mediational model examining stress and coping as mechanisms in the relation between SC perfectionism and stress was cross-validated using a sample of 443 university students. Results showed that daily hassles (measured by the participants' appraisal of how stressful the daily events are) and avoidant coping were unique mediators explaining the relationship between SC and distress. Building on the findings from this study, Dunkley et al. (2003) then used aggregated daily measures (see Bolger, Davis, & Rafaeli, 2003; Schwartz, Neale, Marco, Shiffman, & Stone, 1999) in a second study to test aggregated measures of stress, appraisals, and coping as mediators between SC and negative affect in a sample of 163 university students. In this second study, they found that hassles and avoidant coping were key mediators in the relation between SC and negative affect. Avoidant coping was also indirectly related to negative affect through its association with hassles and event stress.

Further studies have tested the generalizability of Dunkley et al.'s (2000, 2003) previous studies using university professors (Dunn et al., 2006) and a heterogeneous clinical sample (Dunkley, Sanislow et al., 2006). Specifically, Dunn et al. (2006) corroborated earlier findings showing that hassles and avoidant coping fully mediated the relations between SC and distress in a sample of 370 university professors. Additionally, Dunkley, Sanislow, et al., (2006) building on their earlier studies (2000, 2003), found that avoidant coping and daily stress also mediated the relation between SC and depressive symptoms in a heterogeneous clinical sample.

Although these previous mediational studies showed that avoidant coping

and higher levels of daily stress mediate the relationship between SC perfectionism and depressive symptoms, distress and negative affect, the same mediators are not strong candidates in explaining the relation between SC and indicators of subjective well-being over time. Dunkley et al.'s (2003) study showed that avoidant coping and stress were more closely related to negative affect than positive affect. In a more recent study, Dunkley et al. (2011) have corroborated these earlier findings by showing that daily stress and avoidant coping mediated the relationship between SC and negative affect, but did not find any significant indirect relations between SC and positive affect in a sample of community participants. These findings raise the question of whether different mechanisms may underlie the relation between perfectionism and positive outcomes. To address this question, the current study turns to the basic psychological needs as potential mediators given their associations with both SC perfectionism and subjective well-being.

Situating Perfectionism in the Positive Psychology Movement

In the past decade, the field of psychology has begun to shift its focus from studying only psychopathology and negative outcomes, to examining the positive emotions and character traits with hopes of providing a balanced and complete scientific understanding of human adaptation. Reflecting this trend, the aim of the “Positive Psychology” movement (Seligman, 2002; Seligman & Csikszentmihalyi, 2000) was to change our preoccupation with the current reductionist disease model of symptom alleviation and treatment, to more

research exploring the better human qualities and intrinsic strengths (i.e., spirituality, courage, optimism, perseverance) to improve well-being, life satisfaction, happiness and personal fulfillment. By understanding more about the positive aspects of human psychology, we can focus on building resilience to prevent against psychopathology and negative outcomes.

This is where the current research on perfectionism is lagging behind since the majority of the past studies on perfectionism has mainly focused on distinguishing between adaptive and maladaptive dimensions of perfectionism (Dunkley et al., 2000; Dunkley, Sanislow et al., 2006; Stoeber, & Otto, 2006), and understanding their respective associations with psychopathology and negative outcomes (e.g. Dunkley & Blankstein, 2000; Enns & Cox, 1999; Sherry, Hewitt, Flett, & Harvey, 2003). However, very little research has examined how these dimensions of perfectionism actually relate to positive outcomes such as subjective well-being (Chang, 2000). In order to provide a complete picture of how perfectionism affects individual's overall well-being over time, both the negative and positive outcomes should be examined, especially since research has shown that negative and positive affect may be independent of each other rather than just sharing a bipolarity relationship where the absence of one necessarily entails the presence of the other (Russell & Carroll, 1999; Watson & Tellegen, 1985; see Reich, Zautra, & Davis, 2003 for a review). In line with the themes of the "positive psychology" movement, the current study aims to broaden our current understanding of perfectionism by examining its prospective relation to subjective well-being.

Self-Determination Theory and Subjective Well-Being

Self-Determination Theory

Deci and Ryan's (1985, 1991) Self-Determination Theory (SDT) offers a promising framework to help us better understand how perfectionism is related to subjective well-being over time. SDT provides a broad framework in the study of the basis of human personality and motivation (Deci & Ryan, 2000). SDT focuses on how external social, cognitive, and cultural factors may facilitate or undermine individual's sense of volition and personal initiative, and how this would in turn affect well-being and quality of performance in various domains in their life (Ryan & Deci, 2000).

Well-being refers to a sense of optimal psychological functioning and experience (Deci & Ryan, 2008). Diener (1984) has focused on the notion of *subjective* well-being (SWB) arguing that the degree to which an individual experiences a sense of wellness depends very much on how the individual defines and evaluates well-being for themselves. As an operational definition, SWB has been interpreted to mean the experience of a high degree of satisfaction with life and positive affect, with low levels of negative affect (Deci & Ryan, 2008; see Diener, 2008 for a review). More recently, subjective vitality (i.e. the feeling of being alive and full of energy), has also been hypothesized to be an important determinant of subjective well-being (Ryan & Frederick, 1997). Each of these individual components of SWB shows some degree of independence and should therefore be assessed separately as independent aspects of SWB

(Andrews & Withey, 1976; Lucas, Diener, & Suh, 1996).

According to SDT, the key “psychological nutrients” (Ryan, 1995, p. 410) for an individual’s survival, growth, integrity, and overall well-being are the satisfaction of three basic psychological needs, which are considered to be universal aspects of functioning: relatedness, competence, and autonomy (Ryan, 1995; Ryan & Deci, 2000). First, the basic need for relatedness involves establishing a sense of mutual respect and optimal social support with others in the community, family and network. It also involves overcoming feelings of alienation or marginalization from one’s social milieu (Baumeister & Leary, 1995). Second, the need for competence refers to a sense of self-efficacy derived from succeeding at challenges and being able to attain and control the occurrence of desired outcomes as opposed to feeling ineffectual and inept (White, 1959). Last, the basic need for autonomy involves the experience of a sense of choice and the belief that the self is the initiator of one’s own actions and behaviours, as opposed to being coerced and pressured (deCharms, 1968). Meeting these basic psychological conditions would in turn promote positive emotions, including happiness, satisfaction with life, vitality, higher positive affect, and lower negative affect throughout an individuals’ life, all of which independently contribute to improved subjective well-being (e.g., Reis et al, 2000; Ryan, Huta, & Deci, 2008).

Empirical studies examining the relationship between basic psychological needs and subjective well-being have been conducted at both the between-persons and the within-persons level of analyses (e.g. Reis et al., 2000; Sheldon

& Elliot; 1999; Sheldon et al., 1996). Specifically, Sheldon and colleagues (1996) examined the daily fluctuations in satisfaction of both competence and autonomy needs over two weeks. Using hierarchical linear modelling, they found that feelings of competence and autonomy at the between-persons level predicted both happiness and vitality. Additionally, within-person level fluctuations in daily experiences of the fulfillment of these two needs also significantly predicted fluctuations in the daily affects. Reis and colleagues (2000) later showed with a student sample that within-person fluctuations in all three basic psychological needs independently predicted fluctuations in daily positive affect, while contributing to the unique variance in predicting happiness and vitality. Higher levels of subjective well-being in turn can protect against depression (Lewinsohn, Redner & Seeley, 1991) and suicide (Rebblon, Brown & Keyes, 2000), therefore making the satisfaction of these three needs even more important given their relations to improved subjective well-being over time.

Furthermore, the satisfaction of these basic psychological needs for relatedness, competence, and autonomy also play a role in broader psychological and physical functioning, in addition to their associations with subjective well-being (e.g. Fischer & Boer, 2011; Kasser & Ryan, 1999; Wei, Shaffer, Young, & Zakalik, 2005; Vallerand, 2000). Specifically, needs satisfaction measured as a latent variable of all three basic psychological needs partially mediated the relation between attachment anxiety, and outcomes of shame, loneliness and depressive symptoms. Furthermore, needs satisfaction of relatedness, competence, and autonomy also fully mediated the relationship between

attachment avoidance and the same negative outcome variables (Wei et al., 2005). Satisfaction of the needs was also related to physical health outcomes including mortality in a sample of nursing home-residents (Kasser & Ryan, 1999). In addition, greater freedom of choice and autonomy have been consistently linked to increased life satisfaction across eighty societies both longitudinally and cross-sectionally (Inglehart et al., 2008; Welzel & Inglehart, 2010). Given these empirical findings, it is important to have each of these needs met in order to buffer and prevent against symptomology and improve overall well-being.

Relatedness, Competence and Autonomy as Mediators

Although a few recent studies have explored the relations between dimensions of perfectionism and outcomes of subjective well-being (e.g., Chang, 2006) by examining identity formation (Luyckx, Soenens, Goossens, Beckx, & Wouters, 2008) and self-efficacy (Chan, 2007) as plausible mediators in the relationship, no studies to date have considered the basic psychological needs as independent mediators in explaining the specific mechanisms through which SC perfectionism exerts its negative effects on subjective well-being over time. Evidence from the literature suggests that individuals with higher SC show deficits in each of the fundamental psychological needs for relatedness, competence, and autonomy. In particular, satisfactory social relations and interpersonal relatedness buffer against the impact of SC perfectionism on therapeutic outcomes (Shahar, Blatt & Zuroff, 2007), further supporting the

importance of the need for relatedness in SC perfectionism and subjective well-being. The following sections will explain in more detail the theoretical relations between SC and each of these three basic psychological needs.

SC and Relatedness

High-SC individuals usually experience an early environment characterized by harsh, punitive and controlling parenting (e.g. Blatt, 1995; Blatt & Homann, 1992; Koestner, Zuroff, & Powers, 1991; Thompson & Zuroff, 1999; Zuroff et al., 1994). Parental high standards, inconsistent and/or conditional approval contingent on meeting high standards (Hamachek, 1978; Blatt, 1995; Horney, 1950), in addition to the use of love withdrawal and evaluative interactions with their children (Burns, 1980) would lead to the development of a fearful-avoidant attachment style (Bartholomew & Horowitz, 1991). Later on in adulthood, individuals with high SC perfectionism also develop a fear of potential loss of relationships because of their concerns with obtaining others' approval, respect, and admiration (see. Blatt, 1995; Dunkley, Berg, & Zuroff, in press; Wei, Mallinckrodt, Russell, & Abraham, 2004; Zuroff & Fitzpatrick, 1995). They also fear dependency because of their preoccupation with maintaining the appearance of perfection and self-reliance to others in order to gain their respect and admiration (Blatt, 1995; Dunkley, Berg, et al., in press; Hewitt et al., 2003; Wei et al., 2004). Because SC individuals try to maintain superiority and a sense of control at all costs, their interpersonal relationships are likely to be superficial, distant and less emotionally engaging for fear of being

perceived to be a failure or inferior in the eyes of their peers (see Blatt & Zuroff, 1992 for a review). They also engage in a defensive interpersonal style eliciting negative reactions from others (Flett, Hewitt, Garshowitz & Martin, 1997; Frost et al., 1990; Whisman & Friedman, 1998; see Zuroff et al., 2004).

