

# The Existential Model of Perfectionism and Depressive Symptoms: A Short-Term, Four-Wave Longitudinal Study

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Perfectionistic concerns (i.e., negative reactions to failures, concerns over others' criticism and expectations, and nagging self-doubts) are a putative risk factor for depressive symptoms. This study proposes and supports the existential model of perfectionism and depressive symptoms (EMPDS), a conceptual model aimed at explaining why perfectionistic concerns confer risk for depressive symptoms. According to the EMPDS, perfectionistic concerns confer risk for depressive symptoms both through catastrophic interpretations that magnify relatively minor setbacks into seemingly major obstacles and through negative views of life experiences as unacceptable, dissatisfying, and meaningless. This investigation tests the EMPDS in a sample of 240 undergraduates studied using a 4-wave, 4-week longitudinal design. Hypotheses derived from the EMPDS were largely supported, with bootstrap tests of mediation suggesting that the indirect effect of perfectionistic concerns on depressive symptoms through catastrophic thinking and difficulty accepting the past is significant. Results indicated perfectionistic concerns are more an antecedent of, rather than a complication of, catastrophic thinking, difficulty accepting the past, and depressive symptoms. Consistent (but imperfect) support for the incremental validity of the EMPDS beyond either perfectionistic strivings or neuroticism was also observed. Overall, this investigation suggests persons high in perfectionistic concerns not only tend to catastrophize their life experiences but also struggle to accept their life experiences and to negotiate a sense of purpose, direction, and coherence in their lives. With both a catastrophic view of their present and a dark view of their past, this investigation also suggests persons high in perfectionistic concerns are at risk for depressive symptoms.

*Keywords:* perfectionism, cognitive distortions, existentialism, depression, neuroticism

Depression is a prevalent, impairing, and costly mental health problem involving symptoms such as sadness, anhedonia, guilt, fatigue, irritability, and sleep disturbance. Among undergraduates, such symptoms are tied to health-damaging behavior (e.g., smoking), healthcare expenses, suicide risk, lower grades, missing

classes, and relationship problems (Voelker, 2003). There is thus a clear need to understand why people become depressed. In the present study, we conceptualize and measure depression using a dimensional model wherein depressive symptoms are understood as lying along a continuum of severity. Our use of this model is congruent with evidence indicating depression is a quantitative, continuous dimension (Klein, 2008).

Research consistently implicates perfectionism in the onset and the maintenance of depressive symptoms (Chang, 2000; Dunkley, Zuroff, & Blankstein, 2003; Hewitt, Flett, & Ediger, 1996; Rice & Lopez, 2004; Sherry & Hall, 2009). Perfectionism also predicts depressive symptoms above and beyond established contributors to depressive symptoms, including attachment dysfunction, low self-esteem, and ineffective coping (Rice, Ashby, & Slaney, 1998; Wei, Mallinckrodt, Russell, & Abraham, 2004). Though evidence suggests perfectionism and depressive symptoms are robustly linked, there is still much to learn about their interrelation.

## Areas for Improvement in Research on Perfectionism and Depressive Symptoms

Despite advances in the perfectionism-depressive symptoms literature (e.g., Dunkley et al., 2003; Rice & Aldea, 2006), areas

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for improvement remain. For example, integrative models are needed to bring greater clarity and coherence to researchers' understanding of perfectionism and depressive symptoms. Factors linking perfectionism to depressive symptoms are often proposed individually—without reference to a unifying integrative model. As multiple factors are involved in depressive symptoms, integrative models are needed to guide research and intervention.

Studies of perfectionism and depressive symptoms also tend to emphasize moderational models that explain *when* (i.e., the conditions under which) perfectionism is related to depressive symptoms (Enns & Cox, 2005; Sherry, Hewitt, Flett, & Harvey, 2003). In contrast, mediational models that explain *why* (i.e., the mechanisms through which) perfectionism is related to depressive symptoms are only starting to emerge (DiBartolo, Li, & Frost, 2008; Dunkley et al., 2003). Such mediational models are important as they clarify mechanisms linking perfectionism to depressive symptoms and point toward treatment targets.

Moreover, extant mediational models linking perfectionism to depressive symptoms usually involve cross-sectional designs (DiBartolo et al., 2008) or two-wave longitudinal designs (O'Connor, O'Connor, & Marshall, 2007). Cross-sectional tests of mediation are potentially biased (Maxwell & Cole, 2007) and fail to clarify temporal relations, whereas two-wave longitudinal designs capture only a narrow, and possibly unrepresentative, slice of change. Recent advances (D. A. Cole & Maxwell, 2003) indicate mediation is an unfolding temporal process that is best tested using three or more waves of longitudinal data and temporally independent predictors, mediators, and criterion (see also Dunkley, Sanislow, Grilo, & McGlashan, 2009).

Two-wave longitudinal designs in perfectionism research also typically span several months or years (e.g., Hewitt et al., 1996). These designs help clarify long-term patterns, but are ill-suited to studying dynamic, short-term patterns. Perfectionism may contribute to depressive symptoms by generating frequently occurring, short-term patterns of cognition, self-evaluation, or experience that are not adequately sampled by long-term longitudinal designs (Sherry & Hall, 2009). Short-term longitudinal designs involving several waves appear better suited to assessing dynamic, short-term patterns (Rice & Aldea, 2006). Furthermore, short-term, multiwave longitudinal designs may increase reliability by repeatedly assessing events and decrease recall bias by assessing events closer to their actual occurrence (Bolger, Davis, & Rafaeli, 2003).

It is also widely assumed perfectionism is a stable trait that is not unduly influenced by depressive symptoms. This assumption is, however, seldom tested (for exceptions, see Cox & Enns, 2003; Rice & Aldea, 2006; Zuroff, Blatt, Sanislow, Bondi, & Pilkonis, 1999). Additional research is needed to understand whether perfectionism is an antecedent of depressive symptoms, a complication of depressive symptoms, or both. Such research is foundational to an accurate conceptualization of perfectionism, depressive symptoms, and their interrelation.

In summary, areas for improvement remain in the perfectionism-depressive symptoms literature. We start to address these areas by proposing the existential model of perfectionism and depressive symptoms (EMPDS) and by testing this model with a short-term, four-wave longitudinal design wherein undergraduates were assessed once a week for 4 consecutive weeks.

## The EMPDS

### Perfectionism in the EMPDS

Several prominent models of perfectionism exist (e.g., Chang, 2006a; Dunkley et al., 2003; Frost, Marten, Lahart, & Rosenblate, 1990; Hewitt & Flett, 1991; Slaney, Rice, & Ashby, 2002), with evidence suggesting perfectionism is best understood as multidimensional (see Hewitt, Flett, Besser, Sherry, & McGee, 2003). One key model of perfectionism asserts there are two main perfectionism dimensions (Dunkley et al., 2003): perfectionistic concerns (PCs; i.e., negative reactions to failures, concerns over others' criticism and expectations, and doubts about performance abilities) and perfectionistic strivings (PSs; i.e., rigidly and relentlessly demanding perfection of oneself). We draw on this model as it represents a theoretically based and an empirically supported synthesis of several major models of perfectionism (Dunkley et al., 2003).

PCs and PSs each appear to play important, yet different, roles in depressive symptoms. PSs are sometimes tied to positive outcomes (e.g., resourcefulness or task-oriented coping; Dunkley et al., 2003; Stoeber & Otto, 2006) and are not consistently linked to depressive symptoms as a direct effect (Sherry et al., 2003). Achievement stress does, however, appear to moderate the PSs–depressive symptoms link. More specifically, the relation between PSs and depressive symptoms appears to depend on ego-involving achievement stressors (e.g., failing a test) such that persons high in PSs are vulnerable to depressive symptoms when they experience achievement stressors (e.g., Enns & Cox, 2005; Hewitt et al., 1996). In contrast, a model capable of explaining the PCs–depressive symptoms link is still emerging. Although PCs are robustly associated with depressive symptoms (Dunkley et al., 2009), mediators responsible for this link are not yet fully understood and need clarification. The present study thus focuses mainly on PCs.

According to the EMPDS, PCs are a risk factor for depressive symptoms. Nagging self-doubt, social apprehension, harsh self-scrutiny, and perceived criticism are central to PCs and in keeping with accounts of the premorbid personality structure of persons at risk for depressive symptoms (Blatt, 1995). Our view of PCs as a risk factor is also congruent with studies indicating PCs are an antecedent of, but not a complication of, depressive symptoms (Rice & Aldea, 2006).

### Structure and Process in the EMPDS

Persons high in PCs often think in a catastrophic manner wherein relatively minor events (e.g., a “B” grade) are magnified into seemingly major calamities (G. P. Brown & Beck, 2002). We propose such distorted and catastrophic inferences and interpretations predispose persons high in PCs to view their life experiences negatively. Moreover, we propose core attributes of (e.g., harsh self-scrutiny) and key concerns for (e.g., pleasing others) persons high in PCs make their life experiences difficult to accept and impede their growth toward a satisfying, authentic existence.

The EMPDS thus asserts persons high in PCs not only tend to catastrophize their life experiences but also struggle to accept their life experiences and to negotiate a sense of purpose, direction, and coherence in their lives (see Chang, 2006b). Faced with both

catastrophic thoughts and difficulty accepting the past, we also propose persons high in PCs are prone to depressive symptoms. That is, we assert persons high in PCs are more likely to catastrophize their life experiences; to interpret these experiences as unacceptable, meaningless, and unsatisfying; and to therefore encounter depressive symptoms amid such existential problems (see Figure 1).

### PCs, Catastrophic Thinking, and Depressive Symptoms

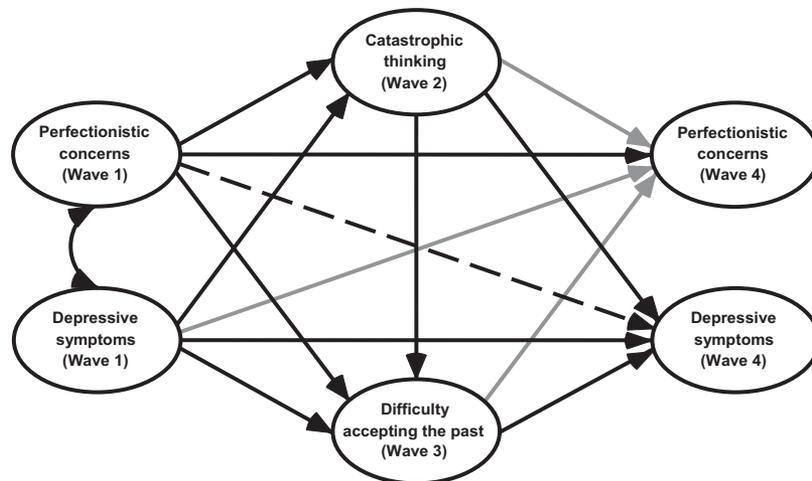
The EMPDS draws on Beck's view of automatic thoughts as rapid, transient—and often distorted—cognitions about everyday life events (Beck, Rush, Shaw, & Emery, 1979). Although PCs are tied to various cognitive distortions (Flett & Hewitt, 2008), research suggests automatic thoughts with catastrophic themes are common among persons high in PCs (Rudolph, Flett, & Hewitt, 2007). We propose persons high in PCs are prone to catastrophizing everyday stressors and challenges because they experience such events as unacceptable and threatening imperfections (Ellis, 2002). Moreover, we propose catastrophic thinking (i.e., magnifying or overemphasizing relatively minor negative events) distorts objective features of everyday stressors and challenges, making these life experiences seem more negative and consequential than they really are.

Consistent with Ellis (1962) and Beck (Beck et al., 1979), we also assert the tendency to catastrophize relatively minor setbacks into seemingly major obstacles is depressogenic. That is, according to the EMPDS, processing information and interpreting experiences in a catastrophic manner has a depressing effect on persons high in PCs. We thus view persons high in PCs as active agents who shape and generate experiences (e.g., sadness) through their own interpretations and conclusions (see also Dunkley et al., 2003; Hewitt & Flett, 2002; Sherry & Hall, 2009).

### PCs, Difficulty Accepting the Past, and Depressive Symptoms

The EMPDS also proposes difficulty accepting the past (i.e., viewing life experiences as incoherent, unacceptable, dissatisfying, and meaningless) is central to explaining why persons high in PCs are vulnerable to depressive symptoms. Several prominent theorists working within the existential tradition (Frankl, 1984; May, 1969; Yalom, 1980) suggest it is important for individuals to find or to create meaning in their lives and their experiences. We propose PCs interrupt this process of meaning making and obstruct persons high in PCs from developing a view of their life experiences that they find acceptable and imbued with personal meaning.

Several reasons exist why persons high in PCs may struggle to accept their past. Persons high in PCs appear sensitive to and reactive to external influences such as parental expectations (Hewitt & Flett, 1991). Indeed, themes of conformity and compliance—not agency and authenticity—are prominent in the lives of persons high in PCs (Bruch, 1979). Feeling they have lived (or are living) their lives in compliance with others' expectations, persons high in PCs may experience their life course as inauthentic and as hard to accept. Moreover, behaviors prototypical of persons high in PCs (e.g., repetitive checking, avoiding mistakes, and compulsive overstriving) may result in a narrow, imbalanced set of life experiences where chances for personal growth, social relations, and meaning making are missed or avoided. That is, with perfection as the one dominant theme in their lives, persons high in PCs may struggle to generate life experiences they find satisfying and meaningful. Persons high in PCs also appear to wrestle with a pattern of harsh self-scrutiny and limited self-acceptance wherein normal human failures and imperfections are seen as unacceptable (Flett, Besser, Davis, & Hewitt, 2003). Such a hypercritical, unforgiving stance toward the self may make it hard to accept the past.



*Figure 1.* The structural model for the existential model of perfectionism and depressive symptoms (EMPDS). Ovals represent latent variables. The double-headed black arrow represents a latent correlation. Single-headed black arrows represent hypothesized direct effects. Single-headed grey arrows represent hypothesized zero effects. The dashed, single-headed black arrow between Perfectionistic concerns (Wave 1) and Depressive symptoms (Wave 4) represents the mediational hypothesis in the EMPDS. In the interest of clarity, manifest variables are not shown.

Existential theorists (Frankl, 1984; Yalom, 1980) also suggest individuals who are unable to see their life experiences as coherent, acceptable, satisfying, and meaningful are prone to depressive symptoms. Consistent with these theorists, the EMPDS asserts persons high in PCs are more likely to view their life experiences as unacceptable and meaningless and to suffer from depressive symptoms as a consequence of their bleak view of existence (see also Frankl, 1984).

### Catastrophic Thinking and Difficulty Accepting the Past

The EMPDS also proposes a relationship between catastrophic thinking and difficulty accepting the past. As a rapid and an automatic cognitive process (Beck et al., 1979), we conceptualize catastrophic thinking as an antecedent of difficulty accepting the past. That is, over time, distorted and catastrophic interpretations of life experiences are proposed to hinder development of a more general sense of life as acceptable, satisfying, and meaningful.

In summary, according to the EMPDS, persons high in PCs struggle to locate meaning and satisfaction in their life experiences. Persons high in PCs also tend to catastrophize relatively minor hassles into seemingly major problems, and such cognitions incline persons high in PCs to view their life experiences negatively. With a catastrophic view of their present and a dark view of their past, the EMPDS contends persons high in PCs are at risk for depressive symptoms.

### Hypotheses Derived From the EMPDS

**Central hypotheses.** As Figure 1 shows, the EMPDS is a dual-pathway mediational model in which (a) PCs at Wave 1 is related to catastrophic thinking at Wave 2 and difficulty accepting the past at Wave 3; (b) catastrophic thinking at Wave 2 and difficulty accepting the past at Wave 3 are related to one another and to depressive symptoms at Wave 4; (c) catastrophic thinking at Wave 2 and difficulty accepting the past at Wave 3 mediate the link between PCs at Wave 1 and depressive symptoms at Wave 4. Both catastrophic thinking and difficulty accepting the past are thus seen as explanatory mechanisms that clarify why PCs contribute to depressive symptoms.

**Stability effects and complication effects.** We decided to test whether, rather than to assume that, PCs are relatively unaltered by preexisting depressive symptoms. We hypothesized PCs represent strongly stable traits that are not meaningfully altered by depressive symptoms (see Figure 1). Rice and Aldea (2006) found evidence consistent with our hypothesis using an undergraduate sample comparable to our own. Our hypothesis is, however, made with caution, as other studies involving clinical samples (e.g., patients diagnosed with major depressive disorder) suggest depressive symptoms may modestly increase PCs (Cox & Enns, 2003; Zuroff et al., 1999).

We also tested whether PCs are a complication of catastrophic thinking or difficulty accepting the past (see Figure 1). As the first study (that we know of) to examine these questions, our research makes a novel contribution to an understudied area. Congruent with the EMPDS, we hypothesized PCs are an antecedent of catastrophic thinking and difficulty accepting the past, but not a consequence. That is, we conceptualize PCs as stable personality

traits that develop before and contribute to catastrophic thinking and difficulty accepting the past (see Beck et al., 1979). Alternatively, catastrophic thinking and difficulty accepting the past may contribute to PCs; for example, catastrophic thinking may heighten concern over mistakes, and a negative view of life experiences may fuel self-criticism. We thus elected to test whether the hypothesized pattern of unidirectional influence (e.g., PCs → catastrophic thinking) was indeed tenable.

Drawing on past research (Tram & Cole, 2006), we hypothesized depressive symptoms are moderately stable (see Figure 1). Because baseline depressive symptoms robustly predict future depressive symptoms (Judd, Schettler, & Akiskal, 2002), accounting for baseline depressive symptoms is potentially important. Controlling for baseline depressive symptoms at Wave 1 also enabled us to test whether the EMPDS predicts changes in depressive symptoms by Wave 4. Moreover, baseline depressive symptoms may contribute to catastrophic thinking and difficulty accepting the past (Santor & Zuroff, 1994), making it important to test whether these two proposed mediators are indeed predicted by PCs and not just a complication of depressive symptoms (see Figure 1).

**Incremental validity.** Building on previous research (Dunkley et al., 2009; Sherry & Hall, 2009), all path coefficients in the EMPDS were hypothesized to remain substantial and relatively unchanged after controlling for two proposed contributors to depressive symptoms, namely, PSs and neuroticism (i.e., a tendency to experience negative emotional states).