The lack of relatedness in SC individuals would also contribute to their needs for competence and autonomy not being met since they would not have developed a “secure base” (Ainsworth, 1990; Ainsworth & Bell, 1974; Bowlby, 1988; 1990) from which to confidently explore their environments and learn to successfully navigate challenging situations. Early experiences of inconsistent approval and disapproval would lead these individuals to be doubtful about whether any effort is ever good enough (e.g., Blatt & Homann, 1992; Rogers, 1951). This would in turn prevent the development of feelings of self-efficacy, and prevent the needs for competence and autonomy from being met over time (Feeney, 2004; Matas, Arend, Sroufe, 1978).

SC and Competence

Furthermore, SC individuals also described themselves as being less competent (Altermatt et al., 2002; Dunkley, Blankstein et al., 2006; Dunkley & Kyparissis, 2008). Feelings of competence, in addition to autonomy and relatedness, facilitate the development of a cohesive self-definition (Blatt & Blass, 1995; Shahar et al., 2003). Positive early relationships, which foster optimal feelings of relatedness, serve as a basis for later exploration, affect and effectance motivation, contributing to the development of competence later on in

life (Ainsworth, 1973, Ainsworth & Bell, 1974; Waters, Wippman, Sroufe, 1979). Additionally, the insecure attachment fears concerning both inclusion (e.g., gaining approval), and exclusion (e.g., avoiding rejection) by others in SC perfectionists may also contribute to lower self-esteem and feelings of competence according to the sociometer theory, which theorizes that self-esteem is a subjective indicator of the degree to which individuals feels included or excluded by others (Leary, Tambor, Terdal, & Downs, 1995).

Additionally, individuals with higher levels of SC tend to respond to challenges and stressful situations with a helplessness orientation (see Dweck & Sorich, 1999), which reduces their engagement in problems-focused coping (Dunkley et al., 2000, 2003; see Flett, Hewitt, Blankstein, Solnik, & Brunshot, 1996). SC individuals are quick to respond to stressful or challenging situations with feelings of perceived defectiveness and self-denigration (Blatt, 1995; Dunkley et al., 2003; Vettese & Mongrain, 2000). They become preoccupied with these perceived deficiencies to such an extent that they would lack the motivation to engage in active coping, choosing instead to avoid the challenges at hand. Their feelings of worthlessness and inferiority would in turn explain their perceptions of low efficacy and self-esteem (e.g. Martin, Flett, Hewitt, Krames, & Szanto, 1996) leading them to further avoidance of the situations, and to engage in self-handicapping behaviours (Dunkley et al., 2003; O'Connor & O'Connor, 2003; Shafran et al., 2002; Zuroff et al., 1994).

This is in contrast to PS individuals who adopt a mastery orientation (see Dweck & Leggett, 1988; Dweck & Sorich, 1999), and engage in active, problem-

focused coping in response to stressful situations (Burns & Fedewa, 2005; Chang, Watkins, Banks, 2004; Dunkley et al, 2000). PS is more closely related to positive correlates including conscientiousness and higher self-esteem, while only showing weak associations to distress and psychopathology outcomes when compared to SC (e.g. Ashby & Rice, 2002; Bieling, Isralie, & Antony, 2004; Enns, Cox & Clara, 2002; Enns, Cox, Sareen, & Freeman, 2001). The engagement and selection of more active, problem-focused coping would in turn help PS individuals to experience more control and competence of their environment as they learn to overcome their challenges and bounce back from failures.

SC and Autonomy

Last, SC also undermines individuals' feelings of autonomous motivation in goal-oriented activities, originating from an early controlling environment characterized by inconsistent parental feedback (Shahar et al., 2003; Thompson & Zuroff, 1998; Zuroff et al., 1994). SC individuals are likely to perceive their parents as intrusive, controlling and disregarding of their personal viewpoints and opinions (Soenens, Vansteenkiste, Luyton, Duriez, & Goossens, 2005; Whiffen & Sasseville, 1991). This would in turn hinder their development of autonomy and personal identity formation (Barber & Harmon, 2002) since the individual does not feel that he or she is the initiator of their own actions or has freedom of choice. Since autonomy is related to intrinsic motivation and a sense of mastery of the environment, which are correlated with increased subjective

well-being (see review by Ryan & Deci, 2000), lowered autonomous motivation in SC individuals is another important mediator to examine in this relationship. High-SC individuals display avoidance and engage in self-handicapping in order to reduce the probability of encountering any criticisms or potential failures. This will thwart the development of feelings of competence and autonomy, often established through engaging in a wide range of challenges and activities (Dunkley et al., 2003; O'Connor & O'Connor, 2003; Shafran et al., 2002; Zuroff et al., 1994).

Although no studies to date have examined the satisfaction of the basic psychological needs with respect to perfectionism and subjective well-being, the present study posits that the basic needs for relatedness, competence and autonomy are good candidates to explain the relationship between perfectionism and lowered subjective well-being over time given the associations between each of the needs to dimensions of perfectionism and subjective well-being. Previous literature has shown that SC individuals emphasize a need for achieving self-esteem and control, often at the expense of establishing meaningful interpersonal relations (Blatt et al., 1998; Santor & Zuroff, 1998). Specifically, Fichman and colleagues (1994) found that adolescent girls and boys who scored high on SC reported more interpersonal difficulties, lack of sociability and over-control in relationships. Self-critics also engaged in less self-disclosure, lower levels of trust and lower relationship satisfaction (Zuroff, 1993), endorsing a fearful-avoidant attachment style because of their fear of rejection (Bartholomew & Horowitz, 1991). Recent studies have shown that high-SC individuals reported

more negative social interactions and negative perceptions of social support (see Zuroff et al., 2004 for review) including expecting their parents to respond to them with coldness (Mongrain, 1998), being more dissatisfied and distrustful of romantic partners (Zuroff & Fitzpatrick, 1995), less willing to accept suggestions or share resources with friends (Santor & Zuroff, 1997, 1998), less loving and more hostile towards romantic partners (Mongrain et al., 1998), and displaying lower agreeableness and higher quarrelsomeness (Zuroff, Moskowitz, & Cote, 1999). Furthermore, using a daily diary approach, Dunkley, Berg, et al. (in press) found that SC individuals reported lower self-esteem, and more attachment fears including fear of closeness, dependency and loss. In contrast to PS perfectionists, they found that SC individuals were emotionally reactive to increases in fear of closeness with others.

Additionally, studies have shown that SC individuals also describe themselves and are viewed by others as being less competent in social situations, feeling inferior to others and reporting lower self-esteem (Altermatt et al., 2002; Dunkley, Blankstein, et al., 2006; Dunkley & Kyparissis, 2008; Fichman, Koestner, & Zuroff, 1996). Other studies have shown that SC also undermines individuals' feelings of autonomous motivation in goal-oriented activities, while showing a positive relationship with controlling parenting and early environments (Shahar et al., 2003; Thompson & Zuroff, 1998; Zuroff et al., 1994). Given the evidence from the literature on the relationship between the basic psychological needs to both subjective well-being and SC, it is important to examine in more detail the mediating role of these needs for relatedness,

competence and autonomy.

Limitations of the Present Literature

First, there is a lack of research examining positive outcomes related to dimensions of personality. Studies on personality vulnerabilities and perfectionism have focused mostly on negative outcomes. But it is especially important to examine positive outcomes in order to better understand the lack of adaptive compensatory experiences for high SC individuals, which contributes to their vulnerability to depression. In order to provide a complete picture of how perfectionism affects individual's overall subjective well-being, both the negative and positive outcomes should be examined. Furthermore, consistent with the research showing how negative and positive dimensions may be independent of each other rather than sharing a bipolar relationship (Russell & Carroll, 1999; Watson & Tellegen, 1985; see Reich, et al., 2003 for a review), the current study will examine the positive outcomes as an independent dimension in its relationship to perfectionism and the basic psychological needs.

To our knowledge, the present study is the first to examine whether the satisfaction of the basic psychological needs for relatedness, competence and autonomy may mediate the relationship between dimensions of perfectionism and subjective well-being over time. Although past mediational studies have placed heavy emphasis on the role of daily hassles and avoidant coping as key mediators in the relationship between SC perfectionism and negative outcomes, no studies to date have explored the mechanisms that may explain how

dimensions of perfectionism relate to positive functioning and outcomes.

Last, of the previous longitudinal studies testing mediational models, a major limitation is that the mediators have been assessed concurrently with the distress outcomes (e.g. Dunkley, Sanislow, et al., 2006; Rice et al., 2006; Wei et al., 2006). One of the methodological strengths of the current study is in its three-wave longitudinal design spanning over three years. The present study will examine the relations between the independent variable (i.e., SC and PS perfectionism), mediators (i.e. satisfaction of basic psychological needs of relatedness, competence, and autonomy), and outcome (i.e., subjective well-being) at three successive time points (Time 1, Year 2, and Year 3). This prospective design allows considerable time to elapse between each assessment, which will strengthen the causal statements that can be made in relation to the findings (see Cole & Maxwell, 2003).

Present Study

Rationale

The main purpose of the current study is to gain a better understanding of the mechanisms through which dimensions of perfectionism relate to levels of subjective well-being over time. It is important to learn more about the potential mechanisms and specific pathways through which dimensions of perfectionism may lead to differential levels of subjective well-being in community participants because it would enable us to learn more about the protective roles that the basic psychological needs and subjective well-being may play in countering negative

outcomes and psychopathology. By examining the basic psychological needs as potential mediators between perfectionism and subjective well-being, we can understand some of the fundamental processes that hinder human thriving and optimal adaptation to the environment. Further understanding of these processes would also help clinicians to develop preventions and targeted interventions that will facilitate quality of life and foster the basic human strengths in order to provide resilience against the effects of cognitive personality vulnerabilities.

Objectives

The present study aims to answer the question: “Does satisfaction of the three basic psychological needs for relatedness, competence and autonomy mediate the relationship between SC and PS dimensions of perfectionism and subjective well-being over the span of three years?” The main objectives of the present study were to (1) examine the relationship between SC and PS perfectionism to individual differences in basic psychological needs satisfaction and subjective well-being over three years; (2) examine how the need for relatedness might mediate the relation between SC and lower levels of competence and autonomy two years later; and (3) examine how relatedness, competence and autonomy mediate the relationship between the SC dimension of perfectionism and subjective well-being over three years.