As PCs and PSs overlap strongly (Wu & Wei, 2008), we tested whether PCs are uniquely related to the variables of the EMPDS once PSs are taken into account. Recent calls to return to an entirely intrapersonal model of perfectionism (Shafran, Cooper, & Fairburn, 2002) also suggest a need to test whether PCs (which involve salient interpersonal content) contribute incrementally to the other variables of the EMPDS beyond PSs (which involve predominantly intrapersonal content).

Researchers also question whether lower order personality traits such as PCs explain incremental variance in depressive symptoms beyond higher order personality domains such as neuroticism (Enns, Cox, & Clara, 2005). As neuroticism overlaps strongly with depressive symptoms and the other variables of the EMPDS (Dunkley et al., 2009), neuroticism was treated as a potentially confounding factor that we needed to control for in testing the EMPDS.

## Method

### Participants

A sample of 240 university students (200 women and 40 men) taking psychology courses at Dalhousie University (Halifax, Nova Scotia, Canada) participated. Participants averaged 20.00 years of age ( $SD = 3.23$ ) and 2.09 years of university education ( $SD = 1.17$ ); 42.9% of students were in first-year university, 20.4% were in second year, 20.8% were in third year, 14.2% were in fourth year or higher, and 1.7% did not report their year in university. Participants reported living in Canada for an average of 18.37 years ( $SD = 5.84$ ), and 86.7% of participants reported their ethnic identity as European, 3.3% as Asian, 2.5% as Black, 3.8% as more than one ethnicity, and 3.7% as members of other ethnicities (e.g., Aboriginal). This sample is comparable to other samples of un-

degraduates recruited at Dalhousie (e.g., Grant, Stewart, & Mohr, 2009).

## Instruments

As recommended (Kline, 2005), constructs were measured with three manifest indicators to represent each latent variable (i.e., PCs, catastrophic thinking, difficulty accepting the past, and depressive symptoms). Variables used in testing incremental validity (i.e., PSs and neuroticism) were each measured with one manifest indicator.

A long-term time frame (i.e., during the past several years) was specified for measures of PCs, PSs, and neuroticism. A short-term time frame (i.e., during the past 7 days) was specified for measures of catastrophic thinking, difficulty accepting the past, and depressive symptoms. Selection of these time frames was informed by theory and by evidence suggesting PCs, PSs, and neuroticism are highly stable (e.g., Rice & Aldea, 2006), and catastrophic thinking, difficulty accepting the past, and depressive symptoms are moderately stable (e.g., Dunkley, Blankstein, Halsall, Williams, & Winkworth, 2000). As in prior multiwave longitudinal studies (J. S. Brown, Meadows, & Elder, 2007), certain scales (noted below in our description of instruments used in the present study) were shortened to reduce participant burden and/or slightly modified to suit a 7-day time frame. For all scales used in our study, higher scores denote higher levels of the construct measured.

**PCs.** PCs were assessed with a short form of the Socially Prescribed Perfectionism subscale of Hewitt and Flett's (1991) Multidimensional Perfectionism Scale (HFMPs-SPP), a short form of the Concern Over Mistakes subscale of Frost et al.'s (1990) Multidimensional Perfectionism Scale (FMPS-COM), and the Doubts About Actions subscale of Frost et al.'s (1990) Multidimensional Perfectionism Scale (FMPS-DAA). The HFMPs-SPP (e.g., "Others expect nothing less than perfection from me") is a five-item subscale rated on a 7-point scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) so that scores range from 7 to 35. Research supports the reliability and validity of the HFMPs-SPP (e.g., Hewitt, Habke, Lee-Bagley, Sherry, & Flett, 2008). Evidence suggests the HFMPs-SPP may be shortened from 15 items (the original form) to five items without compromising the solid psychometric properties of the HFMPs-SPP (Cox, Enns, & Clara, 2002). Hewitt et al. (2008) and Sherry, Graham, and Stewart (2009) found the five-item HFMPs-SPP and 15-item HFMPs-SPP are strongly and significantly related ( $r = .90$  and  $r = .78$ , respectively).<sup>1</sup> Alpha reliabilities for the HFMPs-SPP are usually  $> .75$  (Sherry, Hewitt, Sherry, Flett, & Graham, 2009).

The FMPS-COM (e.g., "If I fail at work, I am a failure as a person") is a five-item subscale, and the FMPS-DAA (e.g., "I usually have doubts about the everyday things I do") is a four-item subscale. Both subscales are rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) so that scores vary from 5 to 20. FMPS-COM scores range from 5 to 25, and FMPS-DAA scores range from 4 to 20. Evidence supports the reliability and validity of the FMPS-COM and FMPS-DAA (e.g., Cox & Enns, 2003). Cox et al. (2002) found the psychometric properties of the FMPS-COM were improved when shortened from nine items (the original form) to five items. Cox et al. (2002) and Sherry, Graham, and Stewart (2009) observed a strong and significant correlation between the five-item FMPS-COM and nine-item FMPS-COM

( $r = .96$  and  $r = .91$ , respectively). The FMPS-DAA subscale was not altered, as evidence suggests this subscale has acceptable psychometric properties (Dunkley et al., 2003). Alpha reliabilities for the FMPS-COM and FMPS-DAA are typically in the range of  $.75$  (Rice & Ashby, 2007).

**PSs.** PSs were assessed with a short form of the Personal Standards subscale of Frost et al.'s (1990) Multidimensional Perfectionism Scale (FMPS-PS). The FMPS-PS (e.g., "I set higher goals than other people") is a four-item subscale rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) so that scores vary from 5 to 20. One item was modified to reduce overlap between the FMPS-PS and conscientiousness (Flett & Hewitt, 2006): "It is important to me that I be competent in everything I do" was modified to "It is important to me that I be perfect in everything that I do." Research suggests the FMPS-PS is reliable and valid (Sherry, Graham, & Stewart, 2009). Sherry, Hall, Hewitt, and Flett (2010) found the FMPS-PS may be shortened from seven items (the original form) to four items without diminishing the strong psychometric properties of the FMPS-PS. Sherry, Graham, and Stewart (2009) showed the four-item FMPS-PS and the seven-item FMPS-PS correlate strongly and significantly ( $r = .81$ ). Alpha reliabilities for the FMPS-PS are usually  $> .80$  (Sherry et al., 2010).

**Neuroticism.** Neuroticism was assessed with the Neuroticism subscale of Benet-Martinez and John's (1998) Big Five Inventory (BFI-N). The BFI-N (e.g., "I see myself as someone who worries a great deal") is an eight-item subscale rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*), meaning that scores range from 8 to 40. The BFI-N subscale was not altered, and evidence supports the reliability and validity of this subscale (e.g., Dollinger, Matyja, & Huber, 2008). Benet-Martinez and John (1998) found the BFI-N is strongly and significantly correlated with the Neuroticism subscale of Costa and McCrae's (1992) NEO Five-Factor Inventory ( $r = .76$ ). Alpha reliabilities for the BFI-N are typically around  $.80$  (Dollinger et al., 2008).

**Catastrophic thinking.** Catastrophic thinking was assessed with a modified form of the Catastrophizing subscale of Garnefski, Kraaij, and Spinhoven's (2002) Cognitive Emotion Regulation Questionnaire (CERQ-C), a modified form of the Helplessness subscale of Sullivan, Bishop, and Pivik's (1995) Pain Catastrophizing Scale (CS-H), and a modified form of the Magnification subscale of Sullivan et al.'s (1995) Pain Catastrophizing Scale (CS-M). The CERQ-C is a four-item subscale rated on a 5-point scale ranging from 1 (*almost never*) to 5 (*almost always*) so that scores range from 4 to 20. CERQ-C instructions were as follows: "Everyone gets confronted with negative or unpleasant events and everyone responds to them in his or her own way. By the following

<sup>1</sup> A cross-sectional study was conducted to examine the association between the original scales (e.g., the 15-item HFMPs-SPP) and the modified scales (e.g., the five-item HFMPs-SPP). All scales were included in this study, except for the FMPS-DAA, BFI-N, CES-D-SF, DASS-D, and SCL-90-R-D. These five scales were excluded as they were not modified for use in our four-wave study. This study involved 83 Dalhousie University undergraduates recruited via flyers posted around campus and the participant pool in the Department of Psychology. Participants averaged 21.51 years of age ( $SD = 5.28$ ) and 2.57 years of university education ( $SD = 1.92$ ). Results from this unpublished study are referenced as Sherry, Graham, and Stewart (2009).

questions you are asked to indicate what you thought, when you experienced negative or unpleasant events.” CERQ-C items were modified to match a 7-day time frame; for instance, “I think how horrible the situation has been” was modified to “During the past 7 days, I thought how horrible the situation has been.” Research indicates the CERQ-C is reliable and valid, including evidence showing the modified and original CERQ-C correlate strongly and significantly ( $r = .77$ ; Sherry, Graham, & Stewart, 2009). Alpha reliabilities for the CERQ-C are usually  $> .80$  (Sherry, Graham, & Stewart, 2009).