We hypothesized that (1) Time 1 SC will predict lower levels of subjective well-being over three years; (2) Time 1 SC will also predict lower satisfaction of relatedness, competence and autonomy, respectively at Year 2;

and (3) the satisfaction of relatedness, competence and autonomy needs at Year 2 will independently predict subjective well-being at Year 3. Furthermore, it was hypothesized that lower satisfaction of the needs for relatedness, competence and autonomy will mediate the relation between SC and decreases in subjective well-being over three years.

Figure 1 depicts the hypothesized relations between SC perfectionism and subjective well-being over three years. The predicted model shows that (a) Time 1 SC will be related to each of the three needs for relatedness, competence and autonomy two years later at Time 2; (b) the need for relatedness will be linked to both competence and autonomy, with competence also linked to autonomy; and (c) the Time 2 needs for relatedness, competence and autonomy will each be independently linked to subjective well-being at Time 3 three years later. Should we find support for these hypotheses, then prevention and intervention efforts should target the satisfaction of the basic psychological needs in order to buffer against psychopathology and negative outcomes, while helping to increase overall well-being in individuals with higher levels of SC perfectionism.

Method

Participants

The research protocol and consent forms were approved by the Ethics Committees of the Sir Mortimer B. Davis Jewish General Hospital and McGill University prior to the study. Participants were 164 community adults (54 male, 110 female) from a larger sample of 223 English and French speaking adults holding paid employment, originally recruited through newspaper and bulletin advertisements for a longitudinal, repeated-measures study of stress generation and reactivity processes in SC perfectionists (see Dunkley & Kyparissis, 2008). Of the 164 participants, 89 (27 male, 62 female) completed the study in English, while 75 (27 male, 48 female) completed the study in French.

Participants ranged in age from 19 to 62 years with a mean age of 41.01 years ($SD = 12.19$). Of the 156 participants who reported their ethnicity, 80.1% ($n = 125$) were self-identified as Canadian, European or Caucasian. Additionally, 6.4% ($n = 10$) identified themselves as Asian, 3.8% ($n = 6$) as African, 3.8% ($n = 6$) as Middle Eastern, 2.6% ($n = 4$) identified themselves as East Indian, 1.3% ($n = 2$) as South American, 1.3% ($n = 2$) as Aboriginal, and 0.6% ($n = 1$) as Caribbean. Regarding participants' educational backgrounds, all participants reported receiving at least a high school education, with 53% ($n = 87$) having attained at least a university degree. The majority of the sample ($n = 111$) reported a family income of less than \$50,000 a year. On average, participants reported working full-time, with a mean of 31.79 hours per week. *T*-tests comparing the English and French participants showed no significant differences

with respect to age, gender, and education between the two groups.

Procedure

Participants started the current study at the 12-months follow-up (Time 1) of the original longitudinal study. They were contacted by a bilingual research assistant two to three weeks before their due date in order to arrange an appointment for an in-session assessment at the Institute of Community and Family Psychiatry at the Jewish General Hospital. At Time 1 (Fall 2007-Spring 2008), participants completed a battery of questionnaires during a 1-hour lab session, which assessed SC and PS dimensions of perfectionism, and subjective well-being, including satisfaction with life, vitality, positive affect, and negative affect. Two years later at Year 2 (36 months follow-up of original study), participants were re-contacted in the Fall of 2009 and Spring of 2010 to complete another 1 hour lab session where they completed a battery of assessments, including the basic psychological needs questionnaire assessing the extent to which each of the three basic psychological needs for relatedness, competence and autonomy have been met (Deci & Ryan, 2000). The final assessment took place at Year 3 (48 months follow-up of original study) in the Fall of 2010 and Spring of 2011, where participants completed several measures including the same Time 1 measures re-assessing the various indicators of subjective well-being three years later.

For those participants who were difficult to schedule by phone or whose contact information was no longer correct, they were also contacted by mail and

invited to complete the questionnaires at home before mailing them back to us in a self-addressed and stamped envelope. After successfully completing the large assessment battery at each of the three time points, participants were compensated \$50 for the first session, \$75 for the second session, and \$50 for completing the third session.

Measures

Perfectionism. SC and PS dimensions of perfectionism were assessed using different combinations of scales from the 66-item Depressive Experiences Questionnaire (DEQ; Blatt et al., 1976), 40-item Dysfunctional Attitudes Scale (DAS; Weissman & Beck, 1978), 35-item Frost Multidimensional Perfectionism Scale (FMPS; Frost et al., 1990), 45-item Hewitt and Flett Multidimensional Perfectionism Scale (HMPS, Hewitt & Flett, 1991), and 23-item Revised Almost Perfect Scale (APS-R; Slaney et al., 2001).

Specifically, the items on the DEQ (Blatt et al., 1976) self-criticism subscale (e.g., “There is considerable difference between how I am now and how I would like to be”) are scored on a 7-point Likert scale, ranging from 1 (Strongly disagree) to 7 (strongly agree). The DAS (Weissman & Beck, 1978) perfectionism scale was derived based on the factor analytic results of Imber and colleagues (1990), who found that 15 items (e.g., “If I fail at my work, then I am a failure as a person”) loaded substantially onto perfectionism. Participants responded to each item on the DAS scale using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The FMPS (Frost et al., 1990)

concern over mistakes (9 items; e.g., “People will probably think less of me if I make a mistake”) and personal standards (7 items; e.g., “I hate being less than the best at things”) subscales were used in the study to assess dimensions of perfectionism. Participants responded to each statement in the FMPS questionnaire using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The HMPS (Hewitt & Flett, 1991) is a 45-item measure of perfectionism, composed of 15-item subscales including self-oriented and socially prescribed perfectionism. Participants make 7-point ratings of agreement with statements such as “One of my goals is to be perfect in everything I do” (self-oriented), and “I feel that people are too demanding of me” (socially-prescribed). Last, the APS-R (Slaney et al., 2001) is composed of 23 items that are responded to on a 7-point Likert-type scale ranging from 1 (strongly disagree) to 7 (strongly agree). The APS-R consists of subscales including high standards (7-items; e.g., “I expect the best from myself) and discrepancy (12 items; e.g., “Doing my best never seems to be enough”).

In the current study, SC perfectionism was assessed using the DEQ self criticism, DAS perfectionism, FMPS concern over mistakes, HMPS socially prescribed perfectionism, and APS- R discrepancy subscales. PS perfectionism measures included FMPS personal standards, HMPS self-oriented perfectionism and APS-R high standards subscales. All of these scales were combined into SC and PS dimensions, consistent with previous factor analytic studies, where they were first transformed into z-score before being summed (Blankstein et al., 2008; Dunkley etl al., 2003; Powers et al., 2004). The reliability and validity of the

DEQ (Blaney & Kutcher, 1991; Zuroff, Quinlan, & Blatt, 1990), DAS (e.g., Blatt & Zuroff, 2005; Dunkley et al., 2004), FMPS (Frost et al., 1990), HMPS (Hewitt & Flett, 1991; Hewitt, Flett, Turnbull-Donovan, & Mikail, 1991), and APS-R (Ashby & Rice, 2002; Slaney et al., 2001; Suddarth & Slaney, 2001) have been well established.

French versions of the DEQ (Boucher, Cyr, & Fortin, 2006), DAS (Cottraux & Blackburn, 1995), FMPS (Rhéaume et al., 1994), HMPS (Labrecque, Stephenson, Boivin, & Marchand, 1998), and APS-R (Kyparissis, Pierre, Goldsmith, & Dunkley, 2006) were administered to the French participants in the study. The internal consistency and validity of the French translations of the DEQ (Boucher et al., 2006), DAS (Cottraux & Blackburn, 1995), FMPS (Bouvard et al., 2000; Labrecque et al., 1998), HMPS (Dunkley & Kyparissis, 2008; Labrecque et al., 1998), and APS-R (Dunkley, Blankstein, et al., in press) have been found to be comparable to the original English versions.

Subjective Well-Being. Consistent with previous findings (e.g., Diener, Oishi & Lucas, 2003; Ruini et al., 2003), subjective well-being was assessed using different measures including the 5-item Satisfaction with Life Scale (SWLS; Diener et al., 1985), the 7-item Subjective Vitality Scale (Ryan & Frederick, 1997), and the 26-item Positive and Negative Affect Schedule (PANAS; Watson, Clark & Tellegen, 1988).

Satisfaction with life was assessed using the SWLS where participants were asked to indicate how much they agree with each of the 5 statements (i.e., “The conditions of my life are excellent”) on a scale from 1 (strongly disagree)

to 7 (strongly agree). Vitality was measured using statements such as “I feel alive and vital” and “I have energy and spirit,” and asking the participants to rate each statement on a Likert-scale from 1 (not at all true) to 7 (very true) with respect to their lives at the present time. Both positive and negative affect were measured using the PANAS. Positive affect was measured using ten different adjectives describing positive emotions (i.e., interested, proud, enthusiastic), while negative affect was measured using adjectives describing negative emotions (i.e., ashamed, irritable, afraid). Participants indicated the extent to which they have felt each of these emotions in the past week on a scale from 1 (very lightly or not at all) to 5 (extremely).

Given the bilingual nature of the current sample, French translations of the PANAS (Gaudreau, Sanchez, & Blodin, 2006) and SWLS (Blais, Vallerand, Pelletier, & Briere, 1989) were administered to French participants. The Subjective Vitality Scale for which a French translation was not available was translated from English to French using a careful forward and back translation method by two bilingual research assistants (M. Purcell Lalonde, P. Goldsmith). The internal consistency and validity of the SWLS (e.g., Diener et al., 1985; Vassar, 2008), Subjective Vitality Scale (e.g., Bostic, Rubio & Hood, 2000), and the PANAS (e.g., Crawford & Henry, 2004; Watson et al., 1988) have been established in the previous studies.

Basic Psychological Needs Satisfaction. The general 21-item Basic Psychological Needs Scale (BPNS; Deci & Ryan, 2000) was used to assess the extent to which each of the three needs for relatedness, competence, and

autonomy have been met. Relatedness (e.g., “I really like the people I interact with”), competence (e.g., “People I know tell me I am good at what I do”) and autonomy (e.g., “I feel like I am free to decide for myself how to live my life”) were each measured by 7 items from the questionnaire. Participants were then asked to indicate how accurately each of the statements describes their lives on a scale from 1 (not true at all) to 7 (very true) in order to assess the level of needs satisfaction in their lives. Previous studies have shown good reliability and validity for the BPNS general scale (e.g., Gagne, 2003; Wei et al., 2005). A French version of the BPNS was administered to the French participants in the study after a careful forward and back translation method by bilingual research assistants (E. Stephenson and A. Shattler).