The CS-H is a six-item subscale; the CS-M is a three-item subscale. Each subscale is rated on a 5-point scale ranging from 0 (*not at all*) to 4 (*all the time*). CS-H scores range from 0 to 24; CS-M scores range from 0 to 12. The CS-H and CS-M were originally designed by Sullivan et al. (1995) to assess catastrophic cognitions associated with painful situations (e.g., injuries or headaches). However, evidence suggests catastrophic cognitions are not limited to painful situations (Garnefski et al., 2002). CS-H and CS-M instructions were as follows:

We are interested in the types of thoughts and feelings that you had when you experienced negative or unpleasant events during the past 7 days. Listed below are nine statements describing different thoughts and feelings that may be associated with negative or unpleasant events. Using the following scale, please indicate the degree to which you had these thoughts and feelings when you experienced negative or unpleasant events during the past 7 days.

In the present study, the CS-H and CS-M were slightly modified (a) to assess catastrophic cognitions associated with negative or unpleasant events and (b) to suit a 7-day time frame. For example, “I worry all the time about if the pain will end” in the original CS-H was changed to “During the past 7 days, when I experienced negative or unpleasant events, I worried all the time about if the negative event would end” in the modified CS-H, and “I keep thinking about other painful events” in the original CS-M was changed to “During the past 7 days, when I experienced negative or unpleasant events, I kept thinking about other negative events” in the modified CS-M. To reflect these revisions, the CS-M was renamed the Catastrophizing Scale. Research supports the reliability and validity of the CS-H and CS-M. For instance, Sherry, Graham, and Stewart (2009) observed a significant correlation between the modified and original CS-H ( $r = .62$ ) and the modified and original CS-M ( $r = .63$ ), which suggests catastrophizing about negative events overlaps strongly with catastrophizing about painful situations. Alpha reliabilities for the CS-H and CS-M are typically in the range of  $.85$  (Sherry, Graham, & Stewart, 2009).

**Difficulty accepting the past.** Difficulty accepting the past was assessed with a modified form of Santor and Zuroff’s (1994) Accepting the Past Scale (ATPS), a modified form of the Past-Negative subscale of Zimbardo and Boyd’s (1999) Time Perspective Inventory (TPI-PN), and a modified form of the Ego Despair subscale of Ryff and Heincke’s (1983) Developmental Personality Scale (DPS-ED). These scales were shortened, as the original ATPS (16 items), TPI-PN (10 items), and DPS-ED (16 items) were potentially burdensome to participants in our four-wave study. The ATPS is a four-item subscale rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) such that scores range from 4 to 20. The modified, four-item ATPS is composed of the four highest item-total correlations from the original 16-item

ATPS (see Santor & Zuroff, 1994). ATPS items were modified to match a 7-day time frame; for example, “Sometimes I have the feeling I’ve never had the chance to live” was modified to “During the past 7 days, sometimes I had the feeling I’ve never had the chance to live.” Evidence suggests the ATPS is reliable and valid, with research indicating the modified and original ATPS correlate strongly and significantly ( $r = .88$ ; Sherry, Graham, & Stewart, 2009). Alpha reliabilities for the ATPS are usually  $> .75$  (Sherry, Graham, & Stewart, 2009).

The TPI-PN is a four-item subscale rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) so that scores range from 4 to 20. The modified, four-item TPI-PN is based on the four highest factor loadings from the original 10-item TPI-PN (see Zimbardo & Boyd, 1999). TPI-PN items were modified to suit a 7-day time frame; for instance, “I think of what I should have done differently in my life” was modified to “During the past 7 days, I thought of what I should have done differently in my life.” Research supports the reliability and validity of the TPI-PN. For example, Sherry, Graham, and Stewart (2009) observed a strong and significant correlation between the modified and original TPI-PN ( $r = .78$ ). Alpha reliabilities for the TPI-PN are typically  $> .80$  (Sherry, Graham, & Stewart, 2009).

The DPS-ED is a five-item subscale rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) such that scores range from 5 to 25. Several ATPS items overlap directly with DPS-ED items (Santor & Zuroff, 1994). In the present study, the DPS-ED is composed of items that do not overlap directly with the ATPS, but still reflect the construct of difficulty accepting the past. DPS-ED items were modified to match a 7-day time frame; for instance, “In general, I have few regrets about my past life” was modified to “During the past 7 days, I had few regrets about my past.” Sherry, Graham, and Stewart (2009) found evidence supporting the reliability and validity of the DPS-ED, including a strong and significant link between the modified and original DPS-ED ( $r = .80$ ). Alpha reliabilities for the DPS-ED are usually in the range of  $.70$  (Sherry, Graham, & Stewart, 2009).

**Depressive symptoms.** Depressive symptoms were assessed with a short form of Radloff’s (1977) Center for Epidemiological Studies Depression Scale (CES-D-SF); the Depression subscale of Lovibond and Lovibond’s (1995) Depression, Anxiety, and Stress Scales-21 (DASS-D); and the Depression subscale of Derogatis’ (1994) Symptom Checklist-90-Revised (SCL-90-R-D). The CES-D-SF, DASS-D, and SCL-90-R-D were not altered. The CES-D-SF (e.g., “I felt everything I did was an effort”) is a 10-item measure rated on a 4-point scale ranging from 0 (*rarely or none of the time*) to 3 (*most or all of the time*), meaning that scores range from 0 to 30. Evidence supports the reliability and validity of the CES-D-SF (Rice, Ashby, & Slaney, 2007). Cole, Rabin, Smith, and Kaufman (2004) found shortening the CES-D from 20 items (the original form) to 10 items resulted in improved psychometric properties. Rice et al. (2007) reported the CES-D-SF and Neuroticism subscale of Costa and McCrae’s (1992) NEO Five-Factor Inventory are strongly and significantly correlated ( $r = .70$ ). Alpha reliabilities for the CES-D-SF are typically in the range of  $.80$  (Cole et al., 2004).

The DASS-D (e.g., “I felt down-hearted”) is a seven-item subscale rated on a 4-point scale ranging from 0 (*did not apply to me at all*) to 3 (*applied to me very much, or most of the time*) so that scores range from 0 to 21. Research indicates the DASS-D is

reliable and valid (e.g., Antony, Bieling, Cox, Enns, & Swinson, 1998). Wei, Shaffer, Young, and Zakalik (2005) observed a strong and significant correlation between the DASS-D and CES-D ( $r = .77$ ). Alpha reliabilities for the DASS-D are usually  $> .85$  (Wei, Vogel, Ku, & Zakalik, 2005). The SCL-90-R-D is a 13-item subscale rated on a 5-point scale such that scores range from 0 to 52. A sample SCL-90-R-D item is “feeling low in energy.” Evidence supports the reliability and validity of the SCL-90-R-D (e.g., Derogatis, 1994). Barker-Collo (2003) reported the SCL-90-R-D and Depression subscale of McNair, Lorr, and Droppleman’s (1992) Profile of Mood States are strongly and significantly correlated ( $r = .86$ ). Alpha reliabilities for the SCL-90-R-D are typically  $> .85$  (Martinez, Stillerman, & Waldo, 2005).

## Procedure

The Research Ethics Board at Dalhousie University approved the present study. Participants were recruited from the participant pool in the Department of Psychology. Recruitment occurred over a 5-month period. Participants responded to an ad inviting their participation in a study of personality traits and depressive feelings. This ad was displayed on a Web-based experiment management system. After reading a description of the present study, participants scheduled a time to begin participating. Before participating, undergraduates were invited to ask questions about participating and to read and to sign a consent form.

The present study involved four waves. Participants completed scales once a week for 4 consecutive weeks. Scales were completed in a lab. Demographics were reported in Wave 1, and all scales were identical in Waves 1, 2, 3, and 4. During Wave 1, participants were scheduled to return for subsequent assessments that occurred 1, 2, and 3 weeks after Wave 1. To encourage full participation, undergraduates received an e-mail reminder to complete subsequent assessments as scheduled. After Wave 4, participants were debriefed and provided with \$10 and a 3.0% bonus added to their overall course grade in a specified psychology course.

Our 240 participants provided 940 weekly reports. All 240 participants (100%) completed Wave 1; 238 of 240 participants (99.2%) completed Wave 2; 230 of 240 participants (95.8%) completed Wave 3; 232 of 240 participants (96.7%) completed Wave 4. Weekly reports provided up to 2 days before or up to 2 days after a scheduled assessment were retained for analyses; 0.6% (6 of 940) of the weekly reports were dropped because they did not fall within this time frame. In total, 934 weekly reports were included in the final sample. Thus, 99.4% (934 of 940) of all possible weekly reports were completed in a timely fashion. On average, 3.92 (of a possible 4) weekly reports were returned ( $SD = 0.40$ ). Most weekly reports were provided in a manner consistent with our four-wave, 4-week design. Wave 2 occurred an average of 7.04 ( $SD = 0.44$ ) days after Wave 1; Wave 3 occurred an average of 14.13 ( $SD = 0.66$ ) days after Wave 1; and Wave 4 occurred an average of 21.20 ( $SD = 1.23$ ) days after Wave 1.

## Data Analytic Strategy

Generalizability theory was used to decompose the variance of, and to compute the reliabilities for, study variables. Confirmatory factor analysis (CFA) was used to test the measurement model for

the EMPDS, and discriminant validity analysis tested whether latent variables were best represented as identical or as distinct. Structural equation modeling (SEM) was used to test the structural model for the EMPDS. The mediational hypothesis in the structural model was tested via bootstrap analyses. Incremental validity analyses were used to test whether the variables of the EMPDS were linked to depressive symptoms and to each other beyond PSs or neuroticism.

## Results

### Descriptive Statistics

We computed means for manifest variables by aggregating means across 4 weeks; likewise, we computed standard deviations for manifest variables by aggregating standard deviations across 4 weeks (see Table 1). Means for manifest variables fell within one standard deviation of means from other studies of undergraduates (Barker-Collo, 2003; Dollinger et al., 2008; Rice & Ashby, 2007; Rice et al., 2007; Sherry, Graham, & Stewart, 2009; Wei et al., 2005). Means from our study are thus consistent with research involving comparable samples.

Table 1  
*Means and Standard Deviations for Manifest Variables*

Manifest variable	<i>M</i>	<i>SD</i>
PCs		
HFMPs socially prescribed perfectionism	16.88	7.21
FMPS concern over mistakes	10.00	4.81
FMPS doubts about actions	9.61	4.27
PSs		
FMPS personal standards	12.96	4.27
Neuroticism		
BFI neuroticism	21.81	5.98
Catastrophic thinking		
CERQ catastrophizing	6.04	2.81
CS helplessness	5.04	5.68
CS magnification	3.07	3.30
Difficulty accepting the past		
ATPS difficulty accepting the past	8.67	3.66
TPI past-negative	9.20	4.19
DPS ego despair	13.10	4.28
Depressive symptoms		
CES-D-SF depressive symptoms	16.31	4.77
DASS depressive symptoms	3.06	3.75
SCL-90-R depressive symptoms	11.42	9.81

*Note.* Means and standard deviations are based on 240 participants and 934 weekly responses provided over 4 weeks. PCs = perfectionistic concerns; HFMPs = Hewitt and Flett’s (1991) Multidimensional Perfectionism Scale; FMPS = Frost et al.’s (1990) Multidimensional Perfectionism Scale; PSs = perfectionistic strivings; BFI = Benet-Martinez and John’s (1998) Big Five Inventory; CERQ = Garnefski et al.’s (2002) Cognitive Emotion Regulation Questionnaire; CS = Sullivan et al.’s (1995) Catastrophizing Scale; ATPS = Santor and Zuroff’s (1994) Accepting the Past Scale; TPI = 94Zimbardo and Boyd’s (1999) Time Perspective Inventory; DPS = Ryff and Heinicke’s (1983) Developmental Personality Scale; CES-D-SF = Radloff’s (1977) Center for Epidemiological Studies Depression Subscale-Short Form; DASS = Lovibond and Lovibond’s (1995) Depression, Anxiety, and Stress Scales-21; SCL-90-R = Derogatis’ (1994) Symptom Checklist-90-Revised.

**Variance Partitioning, Between-Persons and Within-Person Reliabilities, and Alpha Reliabilities**

Generalizability theory was used to decompose the variance of, and to compute the reliabilities for, the variables of the EMPDS (see Cranford et al., 2006; Shavelson, Webb, & Rowley, 1989). Using the VARCOMP program from SPSS 15.0 (2006), an analysis of variance framework was used to decompose the variance of each variable into variability attributable to person, wave, item, and interactions among person, wave, and item (see Table 2). Person, wave, and item variability were treated as random factors in these analyses.

Person variability and Person × Wave Variability accounted for most of the variance in the variables of the EMPDS (see Table 2). The large proportion of variance due to person (range = 63.41%–83.68%) indicates there are traitlike between-persons differences across all waves and across all items. In addition, the large proportion of variance attributable to Person × Wave (range = 11.80%–27.04%) suggests there are between-persons differences at different waves across all items. One more result stands out in Table 2, namely, the 16.35% of variance due to responses to PS items. This may suggest our measure of PSs (i.e., the FMPS-PS) is characterized by differential item salience, differential item means, or unreliability in measurement.

We computed between-persons reliabilities for the measures in the present study on the basis of four waves of data (see Equation 4 on p. 925 of Cranford et al., 2006). All between-persons reliabilities were high (i.e., >.99). These results indicate that measures reliably assessed between-persons differences in PCs, PSs, neuroticism, catastrophic thinking, difficulty accepting the past, and depressive symptoms. Within-person reliabilities were also high (i.e., >.99) for all measures (see Equation 5 on p. 925 of Cranford et al., 2006). These results suggest that measures reliably assessed within-person change in PCs, PSs, neuroticism, catastrophic thinking, difficulty accepting the past, and depressive symptoms over the four waves of the present study.

As in prior research involving the measures used in the present study (e.g., Rice et al., 2007; Sherry, Graham, & Stewart, 2009), alpha reliabilities (i.e., Cronbach’s alphas) were acceptable across all four waves: PCs (.88–.93), PSs (.87–.89), neuroticism (.80–.85), catastrophic thinking (.94–.95), difficulty accepting the past (.86–.89), and depressive symptoms (.94–.95).

**Bivariate Correlations**

Before conducting bivariate correlations, we standardized and summed manifest indicators of latent variables (e.g., the HFMPDS-SPP, FMPS-COM, and FMPS-DAA subscales were standardized and summed to create the PCs variable in Table 3). Across all four waves, (a) PCs correlated with catastrophic thinking, difficulty accepting the past, and depressive symptoms; (b) catastrophic thinking and difficulty accepting the past correlated with each other; and (c) catastrophic thinking and difficulty accepting the past correlated with depressive symptoms (see Table 3). Notably, PCs at Wave 1 and depressive symptoms at Wave 4 correlated strongly and significantly ( $r = .48$ ). This result, along with the overall pattern of intercorrelation, suggests merit in testing the structural model for, and the mediational hypothesis in, the EMPDS.

Table 2  
Variance Components for the Variables of the EMPDS, PSs, and Neuroticism

Source of variance	PCs (14 items)	Percentage of overall variance	PSs (4 items)	Percentage of overall variance	Neuroticism (8 items)	Percentage of overall variance	Cat. thinking (13 items)	Percentage of overall variance	Difficulty accepting (13 items)	Percentage of overall variance	Depressive symptoms (30 items)	Percentage of overall variance
Person	213.95	82.83	8.44	63.41	27.79	83.68	75.55	65.17	86.33	80.67	291.92	76.56
Wave	10.74	4.16	0.04	0.30	0.21	0.63	4.48	3.87	2.96	2.77	4.36	1.14
Item	1.66	0.64	2.18	16.38	0.64	1.93	3.41	2.94	0.28	0.26	1.66	0.44
Person × Wave	30.51	11.81	1.57	11.80	4.19	12.62	31.34	27.04	17.04	15.92	83.32	21.85
Person × Item	1.28	0.50	0.96	7.21	0.33	0.99	1.02	0.88	0.36	0.34	0.00	0.00
Wave × Item	0.04	0.02	0.01	0.07	0.02	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Error	0.12	0.04	0.11	0.83	0.03	0.09	0.12	0.10	0.04	0.04	0.03	0.01
Total	258.30	100.00	13.31	100.00	33.21	100.00	115.92	100.00	107.01	100.00	381.29	100.00

Note. Estimates of variance components are based on 240 participants and 934 weekly responses provided over 4 weeks. In estimating variance components, we observed small (i.e., near zero) negative variances. Such variances are often observed and are typically attributed to sampling error (Brennan, 2001). Negative variances are not theoretically possible; therefore, we followed recommendations to set negative variances to zero (Brennan, 2001). EMPDS = existential model of perfectionism and depressive symptoms; PSs = perfectionistic strivings; PCs = perfectionistic concerns; Cat. thinking = catastrophic thinking; Difficulty accepting = difficulty accepting the past; Person = variance due to between-persons differences across all waves and across all items; Wave = variance due to weekly differences across all persons and across all items; Item = variance due to responses to scale items across all persons and across all waves; Person × Wave = variance due to between-persons differences at different waves across all items; Person × Item = variance due to between-persons differences in responses to scale items across all waves; Wave × Item = variance due to weekly differences in responses to scale items across all persons; Error = systematic error (i.e., the Person × Wave × Item interaction) plus random error (i.e., unknown sources of variance; Cranford et al., 2006).