Model Testing

Path model testing was performed using Analysis of Momentary Structure 5.0 (AMOS version 5.0; Arbuckle, 2003) to examine relatedness, competence and autonomy at Time 2 as mediators of the relations between Time 1 SC perfectionism and Year 3 life satisfaction, vitality, positive affect and negative affect, respectively, three years later. AMOS uses the maximum likelihood estimation method to examine the fit of the hypothesized model (see Figure 1) to the data. Consistent with the recommendations of Hoyle and Panter (1995), multiple indices of fit were considered to provide different information for the evaluation of the model fit. Specifically, we considered the ratio of the χ^2 value to the df in the model (absolute fit), with ratios in the range of 2 to 1

suggesting better fitting models (Carmines & McIver, 1981). We also considered the goodness-of-fit index (GFI, absolute fit) (Joreskog & Sorborm, 1984), incremental fit index (IFI; incremental fit) (Bollen, 1989), and the comparative fit index (CFI, incremental fit) (Bentler, 1990) with values .90 or higher indicating better fitting models (Hoyle & Panter, 1995). Last, we considered the Root Mean Square Error of Approximation (RMSEA, parsimony-adjusted fit) (Steiger, 1990), with values of .08 or less indicating adequate fit (Brown & Cudeck, 1993).

Bootstrapping

Preacher and Hayes' (2008) multiple mediation bootstrapping approach was used to test the significance of the indirect effects between Time 1 SC perfectionism and Year 3 satisfaction with life, vitality, positive affect, and negative affect through the three basic psychological needs assessed at Year 2. Bootstrapping is a non-parametric approach that randomly selects a large number of samples of the original sample size from the data. This approach is different from other frequently used tests of mediation (e.g., Baron & Kenny, 1986; Sobel, 1982) because it does not assume that the results are normally distributed (see Preacher & Hayes, 2004). This bootstrapping technique is an extension of the Sobel Test (Baron & Kenny, 1986; Sobel, 1982), which compares the indirect effect of an independent variable on a dependent variable to the null hypothesis that it equals zero.

The current study tested the significance of all the specific indirect effects

in the between-person model relating Time 1 SC perfectionism to Year 3 satisfaction with life, vitality, positive affect and negative affect. Selig and Preacher's (2008) web-based utility was used to generate and run R code for simulating the sampling distribution of an indirect effect. Indirect effects in the current study ranged from simple mediation to three sequential mediators. For each indirect effect, unstandardized estimates of each path, their standard errors, a 95% confidence interval (CI), and 20,000 values to simulate were entered. The indirect effect is the product of the effect of the independent variable (SC) on the mediators (relatedness, competence, and autonomy), and the effects of the mediators on the dependent variables (Year 3 satisfaction with life, vitality, positive affect, and negative affect). If the values of a 95% CI for mean indirect effect does not include zero, it indicates that the specific indirect effects is significant at the $p < .05$ level.

Results

Descriptive Statistics

Table 1 reports the means, standard deviations, and alpha internal consistency coefficients for the Time 1 SC perfectionism measures (DEQ self-criticism, DAS perfectionism, FMPS concern over mistakes, HMPS socially prescribed perfectionism, APS-R discrepancy) and PS perfectionism measures (FMPS personal standards, HMPS self-oriented perfectionism, APS-R high standards); Year 2 basic psychological needs scores (relatedness, competence,

autonomy); and Time 1 and Year 3 subjective well-being measures (satisfaction with life, vitality, positive affect, negative affect). All measures showed good internal consistency with alpha coefficients greater than $\alpha = .70$. The means and standard deviations were comparable to those reported previously. *T*-tests comparing the means of each of these subjective well-being indicator scores further confirmed that there were no significant differences between participants' Time 1 versus Year 3 averages on these measures.

As the present study consisted of a sample of 164 participants who were part of the 223 participants originally recruited for a larger longitudinal community study (see Dunkley & Kyparissis, 2008), *T*-tests comparing the means on the 5 SC measures, 3 PS measures, and 4 subjective well-being measures at Time 1 showed that the subset of 164 participants who successfully completed the study did not significantly differ from the 59 participants of the original sample who were excluded from the analyses because they did not successfully complete the study. Specifically, only three significant differences emerged between the two groups including Time 1 measures of DEQ self-criticism ($t(198) = 2.34, p < .05$), life satisfaction ($t(197) = -2.82, p < .01$) and vitality ($t(199) = -2.25, p < .05$). However, it is noteworthy that the group means on these three variables were comparable because the differences between the group means were less than 0.5 standard deviation.

Next, a multiple groups approach to test invariance of the covariance matrices between the included ($n=164$) and the excluded participants ($n=59$) was performed using Analysis of Momentary Structure 5.0 (Arbuckle, 2003), which

uses the maximum likelihood estimation method to examine the fit of the models to their respective observed variance-covariance matrices. The covariances among the main study variables (i.e. 5 SC perfectionism measures, 3 PS perfectionism measures, and 4 Time 1 subjective well-being indicator scores) of the participants who completed the study were constrained to be equal to those of the participants who did not complete the study. The fit of this constrained model was compared with the fit of the free model in which the covariances were freely estimated between the completer versus non-completer groups. A significant difference between the constrained model and the freely estimated model, χ^2_{diff} (66, $n = 223$) = 87.24, $p < .05$, emerged showing that there was a difference between the two groups. After unconstraining the covariance between Time 1 life satisfaction and Time 1 positive affect, the difference between the constrained model and the freely estimated model, χ^2_{diff} (65, $n = 223$) = 79.79, was no longer significant. Thus, it was concluded that the covariances among variables were comparable between the completers versus non-completers.

Since participants in the current study had the option of completing the assessments in either English or French, we also tested the differences in means between the English-speaking ($n = 89$) and the French-speaking ($n = 75$) participants. *T*-tests comparing the means on combined Time 1 SC and PS measures, Year 2 needs satisfaction scores (relatedness, competence, and autonomy), in addition to both Time 1 and Year 3 subjective well-being indicators showed that the group means were equivalent for all these measures between the French and English participants, suggesting that these two groups

were comparable. These results were further confirmed by a multiple groups approach testing the invariance of the covariance matrices between these two groups using AMOS. First, the covariances among Time 1 SC and PS perfectionism measures, Year 2 basic psychological needs measures and the 4 indicators of subjective well-being measures (life satisfaction, vitality, positive affect, and negative affect) at both Time 1 and Year 3 of the French participants were constrained to be equal to those of the English participants. The fit of this constrained model was then compared with the freely estimated model, showing that the difference between the two models, $\chi^2_{\text{diff}} (78, n = 164) = 96.90$, was non-significant. This suggests that the covariances among variables were comparable between English and French participants.

Intercorrelations

Table 2 shows the zero-order correlations among Time 1 SC and PS perfectionism, Year 2 basic psychological needs, and both Time 1 and Year 3 assessments of satisfaction with life, vitality, positive affect and negative affect. Cohen's (1992) criteria for weak ($r = .10$), moderate ($r = .30$), and strong ($r = .50$) effect sizes were used to describe the strength of the zero-order correlations.

As shown in Table 2, Time 1 SC showed moderate negative correlations with concurrent Time 1 assessments of satisfaction with life ($r = -.47, p < .001$), vitality ($r = -.39, p < .001$) and positive affect ($r = -.27, p < .001$), and a moderate positive association with negative affect ($r = .46, p < .001$). Furthermore, Time 1 SC showed comparable moderate correlations with Year 3 life satisfaction ($r = -$

.47, $p < .001$), vitality, ($r = -.33$, $p < .001$), positive affect ($r = -.20$, $p < .05$), and negative affect ($r = .38$, $p < .001$). Time 1 SC perfectionism was also significantly correlated with Time 1 PS perfectionism ($r = .53$, $p < .001$), and demonstrated significant ($p < .001$) moderate negative correlations with Year 2 relatedness ($r = -.31$), competence ($r = -.35$), and autonomy ($r = -.37$).

In contrast to the results for Time 1 SC perfectionism, Time 1 PS perfectionism was not correlated with any of the Time 1 or Year 3 subjective well-being indicators except with Time 1 and Year 3 negative affect. Moreover, PS perfectionism was not significantly correlated with any of the basic psychological needs at Year 2 except for autonomy. Partial correlations were then computed to further distinguish between SC and PS dimensions of perfectionism. Results showed that PS was no longer significantly correlated with Time 1 negative affect ($pr = -.06$), Year 3 negative affect ($pr = .10$) and Year 2 autonomy ($pr = .05$), after controlling for the effects of SC perfectionism.

Table 2 also shows that the intercorrelations between the three Year 2 needs for relatedness, competence and autonomy were strongly correlated with each other. Furthermore, both Year 2 relatedness and competence demonstrated significant positive correlations with Time 1 satisfaction with life, vitality, and positive affect. However, Year 2 need for autonomy was not significantly related to Time 1 positive affect. Year 2 relatedness was also not significantly correlated with baseline negative affect. Year 2 relatedness, competence and autonomy were positively correlated with Year 3 life satisfaction and vitality ($p < .001$). Only the Year 2 need for competence was significantly related to Year 3 positive

affect, while both Year 2 relatedness and autonomy were not significantly correlated with positive affect and negative affect at Year 3. With respect to the intercorrelations between the significant well-being indicators, Time 1 and Year 3 satisfaction with life, vitality and positive affect were moderately to strongly intercorrelated with each other. Time 1 and Year 3 negative affect showed weak to negligible associations with Time 1 and Year 3 life satisfaction, vitality and positive affect, respectively.

Mediational Analysis – Path Models

Figure 1 depicts the hypothesized relations between Time 1 SC perfectionism, Year 2 basic psychological needs of relatedness, competence and autonomy, and each of the Year 3 subjective well-being outcome variables. When estimating the hypothesized structural models, the Time 1 assessments of life satisfaction, vitality, positive affect, and negative affect were also included in the model in order to control for their effects on Time 2 mediators (i.e., the three basic needs) and each of the Year 3 dependent variables (i.e., subjective well-being indicators). The following sections will present the findings for each of the hypothesized and final structural models showing the paths between Time 1 SC perfectionism, Year 2 basic psychological needs, and each of the Year 3 subjective well-being outcomes.

First, the hypothesized structural model predicting the relations between SC perfectionism and Year 3 satisfaction with life will be presented (Figure 1). The hypothesized model resulted in the following acceptable fit indices: χ^2 (1, N

= 153) = 3.31, $p < .05$; $\chi^2 / df = 3.31$; GFI = .99; IFI = .99; CFI = .99; RMSEA = .12. Next, the non-significant paths from competence to Year 3 life satisfaction, relatedness to Year 3 life satisfaction, Time 1 life satisfaction to autonomy, and Time 1 SC to competence were removed one at a time, and the model was re-estimated each time. This resulted in a final structural model with the following acceptable fit indices: $\chi^2 (5, N = 153) = 6.06$, NS; $\chi^2 / df = 1.21$; GFI = .99; IFI = 1.00; CFI = 1.00; RMSEA = .04.

To test whether the relation between SC perfectionism and Time 3 life satisfaction was fully mediated, a partially mediated model with a direct path from Time 1 SC to Year 3 life satisfaction was also estimated and compared to the fully mediated model (i.e. with no direct path from Time 1 SC perfectionism to Year 3 satisfaction with life). The partially mediated model did not provide a significantly better fit to the data than the fully mediated model, $\chi^2_{diff}(1, N = 153) = 2.71$, *ns*, with the path from SC to Year 3 life satisfaction being non-significant ($\beta = -.13$). Thus, a fully mediated model was adopted in explaining the relation between Time 1 SC and Year 3 life satisfaction.

The 95% CIs showed the significance of several specific indirect effects leading from SC to Year 3 life satisfaction (Table 3). The indirect relations between SC and Year 3 life satisfaction were represented within the path: SC → relatedness → competence → autonomy → Year 3 life satisfaction. Within this path, all 9 of the indirect effects were significant including 5 simple mediation, 3 with two sequential mediators, and 1 with three sequential mediators. Specifically, the 95% CIs from Time 1 SC to Year 2 competence and autonomy

supported the significance of the specific indirect effects of Time 1 SC on both Year 2 competence and autonomy through relatedness as a single mediator. Furthermore, the 95% CIs from SC to Year 3 life satisfaction supported the significance of the specific indirect effects of Time 1 SC on Year 3 life satisfaction through: 1) Year 2 autonomy as a single mediator; 2) Year 2 relatedness and autonomy as two sequential mediators; and 3) Year 2 relatedness, competence and autonomy as three sequential mediators.

Figure 2 shows the significant standardized parameter estimates of the final structural model relating SC perfectionism and Year 3 satisfaction with life. The residual arrows indicate the proportion of variance in each variable unaccounted for by the other variables in the model. The mediation results can be further grasped by considering first the paths leading from Time 1 SC perfectionism to Year 3 satisfaction with life. First, relatedness mediated the relationship between SC and both Year 2 competence and autonomy. Both relatedness and competence also mediated the relation between SC and Year 3 life satisfaction through their indirect relations to Year 2 autonomy. Furthermore, Time 1 SC perfectionism was linked to Year 2 autonomy, which was in turn directly related to Year 3 life satisfaction.

Next, we examined the relation between Time 1 SC perfectionism and Year 3 vitality in the same manner as above. The hypothesized model relating SC and Year 3 vitality (see Figure 1) showed the following excellent fit indices: $\chi^2(1, N = 153) = .39$, NS; $\chi^2 / df = .39$; GFI = 1.00; IFI = 1.00; CFI = 1.00; RMSEA = .00). Next, the non-significantly paths from Time 1 vitality to

autonomy, competence to Year 3 vitality, relatedness to Year 3 vitality, and Time 1 vitality to competence were removed one at a time, and the model was re-estimated each time. This resulted in a final structural model with the following acceptable fit indices: $\chi^2(5, N = 153) = 2.38$, NS; $\chi^2 / df = .48$; GFI = 1.00; IFI = 1.00; CFI = 1.00; RMSEA = .00. To test whether the relation between SC perfectionism and Year 3 vitality was fully mediated, a partially mediated model with a direct path from Time 1 SC to Year 3 vitality was also estimated and compared to the fully mediated model (i.e. with no direct path from Time 1 SC perfectionism to Year 3 vitality). The partially mediated model did not provide a significantly better fit to the data than the fully mediated model, $\chi^2_{diff}(1, N = 153) = 2.00$, *ns*, and the path from SC to vitality was non-significant ($\beta = -.04$). Thus, the relation between Time 1 SC perfectionism and Year 3 life satisfaction was considered to be fully mediated.

The indirect relation between SC and Year 3 vitality was represented by the path: SC \rightarrow relatedness \rightarrow competence \rightarrow autonomy \rightarrow Year 3 vitality (see Table 3). Within this path, all 12 of the indirect effects were significant, including 7 simple mediation, 4 with two sequential mediators, and 1 with three sequential mediators. Specifically, the 95% CIs from SC to Year 2 competence demonstrated the significance of the specific indirect effects of Time 1 SC on Year 2 competence through relatedness as a single mediator. Moreover, the 95% CIs from SC to Year 2 autonomy illustrated the significance of the indirect effects through each of relatedness and competence as a single mediator, and both relatedness and competence as two sequential mediators. The 95% CIs from

SC to Year 3 vitality supported the significance of the specific indirect effects of Time 1 SC on Year 3 vitality through: 1) autonomy as a single mediator; 2) both relatedness and autonomy, in addition to competence and autonomy as two sequential mediators; and 3) relatedness, competence and autonomy as 3 sequential mediators.

Figure 3 demonstrates the significant standardized parameter estimates of the final model illustrating the paths from SC perfectionism to Year 2 basic psychological needs, and to Year 3 vitality. First, relatedness mediated the relation between SC and both competence and autonomy. SC was also linked to Year 2 competence, which in turn was linked to autonomy. Both relatedness and competence also mediated the relation between Time 1 SC and Year 3 vitality indirectly through their relation to autonomy. Last, Year 2 autonomy mediated the relation between Time 1 SC and Year 3 vitality.

Next, the relationship between SC perfectionism and Time 3 positive affect was examined. The hypothesized model showing the relation between SC and positive affect (see Figure 1) had the following fit indices: $\chi^2 (1, N = 153) = .17$, NS; $\chi^2 / df = .17$; GFI = 1.00; IFI = 1.00; CFI = 1.00; RMSEA = .00. Next, the non-significant paths from relatedness to Year 3 positive affect, competence to Year 3 positive affect, Time 1 positive affect to relatedness, autonomy to Year 3 positive affect, Time 1 positive affect to autonomy, and SC to competence were removed one at a time, and the model was re-estimated each time. The final model had the following acceptable fit indices: $\chi^2 (7, N = 153) = 8.77$, NS; $\chi^2 / df = 1.25$; GFI = .98; IFI = .99; CFI = .99; RMSEA = .04. Because the Year 2 needs

for relatedness, competence, and autonomy were not related to Year 3 positive affect in the final model, they did not meet conditions to be considered as mediators of the relation between SC and Year 3 positive affect. To test whether the relation between SC perfectionism and Year 3 positive affect was significant controlling for Time 1 positive affect, a direct path from Time 1 SC to Year 3 positive affect was estimated. This model was not a significantly better fit to the data compared to the final model with no direct path from Time 1 SC perfectionism to Year 3 positive affect, $\chi^2_{\text{diff}}(1, N = 153) = .74, ns$, and the path from SC to Year 3 positive affect was non-significant ($\beta = -.07$).

Figure 4 shows the standardized parameter estimates of the final model. The overlapping indirect effects within the path SC \rightarrow relatedness \rightarrow competence \rightarrow autonomy were essentially identical for the model predicting Year 3 positive affect when compared to the previous models predicting Year 3 life satisfaction and vitality. Different from the previous models predicting life satisfaction and vitality, the final model predicting positive affect illustrated that none of the basic psychological needs mediated the relation between SC and Year 3 positive affect. Rather, the effect of SC perfectionism on Year 3 positive affect was through the shared variance with Time 1 positive affect.

Last, we examined the relation between SC perfectionism and Year 3 negative affect. The hypothesized structural model (see Figure 1) resulted in the following acceptable fit indices according to 3 out of the 5 indices: GFI = .99; IFI = .98; CFI = .98, with $\chi^2 / df = 5.23$ and RMSEA = .17 being lower than desirable. Next, the non-significant paths from Time 1 negative affect to

autonomy, competence to Year 3 negative affect, Time 1 negative affect to relatedness, Time 1 negative affect to competence, relatedness to Year 3 negative affect, and autonomy to Year 3 negative affect were deleted one at a time, and the model was re-estimated each time. The final model had the following fit indices: $\chi^2 (7, N = 153) = 6.23$, NS; $\chi^2 / df = .89$; GFI = .99; IFI = 1.00; CFI = 1.00; RMSEA = .00. Similar to the model predicting positive affect, the Year 2 needs for relatedness, competence, and autonomy were also not related to Year 3 negative affect in the final model. Therefore, they did not meet conditions to be considered as mediators of the relation between SC and Year 3 negative affect. To test whether the relation between SC perfectionism and Year 3 negative affect was significant controlling for Time 1 negative affect, a direct path from Time 1 SC to Year 3 negative affect was estimated. This final model was a significantly better fit to the data when compared to the model with no direct path from Time 1 SC to Year 3 negative affect, $\chi^2_{diff} (1, N = 153) = 1.27$, $p < .05$, and the path from Time 1 SC to Year 3 negative affect ($\beta = .17$, $p < .05$) was also significant.

As illustrated in Figure 5, SC perfectionism was directly related to Year 3 negative affect through its shared variance with Time 1 negative affect. The overlapping indirect effects within the path SC \rightarrow relatedness \rightarrow competence \rightarrow autonomy were essentially identical for the model predicting Year 3 negative affect when compared to the previous models predicting Year 3 life satisfaction, vitality, and positive affect. Results also showed that none of the Year 2 basic psychological needs for relatedness, competence and autonomy mediated the

relationship between SC perfectionism and Year 3 negative affect. Furthermore, Time 1 assessment of negative affect was also not related to any of the Year 2 basic psychological needs.

Discussion

The current study was the first to examine how the satisfaction of the basic psychological needs of relatedness, competence, and autonomy would mediate the relation between SC and PS dimensions of perfectionism and positive indicators of subjective well-being over three years in a sample of community adults. It is important to examine the specific mechanisms underlying the relation between perfectionism and subjective well-being in order to understand the adaptive significance and the protective roles that positive aspects of functioning might have in the prevention of depressive symptoms in perfectionists (see Folkman & Moskowitz, 2000). This is especially important since perfectionism is consistently related to higher levels of depressive symptoms (e.g., Brewin & Fifth-Cozens, 1997; Dunkley, Sanislow, et al., 2006; Enns & Cox 2005; Hewitt & Flett, 1990; Kawamura, Hunt, Frost, & DiBartolo, 2001) and impedes aspects of the therapeutic process including alliance, resulting in poor treatment outcomes (e.g., Blatt et al., 1995; Blatt & Zuroff, 2005; Blatt et al., 1998; Dunkley et al., 2009).