Table 3  
Bivariate Correlations

Manifest variable	Wave 1					Wave 2					Wave 3					Wave 4									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
	Wave 1																								
1. PCs	—	.53	.51	.44	.56	.51	<b>.87</b>	.54	.50	.51	.58	.55	<b>.84</b>	.57	.45	.45	.55	.44	<b>.82</b>	.52	.49	.41	.57	.48	
2. PSs		—	.15	.17	.13	.18	.47	<b>.85</b>	.15	.20	.16	.24	.46	<b>.84</b>	.09	.13	.11	.08	.44	<b>.81</b>	.13	.19	.15	.19	
3. Neuroticism			—	.52	.52	.56	.50	.17	<b>.86</b>	.51	.51	.52	.47	.20	<b>.86</b>	.41	.43	.44	.48	.19	<b>.83</b>	.35	.47	.44	
4. Cat. thinking				—	.60	.75	.49	.23	.62	<b>.73</b>	.60	.65	.47	.27	.54	<b>.63</b>	.51	.59	.49	.27	.51	<b>.62</b>	.52	.62	
5. Difficulty accepting					—	.70	.57	.21	.51	.58	<b>.84</b>	.60	.54	.24	.47	.51	<b>.81</b>	.58	.60	.26	.47	.44	<b>.80</b>	.52	
6. Depressive symptoms						—	.54	.25	.59	.67	.65	<b>.78</b>	.50	.25	.54	.62	.64	<b>.77</b>	.54	.27	.51	.58	.64	<b>.70</b>	
	Wave 2																								
7. PCs							—	.57	.55	.57	.59	.59	<b>.93</b>	.58	.49	.48	.57	.47	<b>.90</b>	.54	.49	.43	.60	.50	
8. PSs								—	.18	.30	.23	.30	.56	<b>.90</b>	.13	.21	.20	.17	.53	<b>.89</b>	.17	.28	.23	.26	
9. Neuroticism									—	.56	.55	.56	.52	.23	<b>.91</b>	.46	.46	.45	.51	.22	<b>.89</b>	.42	.48	.46	
10. Cat. thinking										—	.62	.77	.56	.34	.52	<b>.71</b>	.57	.64	.58	.34	.50	<b>.70</b>	.54	.66	
11. Difficulty accepting											—	.66	.60	.28	.51	.56	<b>.85</b>	.60	.64	.29	.50	.51	<b>.85</b>	.57	
12. Depressive symptoms												—	.57	.32	.53	.66	.65	<b>.78</b>	.59	.34	.49	.59	.60	<b>.76</b>	
	Wave 3																								
13. PCs													—	.59	.50	.50	.57	.50	<b>.94</b>	.56	.50	.43	.60	.50	
14. PSs														—	.16	.23	.20	.19	.55	<b>.92</b>	.20	.27	.21	.26	
15. Neuroticism															—	.47	.47	.50	.49	.16	<b>.90</b>	.41	.47	.46	
16. Cat. thinking																—	.61	.79	.53	.27	.44	<b>.82</b>	.57	.70	
17. Difficulty accepting																	—	.67	.60	.23	.42	.49	<b>.88</b>	.60	
18. Depressive symptoms																		—	.53	.21	.46	.66	.64	<b>.80</b>	
	Wave 4																								
19. PCs																				—	.56	.51	.50	.66	.57
20. PSs																					—	.18	.31	.26	.26
21. Neuroticism																						—	.42	.47	.48
22. Cat. thinking																							—	.52	.77
23. Difficulty accepting																								—	.65
24. Depressive symptoms																									—

Note. A bivariate correlation in the range of .10 signifies a small effect size; a bivariate correlation in the range of .30 signifies a medium effect size; a bivariate correlation in the range of .50 signifies a large effect size (Cohen, 1992). In Table 3, bivariate correlations greater than or equal to .14 are significant at  $p < .05$ . PCs = perfectionistic concerns; PSs = perfectionistic strivings; Cat. thinking = catastrophic thinking; Difficulty accepting = difficulty accepting the past. Test-retest correlations appear in bold.

Across all four waves, PSs correlated with most (but not all) variables in the EMPDS (see Table 3). Neuroticism correlated with the variables of the EMPDS across all four waves, whereas the link between neuroticism and PSs was less consistent. Overall, these results suggest PSs and neuroticism are suitable covariates for incremental validity analyses. The variables in the EMPDS were not correlated with demographics (i.e., gender, age, year of study in university, years living in Canada, and ethnicity). Demographics are therefore not used as covariates.

Finally, test-retest correlations, which appear in bold in Table 3, were high across all four waves: PCs (.82–.94), PSs (.81–.92), neuroticism (.83–.91), catastrophic thinking (.62–.82), difficulty accepting the past (.80–.88), and depressive symptoms (.70–.80). These results support the reliability of the measures used in the present study.

## SEM

SEM was conducted with AMOS 7.0 (Arbuckle, 2006). We used full information maximum likelihood estimation (FIML) to handle missing data. Missing data were minimal (i.e., less than 3%

for any variable in the present study). FIML estimates are less biased than estimates generated using other methods (e.g., mean imputation or deleting cases; Acock, 2005). We also examined measurement models prior to testing structural models (Byrne, 2001).

Model fit was assessed with multiple indices. Adequate fit is suggested by a chi-square/df ratio ( $\chi^2/df$ ) in the range of 2, a root-mean-square error of approximation (RMSEA) in the range of .05–.08, and a comparative fit index (CFI) and an incremental fit index (IFI) in the range of .95 (Kline, 2005). RMSEA values are reported with 90% confidence intervals (90% CIs). Model comparisons involved the Akaike information criterion (AIC). Smaller AIC values indicate better fit and greater parsimony (Byrne, 2001).

## The Measurement Model for the EMPDS

We used CFA to test whether the measurement model for the EMPDS is valid. Latent variables were allowed to covary with no structural relations specified, and manifest variables were restricted to load onto their corresponding latent variables. The measurement model consisted of the six latent variables in Fig-

ure 1. As factor loadings were not expected to vary across waves, factor loadings for like indicators of PCs and factor loadings for like indicators of depressive symptoms were fixed to equality across waves (Cole & Maxwell, 2003).

The measurement model for the EMPDS showed acceptable fit indices,  $\chi^2(118, N = 240) = 208.99, p < .001; \chi^2/df = 1.77; CFI = .97; IFI = .97; RMSEA = .06$  (90% CI: .04, .07). Moreover, standardized factor loadings for the manifest indicators of the latent variables of the EMPDS were substantial and significant ( $p < .001$ ). These factor loadings ranged from .61 to .79 for PCs at Wave 1, from .84 to .93 for depressive symptoms at Wave 1, from .73 to .91 for catastrophic thinking at Wave 2, from .75 to .86 for difficulty accepting the past at Wave 3, from .67 to .80 for PCs at Wave 4, and from .89 to .94 for depressive symptoms at Wave 4. In summary, CFA indicated the latent variables of the EMPDS were adequately measured by their respective manifest indicators.

Latent correlations for the measurement model for the EMPDS ranged between .61 (for the link between PCs at Wave 1 and catastrophic thinking at Wave 2) and .89 (for the link between PCs at Wave 1 and PCs at Wave 4). Latent correlations, which correct for measurement error, were all higher in magnitude than bivariate correlations. Given the overlap between the latent variables of the EMPDS, discriminant validity analyses were conducted.

**Discriminant validity analyses.** Discriminant validity analyses tested whether the latent variables of the EMPDS are better understood as identical or as distinct. The measurement model for the EMPDS (i.e., Model 1) was compared with six strategically modified versions of this measurement model. Modified versions of the measurement model for the EMPDS were identical to Model 1, except certain latent correlations were fixed to 1.0. This means certain pairs of latent variables, specified below, were treated as identical (see Kline, 2005).

We generated six modified versions of the measurement model for the EMPDS to compare them with Model 1. These models are labeled as Models 2 through 7. In Model 2, all paths between PCs and depressive symptoms were treated as identical; in Model 3, all paths between PCs and catastrophic thinking were treated as identical; in Model 4, all paths between PCs and difficulty accepting the past were treated as identical; in Model 5, all paths between catastrophic thinking and difficulty accepting the past were treated as identical; in Model 6, all paths between catastrophic thinking and depressive symptoms were treated as identical; in Model 7, all paths between difficulty accepting the past and depressive symptoms were treated as identical.

Burnham and Anderson (1998) suggested if AIC values for Model 1 are 10 or more units lower than AIC values for other models (e.g., Model 2), then there is strong evidence Model 1 is better than other models (e.g., Model 2). AIC values indicated Model 1 (AIC = 350.99) fit the data better than Model 2 (AIC = 439.14), Model 3 (AIC = 402.50), Model 4 (AIC = 440.52), Model 5 (AIC = 401.78), Model 6 (AIC = 453.89), and Model 7 (AIC = 463.19). AIC values for Model 1 were 10 or more units lower than AIC values for all other models. These results indicate that, although the latent variables of the EMPDS are related, they are best seen as distinct. Overall, results suggest the measurement model for the EMPDS is well fitting and suitable for testing in structural form.<sup>2</sup>

## The Structural Model for the EMPDS

**Model testing.** Corresponding error terms were correlated across time points (Cole & Maxwell, 2003). Fit indices suggested the structural model for the EMPDS fit the data well,  $\chi^2(119, N = 240) = 213.89, p < .001; \chi^2/df = 1.80; CFI = .97; IFI = .97; RMSEA = .06$  (90% CI: .05, .07); AIC = 353.89. As hypothesized, (a) PCs at Wave 1 were correlated with depressive symptoms at Wave 1, (b) PCs at Wave 1 were linked to catastrophic thinking at Wave 2 and difficulty accepting the past at Wave 3, and (c) catastrophic thinking at Wave 2 and difficulty accepting the past at Wave 3 were linked to depressive symptoms at Wave 4. Depressive symptoms at Wave 1 were also tied to catastrophic thinking at Wave 2 and difficulty accepting the past at Wave 3. Consistent with the mediational hypothesis in the EMPDS, PCs at Wave 1 were unrelated to depressive symptoms at Wave 4 (see the Mediational analyses section below). One unexpected result was also found: Catastrophic thinking at Wave 2 was unrelated to difficulty accepting the past at Wave 3. Overall, however, paths in the EMPDS were substantial, significant, and congruent with the hypothesized structural model for the EMPDS (see Figure 2).

**Stability and complication effects.** As hypothesized, PCs at Wave 1 were strongly linked to PCs at Wave 4, whereas depressive symptoms at Wave 1 were moderately linked to depressive symptoms at Wave 4 (see Figure 2). Two of three hypotheses pertaining to complication effects were also as expected: Depressive symptoms at Wave 1 and difficulty accepting the past at Wave 3 were unrelated to PCs at Wave 4. However, counter to hypotheses, catastrophic thinking at Wave 2 was linked to PCs at Wave 4.

**Mediational analyses.** A significant indirect effect suggests mediation has occurred (Mallinckrodt, Abraham, Wei, & Russell, 2006). We used bootstrap analyses to evaluate the significance level of the hypothesized indirect effect in the EMPDS (see Figure 2). Random sampling with replacement was used to make 20,000 ( $n = 240$ ) bootstrap samples; these samples were used to estimate bias-corrected standard errors for the hypothesized indirect effect. This indirect effect was based on all possible indirect paths and was computed by multiplying (a) path coefficients from the predictor to mediators and (b) path coefficients from mediators to the criterion. CIs were also computed. An indirect effect is significant ( $p < .05$ ) if the 95% CI for this indirect effect does not include zero. Bootstrap estimates indicated the hypothesized indirect effect in the EMPDS was significant ( $\beta = .20, B = .21$  [95% CI: .03, .40], and  $SE = .09$ ). That is, the indirect effect of PCs (at Wave 1) on depressive symptoms (at Wave 4) through catastrophic thinking (at Wave 2) and difficulty accepting the past (at Wave 3) was significant.

<sup>2</sup> The first, second, and fourth authors independently rated the potential overlap of items measuring difficulty accepting the past with items measuring depressive symptoms. All raters agreed (a) no items measuring difficulty accepting the past were overlapping with depressive symptoms and (b) two items measuring depressive symptoms were overlapping with difficulty accepting the past (see Item 7 in the CES-D-SF and in the DASS-D). Our central analyses were rerun (i.e., the measurement and the structural model for the EMPDS) after we removed these two overlapping items. We found our results were virtually unaltered when using a version of the CES-D-SF and the DASS-D that dropped these two potentially overlapping (redundant) items.

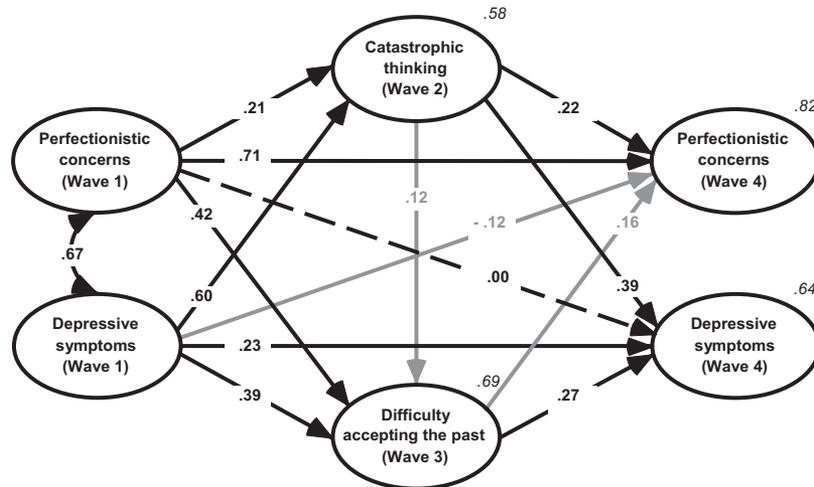


Figure 2. The structural model for the existential model of perfectionism and depressive symptoms (EMPDS). Ovals represent latent variables. The double-headed black arrow represents a significant latent correlation (i.e.,  $p < .05$ ). Single-headed black arrows represent significant paths (i.e.,  $p < .05$ ). Single-headed grey arrows represent nonsignificant paths (i.e.,  $p > .05$ ). The dashed, single-headed black arrow between Perfectionistic concerns (Wave 1) and Depressive symptoms (Wave 4) represents a nonsignificant path (i.e.,  $p > .05$ ). Standardized path coefficients appear in bold. Italicized numbers (e.g., .64) appearing in the upper right hand of endogenous variables (e.g., Depressive symptoms [Wave 4]) represent the proportion of variance accounted for by associated exogenous variables. In the interest of clarity, manifest variables are not shown.

**Incremental validity.** As hypothesized, paths in the structural model for the EMPDS were substantial and relatively unchanged (as seen in Figure 2) when PSs or neuroticism were added as a covariate. One exception to our expected pattern of incremental validity was also found: PCs and catastrophizing were not related after controlling for neuroticism ( $\beta = .16, p > .05$ ).

Two additional results support our incremental validity hypotheses: First, neither PSs ( $\beta = .08, p > .05$ ) nor neuroticism ( $\beta = -.03, p > .05$ ) were related to depressive symptoms when added to the structural model for the EMPDS. (Each covariate was added separately to this model.) Second, the AIC value for the structural model was 10 or more units lower than the AIC value for this model when either PSs (AIC = 443.17) or neuroticism (AIC = 386.02) were added. Model fit was thus eroded when PSs or neuroticism were added to the structural model for the EMPDS (see Burnham & Anderson, 1998).<sup>3</sup>

In summary, results suggest the hypothesized structural model for the EMPDS is a well-fitting model that is consistent with the expected pattern of (a) direct and indirect effects, (b) stability and complication effects, and (c) incremental validity beyond PSs or neuroticism.<sup>4</sup>

## Discussion

The EMPDS relates PCs to depressive symptoms through both catastrophic thinking and difficulty accepting the past. SEM indicated that the measurement model for the EMPDS is an adequately fitting model involving several related, but substantively different, constructs. The structural model for the EMPDS also fit the data well and supported all (but one) hypothesized path. Consistent with our key mediational hypothesis, bootstrap analyses indicated that catastrophic thinking and difficulty accepting the past repre-

sent explanatory mechanisms linking PCs to depressive symptoms. Though traitlike between-persons differences were observed for all study variables, significant Person  $\times$  Wave variability was also found, suggesting meaningful change occurred during our four-wave study. Moreover, results indicated PCs are more an antecedent of, rather than a complication of, the variables of the EMPDS; consistent (but imperfect) support for the incremental validity of the EMPDS beyond either PSs or neuroticism was observed.

## The Structural Model for the EMPDS

Perfectionism, cognitive distortions, and existential problems are important themes with long histories in counseling psychology

<sup>3</sup> The incremental validity shown by the EMPDS is notable; however, problems may arise from using statistical controls such as PSs or neuroticism. Removing variance from PCs that is shared with PSs or neuroticism may result in a form of PCs that is seldom observed in everyday life and has questionable meaning (see Coyne & Gottlieb, 1996). Due to such concerns, tables and figures do not display results where PSs or neuroticism are used as a covariate.

<sup>4</sup> Although the EMPDS does not propose the relationship between PCs and depressive symptoms is moderated by catastrophic thinking and by difficulty accepting the past, exploratory moderated multiple regression analyses were nonetheless conducted. Consistent with the timing and the sequence of variables in Figure 1, we tested whether PCs at Wave 1 interacted with catastrophic thinking at Wave 2 and with difficulty accepting the past at Wave 3 to predict depressive symptoms at Wave 4 after controlling for depressive symptoms at Wave 1. This three-way interaction (PCs  $\times$  Catastrophic Thinking  $\times$  Difficulty Accepting the Past) was nonsignificant, which suggests the relationship between PCs and depressive symptoms is not conditional on catastrophic thinking and difficulty accepting the past in the present study.

(e.g., Rice et al., 1998; Rogers, 1961). These three themes, although often studied, are seldom integrated, leaving open to question both their unique and their collective influence on adjustment. In contrast, the structural model for the EMPDS integrated key variables representing these three themes (i.e., PCs, catastrophic thinking, and difficulty accepting the past) into a coherent model explaining why people become depressed.

Consistent with the EMPDS, PCs and depressive symptoms were related, and the indirect effect of PCs (at Wave 1) on depressive symptoms (at Wave 4) through catastrophic thinking (at Wave 2) and difficulty accepting the past (at Wave 3) was significant, thereby confirming our central mediational hypothesis, and helping to identify explanatory mechanisms responsible for the PCs–depressive symptoms connection. The EMPDS thus offers a novel explanation for why persons high in PCs are prone to depressive symptoms: that is, because they engage in automatic, catastrophic thinking patterns and experience profound difficulty in accepting the past.

As the EMPDS predicts, catastrophic inferences and interpretations appear to represent a cognitive pattern typical of persons characterized by negative reactions to failures, concerns over others' criticism and expectations, and recurrent self-doubts (see also Rudolph et al., 2007). Vis-à-vis cognitive models of depressive symptoms (Beck et al., 1979), PCs may be thought of as core, enduring, and distorted attitudes that lead individuals to engage in automatic, ineffective, and catastrophic cognitions. Our results also suggest cognitive appraisals of minor setbacks as major obstacles are depressogenic, a finding observed in other research (Rudolph et al., 2007). Catastrophic thinking may thus be conceptualized as an end product or a cognitive expression of PCs, an ineffective cognitive coping style, and one key reason why persons high in PCs become depressed (see below for consideration of catastrophic thinking as a contributor to PCs).