The first main goal of the current study was to examine the relations between SC and PS dimensions of perfectionism, and how they each relate to

indicators of subjective well-being over three years. A second goal of the study was to better understand the link between SC and the basic psychological needs at Year 2, especially with respect to relatedness as a mediator in the relationship between SC and both competence and autonomy two years later. Last, the current study examined the satisfaction of the basic psychological needs for relatedness, competence, and autonomy as mediators in the link between SC and subjective well-being. This will add to the past mediational literature, which has focused extensively on the roles of daily stress and avoidant coping as mechanisms in the relationship between perfectionism and negative outcomes (e.g., Dunkley et al., 2000, 2003; Dunkley, Sanislow, et al. 2006; Dunn et al., 2006).

Results from the present study demonstrated how SC and PS dimensions of perfectionism differentially relate to concurrent Time 1 and Year 3 subjective well-being outcomes, in addition to the Year 2 basic psychological needs. SC perfectionism showed moderate to strong negative correlations with each of Time 1 and Year 3 life satisfaction, vitality and positive affect, while exhibiting a strong positive relation with negative affect. This is consistent with previous studies showing SC's unique relations in predicting maladjustment and negative outcomes (Dunkley & Blankstein, 2000; Dunkley et al., 2009; Dunkley et al., 2003; Enns & Cox, 1999; Zuroff et al., 1994). Additionally, SC perfectionism also showed significant negative correlations with each of the basic psychological needs for relatedness, competence and autonomy at Year 2. These results support previous findings suggesting that SC individuals have

impairments in each of the needs for relatedness (e.g., Fichman et al., 1994; Koestner et al., 1991; Santor & Zuroff, 1998; Zuroff, 1993), competence (e.g., Altermatt et al., 2002; Dunkley, Blankstein, et al., 2006; Dunkley & Kyparissis, 2008; Fichman et al., 1996), and autonomy (e.g., Barber & Harmon, 2002; Shahar et al., 2003; Whiffen & Sasseville, 1991).

On the other hand, PS perfectionism only showed weak positive relations to Time 1 and Year 3 negative affect, in addition to a weak negative correlation with Year 2 autonomy. Further, after controlling for PS perfectionism's shared variance with SC, PS was no longer significantly related to Time 1 and Year 3 negative affect, nor to Year 2 autonomy. This corroborates previous findings in the literature demonstrating that in contrast to SC perfectionism, PS perfectionism has only weak to negligible relations to negative outcomes, especially in non-clinical samples (e.g., Dunkley et al., 2000; Dunkley, Zuroff, et al., 2006; Enns & Cox, 1999; Flett et al., 1997; Frost et al., 1993; Stober, 1998). These current findings also support the existence of two separate dimensions of perfectionism, showing that PS is not in and of itself maladaptive but it is rather SC perfectionism that is consistently associated with the negative aspects of functioning (Dunkley et al., 2003; Frost et al., 1990; Shafran et al., 2002; Stoeber & Otto, 2006).

Furthermore, the current study addressed some of the limitations in the previous mediational studies, which have mostly explored the relations between SC and negative outcomes (e.g., Dunkley et al., 2000; 2003; Dunkley, Sanislow et al., 2006; Dunn et al., 2006) by examining the plausibility of the basic

psychological needs as mediators given their relations to both SC perfectionism (e.g., Altermatt et al, 2002; Dunkley, Blankstein, et al., 2006; Dunkley & Kyparissis, 2008; Dunkley, Sanislow, et al., 2006; Shahar et al, 2003; Thompson & Zuroff, 1998; see Zuroff et al., 2004) and subjective well-being (e.g., Chang, 2000; Reis et al., 2000; Sheldon et al., 1996; Sheldon & Elliot, 1999). Deficits in the satisfaction of each of these three basic psychological needs might in turn lead SC individuals to experience decreased overall subjective well-being as these basic needs are key nutriments in fostering optimal functioning and are related to increased subjective well-being (e.g., Reis et al., 2000; Sheldon et al., 1996; Sheldon & Elliot, 1999).

In all of the mediational models predicting each of the four subjective well-being indicators (life satisfaction, vitality, positive affect and negative affect), results showed that the need for relatedness mediated the relation between SC perfectionism and both competence and autonomy two years later, with a path also linking competence to autonomy. These findings are consistent with previous empirical research showing that higher levels of SC negatively impacts interpersonal relationships and perceptions of close relationships (Dunkley, Berg, et al., in press; Fichman et al., 1994; see Zuroff et al., 2004 for a review). From a theoretical perspective, these findings are also in keeping with previous theories, which posit that deficits in interpersonal relationships and feelings of relatedness in SC individuals originate from an early developmental environment that is characterized by controlling parenting (Blatt, 1995; Koestner et al., 1991; Thompson & Zuroff, 1999; Zuroff et al., 1994), parental high

standards, and inconsistent and/or conditional approval based on the fulfillment of these standards (Blatt, 1995; Hamachek, 1978; Horney, 1950).

Further, these findings are consistent with previous research showing that deficits in the need for relatedness in turn prevent the needs for both competence and autonomy from being met (e.g., Barber & Harmon, 2002; Leary et al., 1995; Zuroff et al., 1994). According to the sociometer theory (Leary et al., 1995), insecure attachment fears involving gaining approval and avoiding rejection by others prevalent in SC individuals contribute to lower self-esteem, self-efficacy, and decreased competence overall (Dunkley, Berg, et al., in press). Since self-esteem and self-perceptions of efficacy and competence are reflective of the degree to which individuals feel included or excluded by others, the lack of relatedness experienced by SC might lead to lower levels of competence and self-esteem in these individuals. In addition, SC individuals perceive relationships with their parents as intrusive, controlling and feel their personal views and opinions are often dismissed (Soenens et al., 2005; Whiffen & Sasseville, 1991), which might in turn hinder the later formation of an autonomous personal identity in these individuals.

Results from the current study also demonstrated that the basic need for autonomy fully mediated the relationship between SC perfectionism and both life satisfaction and vitality three years later. SC was also indirectly linked to life satisfaction and vitality, respectively, through Year 2 relatedness and competence, which are both linked to autonomy. Previous studies have shown that freedom of choice and autonomy are consistently related to increased life

satisfaction both longitudinally and cross-sectionally (Inglehart et al., 2008; Welzel & Inglehart, 2010). Autonomy has also emerged as the most important predictor of the three needs in predicting subjective well-being in past studies (Kasser & Ryan, 1999; Diener et al., 1995). These current results also support previous theories showing that SC hinders individuals' development of an autonomous motivation, most likely originating from an early controlling environment where personal opinions and initiatives are often ignored or overruled, leading these individuals to question whether their effort is ever good enough (e.g., Barber & Harmon, 2002; Blatt & Homann, 1992; Rogers, 1951). Feeling less autonomous might then lead SC individuals to feel less satisfied and vital in their daily lives when they believe that they are not in control or have any real choice, resulting in overall decreased feelings of subjective well-being over time (e.g., Fischer & Boer, 2011).

Although autonomy emerged as a common mediator in the relationship between SC perfectionism and both vitality and life satisfaction, this finding was not consistent across all of path models predicting each of the subjective well-being indicators. Even though life satisfaction, vitality, positive affect, and low negative affect are all important aspects reflecting overall subjective well-being (Deci & Ryan, 2008; Ryan & Frederick, 1997; see Diener, 2008, for a review), each of these dimensions also represent separate constructs with unique contributions towards overall well-being (Andrews & Withey, 1976; Lucas et al., 1996). As such, each independent subjective well-being indicator might presumably have differential relationships to each of the mediators (i.e. basic

psychological needs) in addition to differences in their relations to SC. The observed differences in the current results with respect to each of the indicators of subjective well-being reflect the multifaceted and complex nature of well-being, showing that each of life satisfaction, vitality, positive affect and low negative affect play a unique role with respect to SC perfectionism and basic psychological needs (see Diener, Scollon, & Lucas, 2003; Ryan & Deci, 2001, for reviews).

Furthermore, the current findings did not support any of the three basic psychological needs as mediators in the relation between SC, and both positive affect and negative affect, respectively. This suggests that different mechanisms may underlie the relation between perfectionism and more positive outcomes (e.g., Dunkley et al., 2003; 2011). Although the basic psychological needs for autonomy, relatedness and competence are plausible explanatory factors in teasing apart the relation between SC perfectionism and more positive outcomes such as the various positive indicators of subjective well-being, they may not be as suitable in explaining the negative outcomes associated with SC as other mediators (i.e., avoidant coping, stressful events) in previous studies (Dunkley et al., 2000; 2003; Dunkley, Sanislow et al., 2006; Dunn et al., 2006). This contributes to the contention that positive and negative affect are not merely sharing a bipolarity relationship where the absence of one necessarily entails the presence of the other (Russell & Carroll, 1999; Watson & Tellegen, 1985; see Reich et al., 2003, for a review), but rather are independent of each other given that specific and different mechanisms underlie the relationship between

perfectionism and both negative and positive affect. In support of Folkman & Moskowitz's (2000) argument, more research should focus on the adaptational significance of positive affect and the mechanisms underlying this construct in order to bolster the current literature, which has examined predominantly the correlates and mechanisms underlying negative affect.

Contrary to Wei and colleagues' (2005) findings, results from the current study did not show any relations between the basic psychological needs and negative affect. This could be in part due to the fact that Wei et al. (2005) used a different scoring of needs satisfaction in their study, whereas the current study examined the satisfaction of each of these three needs as independent mediators. Furthermore, although negative outcomes of shame, loneliness and depressive symptoms are all negative emotions, the exact measurement scales and operationalization of these constructs used in the study are very different from the current study where general negative affect was surveyed as a combination of adjectives (i.e. distressed, guilty, blue) measured with the PANAS (Watson et al., 1988) over the past week. Differences in assessments of the negative affective outcomes, in addition to how needs satisfaction was measured may have contributed to the discrepancy between our current study and the findings of Wei and colleagues (2005) with respect to the relationship between basic psychological needs and negative outcomes.

It is important to consider some of the clinical implications of the current results, especially with respect to prevention efforts given the fact that SC perfectionism has emerged as an cognitive-personality vulnerability associated

with a wide range of psychopathology (see Egan et al., 2011; Shafran & Mansell, 2001, for reviews) and consistently related to higher levels of depressive symptoms and suicide (e.g., Brewin & Fifth-Cozens, 1997; Dunkley, Sanislow et al., 2006; Enns & Cox 2005; Hewitt & Flett, 1990; Kawamura et al., 2001). Consistent with previous research on the multi-dimensional nature of perfectionism, the current study highlights the importance of assessing perfectionism as a multidimensional construct taking into account that personal standards, in contrast to self-critical dimension of perfectionism, are not in and of themselves maladaptive (e.g. Dunkley et al., 2000; Dunkley, Blankstein et al., 2006; Dunkley, Sanislow et al., 2006; Frost et al., 1990; Shafran et al., 2002; Slaney et al., 2001; Stoeber & Otto, 2006). In preventing negative affect and outcomes, clinicians should first focus on the maladaptive aspects associated with self-critical components of perfectionism, especially those that directly affect the satisfaction of the basic psychological needs and subjective well-being.

Second, the current results pinpoint prevention as an important step in minimizing negative affect and depressive symptoms in SC perfectionist since these individuals show poor treatment outcomes (e.g., Blatt et al., 1998; Blatt et al., 1995; Zuroff et al., 2000). Specifically, clinicians might attempt to prevent depressive symptoms and negative affect in self-critical individuals by examining ways to increase the satisfaction of the basic needs for relatedness, competence and autonomy and improve subjective well-being in the daily lives of these individuals. Specific focus should be on improving the need for relatedness in self-critics since the current study shows that the lack of

relatedness might impact the other two needs for competence and autonomy in being met as well. Improved satisfaction in these basic needs will help with overall improved subjective well-being later on in self-critics. The overall goal is to prevent depressive symptoms and negative affect in SC individuals from occurring in the first place by utilizing the adaptational significance of positive affect and increasing subjective well-being through the fulfillment of the basic psychological needs, rather than focusing only on minimizing negative affect and symptoms to improve overall functioning in the lives of these individuals.

Limitations

Although the current study builds upon previous theory and empirical research while using a three-wave mediational model to examine the question of how the basic psychological needs mediate the relationship between dimensions of perfectionism and well-being, there are still a few limitations that warrant attention and consideration in future studies. First, the current study used a between-persons design rather than a daily assessment of the basic psychological needs, which would have permitted the examination of within-person fluctuations in daily needs satisfaction and the indicators of subjective well-being. Contrary to the findings from previous studies (e.g., Sheldon et al., 1996; Reis et al., 2000) utilizing within-person designs to assess daily fluctuations in the basic psychological needs and subjective well-being, the current study did not find unique effects for the three needs, which might be attributed to the use of a between-persons design in the current study. Future studies should attempt

to replicate the current findings using a daily diary method assessing daily fluctuations in needs and life satisfaction over time in order to test for unique effects of the basic psychological needs. Second, the three basic psychological needs were assessed concurrently at year two, which prevented the examination of the directionality within the relations of these three needs. Future studies should assess each of these three needs sequentially, at different time points, in order to verify the hypothesis that relatedness has direct paths to both competence and autonomy, with competence also linked to autonomy. Third, because these findings are based on retrospective self-report questionnaires taken at each of the three different time points, replication with other methods in data collection (e.g., interviews, daily repeated assessments, behavioral observations, etc) may be beneficial to capture the objective and subjective aspects of perfectionists' subjective well-being and basic psychological needs satisfaction. Last, the current study uses a sample of community adults recruited from the greater Montreal, Quebec area. Future studies should also examine the generalizability of these findings to a different population from different geographical locations, in addition to a clinical population to examine whether the same results hold for these different groups.

Conclusion

The current study was the first to examine the relation between SC and PS dimensions of perfectionism and individuals' subjective well-being over three years, while highlighting the importance of the basic psychological needs for

relatedness, competence and autonomy as explanatory processes in the relationship between SC and subjective well-being. It is clear from these results that SC perfectionism negatively impacts the satisfaction of the basic psychological needs, which in turn leads to decreased subjective well-being over time. Moreover, the current results demonstrate the importance of distinguishing between SC and PS dimensions of perfectionism in their relations to the basic psychological needs and positive psychological outcomes. In contrast to SC, PS perfectionism did not have a significant relationship to the basic psychological needs or subjective well-being variables, supporting previous findings in the literature showing that PS perfectionism is not necessarily maladaptive. Furthermore, the current study demonstrated that different mechanisms underlie SC perfectionism and positive outcomes, providing a first look at how the basic psychological needs explain the relation between dimensions of perfectionism and subjective well-being. Overall, the current findings demonstrated the importance of considering the adaptive significance of positive aspects of functioning to prevent the onset of depressive symptoms in the first place in self-critical individuals. Given the association between SC and both levels of depressive symptoms and negative treatment outcomes, the current findings are an important step toward improving the quality of life for individuals with higher levels of self-critical perfectionism.

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Table 1
Means, Standard Deviations, and Internal Consistencies

Variables	Mean	Stand. Dev.	Internal Consistency (α)
Time 1 Self-Criticism Measures:			
T1 DEQ Self-Criticism ^b	-.26	1.09	-- ^a
T1 DAS-Perfectionism ^b	38.75	14.45	.87
T1 FMPS Concern over Mistakes	20.63	8.16	.91
T1 HMPS Socially Prescribed Perf.	50.12	14.13	.87
T1 APS-R Discrepancy	42.30	16.71	.95
Time 1 Personal Standards Measures:			
T1 FMPS Personal Standards	21.88	5.37	.77
T1 HMPS Self-Oriented Perf.	63.34	16.95	.89
T1 APS-R High Standards	35.20	8.15	.88
Time 1 Subjective Well-Being Measures			
T1 Satisfaction with Life ^c	21.35	7.64	.88
T1 Vitality	32.66	8.71	.89
T1 Positive Affect	31.09	8.18	.91
T1 Negative Affect	20.26	7.48	.88
Year 2 Basic Psychological Needs			
Year 2 Relatedness ^d	41.94	7.45	.72
Year 2 Competence ^d	28.70	6.82	.71
Year 2 Autonomy ^d	34.65	7.04	.70
Year 3 Subjective Well-Being Measures			
Year 3 Satisfaction with Life	21.33	7.53	.89
Year 3 Vitality	31.10	8.78	.87
Year 3 Positive Affect ^e	32.25	8.05	.92
Year 3 Negative Affect ^e	19.52	7.63	.89

Note. $n = 164$ except where otherwise indicated.

Stand. Dev. = Standard Deviation. T1 = Time 1.

^a Cronbach alphas were not computed because this variable was not scored in the conventional fashion of summing a series of items; rather, the factor scoring procedure of Blatt et al. (1976) was used.

^b $n = 163$

^c $n = 162$

^d $n = 157$

^e $n = 162$

Table 2
Zero-Order Correlations of Personal Standards, Self-Criticism, Basic Psychological Needs and Subjective Well-Being Measures

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. T1 Self. Crit.	--											
2. T1 Pers. Stds.	.53***	--										
3. T1 Satis.w. Life	-.47***	-.01	--									
4. T1 Vitality	-.39***	.03	.51***	--								
5. T1 Pos. Aff.	-.27***	.10	.47***	.70***	--							
6. T1 Neg. Aff.	.46***	.20**	-.26***	-.26***	-.23**	--						
7. Y2 Relatedness	-.31***	-.09	.29***	.31***	.16*	-.11	--					
8. Y2 Competence	-.35***	.00	.35***	.32***	.24**	-.17*	.62***	--				
9. Y2 Autonomy	-.37***	-.16*	.31***	.27***	.06	-.17*	.60***	.58***	--			
10. Y3 Satis.w.Life	-.47***	-.12	.66***	.38***	.29***	-.26***	.32***	.33***	.40***	--		
11. Y3 Vitality	-.33***	-.06	.35***	.61***	.41***	-.19*	.28***	.29***	.31***	.61***	--	
12. Y3 Pos. Aff.	-.20*	.10	.29***	.41***	.43***	-.02	.12	.19*	.13	.43***	.63***	--
13. Y3 Neg. Aff.	.38***	.27***	-.17*	-.15	-.02	.51***	-.05	-.08	-.11	-.30***	-.28***	-.13

Note. $n = 164$.

T1 = Time 1. Self. Crit. = Self-Criticism. Pers. Stds. = Personal Standards. Satis. = Satisfaction. W.= With. Pos. = Positive. Neg. = Negative. Aff. = Affect. Y. = Year.

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

Table 3
Bootstrap Analysis of Magnitude and Statistical Significance of Indirect Effects

Indirect Effects	β (Standardized Path Coefficient and Product)	95% CI for Mean Indirect Effects ^a (Lower to Upper)
A. Self-Criticism → Relatedness → Competence → Autonomy → Life Satisfaction		
<i>Simple Mediation:</i>		
A1. SC → Y2Reltd. → Y2Compt.	$(-.23) \times (.57) = -.131$	-1.963 to -.290*
A2. SC → Y2Reltd. → Y2Auton.	$(-.23) \times (.40) = -.092$	-1.508 to -.199*
A3. SC → Y2Auton. → Y3SWLS	$(-.13) \times (.19) = -.025$	-.528 to -1.94e-05*
A4. Y2Reltd. → Y2Compt → Y2Auton.	$(.57) \times (.28) = .160$.067 to .244*
A5. Y2Reltd. → Y2Auton → Y3SWLS	$(.40) \times (.19) = .076$.027 to .142*
<i>Two Sequential Mediators:</i>		
A6. SC → Y2Reltd. → Y2Comp. → Y2Auton.	$(-.23) \times (.57) \times (.28) = -.037$	-.667 to -.066*
A7. SC → Y2Reltd. → Y2Auton. → Y3SWLS	$(-.23) \times (.40) \times (.19) = -.017$	-.373 to -.028*
A8. Y2Reltd. → Y2Comp. → Y2Auton. → Y3SWLS	$(.57) \times (.28) \times (.19) = .030$.009 to .062*
<i>Three Sequential Mediators :</i>		
A9. SC → Y2Reltd. → Y2Comp. → Y2Auton. → Y3SWLS	$(-.23) \times (.57) \times (.28) \times (.19) = -.007$	-.161 to -.010*
B. Self-Criticism → Relatedness → Competence → Autonomy → Vitality		
<i>Simple Mediation:</i>		
B1. SC → Y2Reltd. → Y2Compt	$(-.24) \times (.58) = -.139$	-1.964 to -.352*
B2. SC → Y2Reltd. → Y2Auton.	$(-.24) \times (.40) = -.096$	-1.513 to -.241*
B3. SC → Y2Compt. → Y2Auton	$(-.15) \times (.28) = -.042$	-.770 to -.038*
B4. SC → Y2Auton. → Y3Vital.	$(-.13) \times (.15) = -.020$	-.523 to -.013*
B5. Y2Reltd. → Y2Compt → Y2Auton.	$(.58) \times (.28) = .162$.066 to .247*
B6. Y2Reltd. → Y2Auton → Y3Vital	$(.40) \times (.15) = .060$.007 to .142*
B7. Y2Compt → Y2Auton. → Y3Vital.	$(.28) \times (.15) = .042$.005 to .118*

(Table 3 continues)

Table 3 continued

Indirect Effects	β (Standardized Path Coefficient and Product)	95% CI for Mean Indirect Effects ^a (Lower to Upper)
<i>Two Sequential Mediators :</i>		
B8. SC → Y2Reltd. → Y2Comp. → Y2Auton.	$(-.24) \times (.58) \times (.28) = -.039$	-.679 to -.080*
B9. SC → Y2Reltd. → Y2Auton. → Y3Vital.	$(-.24) \times (.40) \times (.15) = -.014$	-.364 to -.009*
B10. SC → Y2Compt. → Y2Auton. → Y3Vital.	$(-.15) \times (.28) \times (.15) = -.006$	-.183 to -7.63e-06*
B11. Y2Reltd. → Y2Comp. → Y2Auton. → Y3Vital.	$(.58) \times (.28) \times (.15) = .024$.002 to .063*
<i>Three Sequential Mediators:</i>		
B12. SC → Y2Reltd. → Y2Comp. → Y2Auton. → Y3Vital.	$(-.24) \times (.58) \times (.28) \times (.15) = -.006$	-.157 to -.003*

Note. $n = 153$. SC = Self-Criticism. Reltd. = Relatedness. Compt. = Competence. Auton. = Autonomy. SWLS = Satisfaction with Life. Vital. = Vitality. T1 = Time 1. Y. = Year

^a These values are based on the unstandardized path coefficients.

* $p < .05$.

Figure 1. *Hypothesized structural model relating self-criticism, basic psychological needs, and indicators of subjective well-being.*

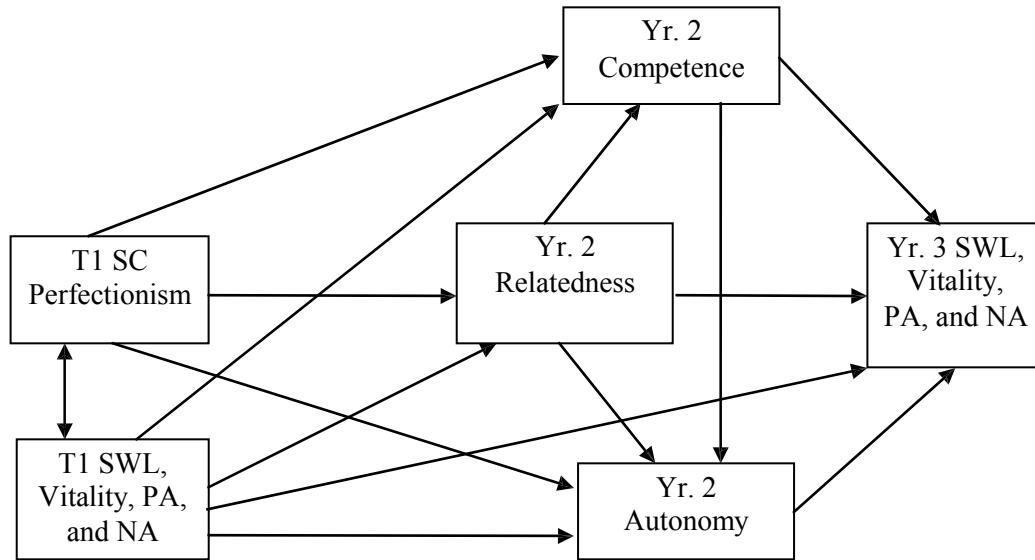


Figure 2. *Standardized parameter estimates of the final structural model relating self-criticism, basic psychological needs and satisfaction with life. The residual arrows denote the proportion of variance in the measured or latent variable that was unaccounted for by other variables in the model.*

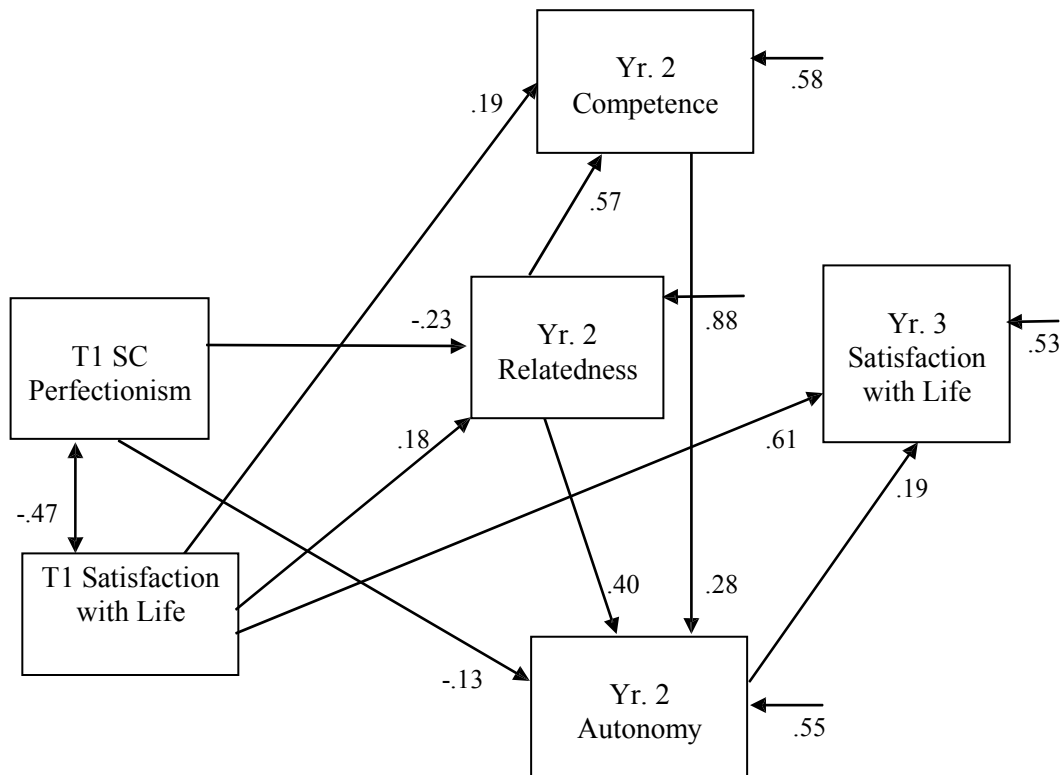


Figure 3. *Standardized parameter estimates of the final structural model relating self-criticism, basic psychological needs and vitality. The residual arrows denote the proportion of variance in the measured or latent variable that was unaccounted for by other variables in the model.*

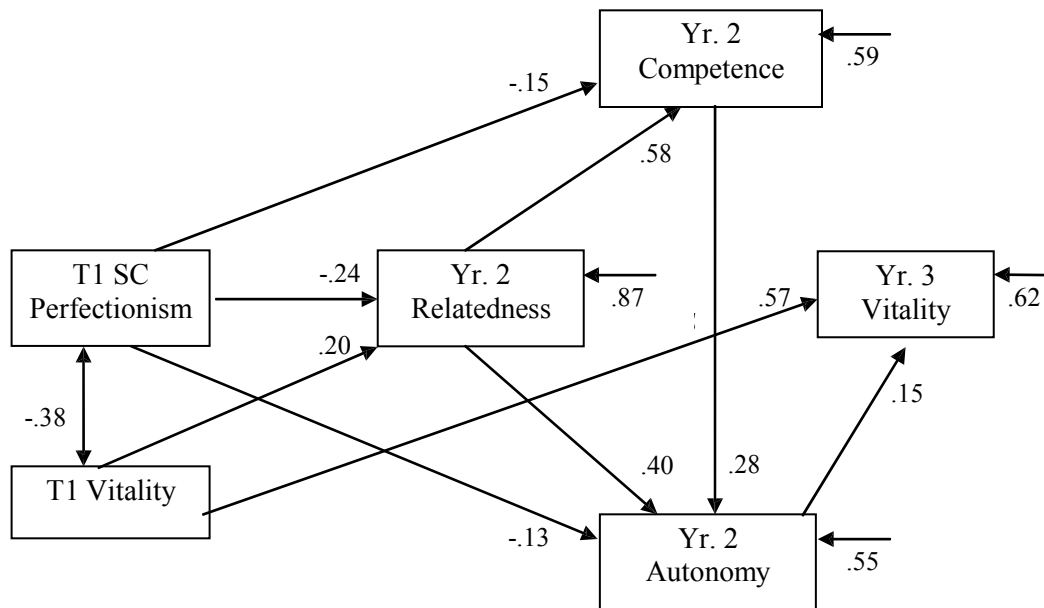


Figure 4. *Standardized parameter estimates of the final structural model relating self-criticism, basic psychological needs and positive affect. The residual arrows denote the proportion of variance in the measured or latent variable that was unaccounted for by other variables in the model.*

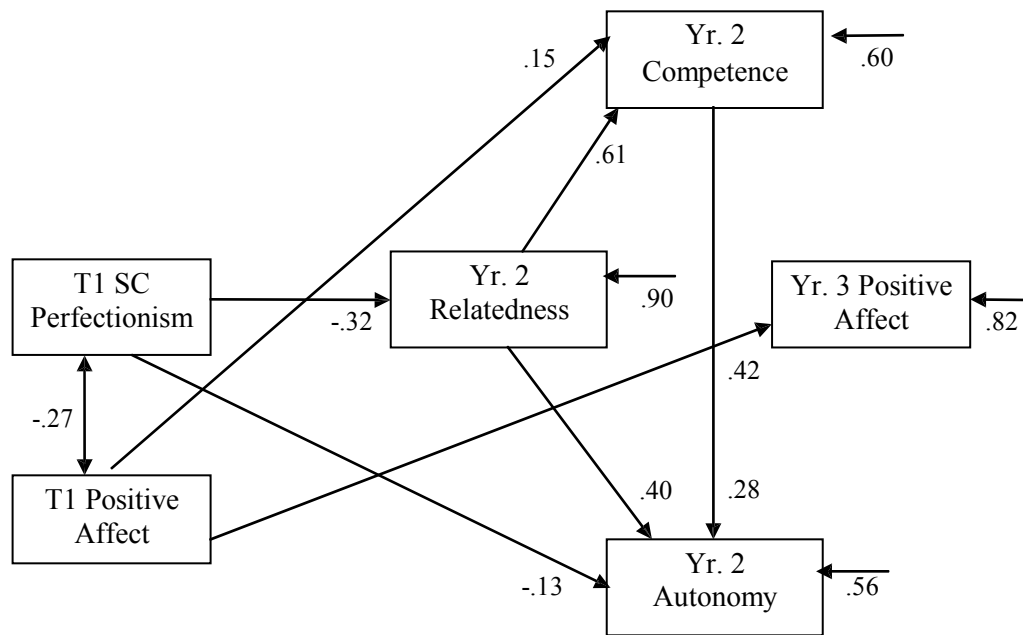


Figure 5. *Standardized parameter estimates of the final structural model relating self-criticism, basic psychological needs and negative affect. The residual arrows denote the proportion of variance in the measured or latent variable that was unaccounted for by other variables in the model.*