The EMPDS, and our results, also suggest that difficulty accepting the past is central to explaining why persons high in PCs get depressed. Existentialists argue accepting life experiences and making meaning of trials and tribulations is an important process (May, 1969; Yalom, 1980). As hypothesized, PCs were tied to difficulty accepting the past, suggesting persons high in PCs struggle to consolidate their life experiences into a coherent, satisfying, and meaningful story. Feeling as if they have lived their lives in the service of others' expectations (Bruch, 1979; Hewitt & Flett, 1991), past events may be hard to accept for persons high in PCs. The experience of pursuing perfection may also lack meaning and undermine satisfaction, as "perfection" is hard to define, hard to obtain, nearly impossible to maintain, and arguably ethereal or nonexistent.

By frequently refusing to accept their perceived failures and limitations, persons high in PCs may also end up dissatisfied with other people, themselves, and the past (see also Flett et al., 2003). In fact, existentialists assert failing to locate meaning and to find satisfaction in life experiences may result in feelings of frustration, emptiness, and depression (Frankl, 1984). Consistent with both this assertion and the EMPDS, our results suggest persons high in PCs are vulnerable to depressive symptoms as a consequence of their negative view of the past.

Although catastrophic thinking at Wave 2 and difficulty accepting the past at Wave 3 are strongly related ( $r = .57$ ), contrary to the EMPDS, the path between these two mediating variables was

nonsignificant in Figure 2, suggesting that catastrophic thinking and difficulty accepting the past exert a simultaneous, but independent, influence on depressive symptoms. A moderator, like rumination, may influence the strength of the relation between these variables such that persons high in PCs who engage in catastrophic thinking and who ruminate about these perceived catastrophies, encounter greater difficulty accepting the past. Given the strong bivariate relationship between catastrophic thinking and difficulty accepting the past, caution is also suggested in interpreting their null relationship in Figure 2 pending replication.

### Stability Effects and Complication Effects

PCs are assumed to show rank-order stability, representing the extent to which the relative ordering of individuals on PCs is maintained over time (Caspi, Roberts, & Shiner, 2005). Consistent with this assumption, which is shared by the EMPDS, test–retest correlations, generalizability theory analyses, and SEM indicated PCs are strongly stable traits that maintain high rank-order stability. Our results also complement a larger empirical literature suggesting that PCs are strongly stable across longer time frames (Hewitt & Flett, 1991; Rice & Aldea, 2006). In addition, we found evidence suggesting depressive symptoms are moderately stable, a result observed in numerous other studies (Tram & Cole, 2006). Given such moderate stability, it is notable that PCs, catastrophic thinking, and difficulty accepting the past predict changes in depressive symptoms at Wave 4 over and above baseline levels of depressive symptoms.

The EMPDS asserts PCs both come before and contribute to depressive symptoms, but are largely unaltered by preexisting depressive symptoms. Our results support this conceptualization of PCs and fail to support a complication (or scar) conceptualization of PCs where depressive symptoms contribute to alterations in PCs. Our study, and several others (e.g., Rice & Aldea, 2006), suggest PCs are salient before, during, and after depressive symptoms. PCs appear to represent an antecedent and a concomitant, but not an epiphenomenon, or a consequence, of depressive symptoms. In contrast to the present research, two studies involving clinical samples report complication effects where depressive symptoms modestly increase PCs (Cox & Enns, 2003; Zuroff et al., 1999). The presence of complication effects may depend on the nature of the depressive episode, and research is needed to examine whether symptom course, severity, duration, or expression influence whether depressive symptoms exert complication effects on PCs.

Neither catastrophic thinking nor difficulty accepting the past were hypothesized to exert complication effects on PCs. Whereas viewing life experiences as incoherent, unacceptable, dissatisfying, and meaningless does not appear to exacerbate PCs, our results suggest catastrophic thinking does exacerbate PCs. For persons dispositionally predisposed to concern over mistakes, catastrophic thinking may increase the cognitive salience and the perceived severity of mistakes, thereby heightening concern over mistakes. Catastrophic thinking may thus represent both a private, cognitive expression of PCs and a cognitive-motivational variable that exacerbates PCs.

### Incremental and Discriminant Validity

As hypothesized, each path coefficient in the EMPDS remained substantial and relatively unchanged after controlling for PSs. This suggests PCs are uniquely related to the variables of the EMPDS beyond PSs. Contrary to Shafran et al. (2002), who advocated returning to an entirely intrapersonal model of perfectionism, our findings suggest a clear role for PCs, which involves salient interpersonal content (e.g., concerns over others' criticism and expectations).

We also controlled for the potentially confounding influence of neuroticism. As hypothesized, every path coefficient in the EMPDS, with the exception of PCs at Wave 1 to catastrophic thinking at Wave 2, remained substantial and relatively unchanged after controlling for neuroticism. Although SEM indicated PCs and catastrophic thinking were significantly related (see Figure 2), this relationship was no longer significant once we controlled for neuroticism. This finding was unexpected, but is congruent with research suggesting that automatic thoughts with catastrophic themes are common among persons high in neuroticism (Turner & Aaron, 2001).

Apart from this one unexpected finding, our overall pattern of results supports the incremental validity of the EMPDS beyond neuroticism. This pattern of results is notable, as neuroticism is a higher order personality domain that encapsulates several maladaptive aspects of personality and shares variance with the variables of the EMPDS (e.g., Dunkley et al., 2009). Considered alongside our discriminant validity analyses, which indicated the variables of the EMPDS are best represented as distinct (vs. identical), the present study suggests PCs are a unique lower order personality trait that is neither redundant with nor captured by neuroticism.

### Present Limitations and Future Directions

Our study used a four-wave, 4-week longitudinal design in which participants provided four weekly reports. Time lags between measurement occasions (e.g., 1 day vs. 1 week vs. 6 months) may influence observed results (Gollob & Reichardt, 1991; Maxwell & Cole, 2007). This means the links among the variables of the EMPDS may potentially change with longer or shorter time lags between measurement occasions. For example, the nonsignificant link between catastrophic thinking and difficulty accepting the past (see Figure 2) may have occurred because too much time elapsed between measurement occasions. Alternatively, depressive symptoms may not have exerted complication effects on PCs (see Figure 2) as too little time elapsed between measurement occasions. Future studies using intensive measurement schedules (e.g., experience sampling) and long-term longitudinal designs are needed to rigorously test the EMPDS.

Our study also included latent variables at some waves and excluded latent variables at other waves. For example, as Figure 2 shows, we included catastrophic thinking at Wave 2 only and difficulty accepting the past at Wave 3 only. Future research on the EMPDS might control for baseline levels of catastrophic thinking and difficulty accepting the past, thereby testing whether changes in (and not merely the occurrence of) these variables mediate the PCs–depressive symptoms link.

Additionally, our study involved a sample of young, advanced, and goal-oriented undergraduates. It is thus unclear whether

our results will generalize to other samples. Erikson (1950) argued that the evaluation and the acceptance of life experiences are a fundamental process typically negotiated during the final stage of adult development. Future research might examine the EMPDS in elderly persons as they undergo a period of intensive self-reflection and life review.

In measuring catastrophic thinking, we also inferred a negative event occurred that activated catastrophic thinking—without explicitly measuring whether a negative event actually occurred. Negative events and catastrophic thinking were thus overlapping in our study (see the Method section). Future research on the EMPDS is needed in which negative events, and resulting catastrophic interpretations, are measured separately, especially because persons high in PCs report experiencing more negative events (e.g., Dunkley et al., 2003; Dunn, Whelton, & Sharpe, 2006).

Another future direction is to test whether the EMPDS predicts a broad range of emotional distress (e.g., anger, anxiety, etc.) or whether the EMPDS predicts depressive symptoms specifically. Future research might also use informant reports to provide a more encompassing assessment of perfectionism and to address potential limitations of self-report scales (e.g., self-serving biases). Finally, we used several modified scales. Although less is known about the psychometric properties of these modified scales, between-persons, within-person, alpha, and test–retest reliabilities for these modified scales were all acceptable in our study. Additional support for the reliability and validity of these modified scales was also provided by the psychometrics study we conducted in conjunction with the present research (see Footnote 1).

### Implications for Counseling Psychology

At least three interventions are potentially relevant to counselors working with clients who are high in PCs and experiencing cognitive distortions, existential concerns, and/or depressive symptoms. Given the central role of PCs in the EMPDS, our study points toward PCs as a treatment target. A reduction in PCs may contribute to a corresponding reduction in catastrophic thinking, difficulty accepting the past, and depressive symptoms. Cognitive-behavioral therapy for perfectionism is an intervention with promising, but preliminary, empirical support (Flett & Hewitt, 2008). This intervention involves challenging perfectionism-linked cognitive distortions (e.g., catastrophizing) and behavioral patterns (e.g., avoidance) through cognitive restructuring, behavioral experiments, and other techniques (see Antony & Swinson, 1998).

Not unlike the EMPDS, cognitive therapy for depressive symptoms (Beck et al., 1979) proposes that transient automatic thoughts play a role in maintaining depressive symptoms. Cognitive therapy for depressive symptoms (Beck et al., 1979) may be understood as part of the second wave of cognitive-behavioral therapy in which cognitive errors, automatic thoughts, maladaptive schemas, dysfunctional attitudes, and faulty information processing are detected, disputed, and corrected (Hayes, 2004). In terms of the present study, cognitive therapy for depressive symptoms might be used to target, challenge, and modify dysfunctional perfectionistic attitudes (e.g., "If I do not do as well as others, I am an inferior human") and negative automatic thoughts (e.g., catastrophic thinking) and to replace such attitudes and thoughts with more rational cognitions (Beck et al., 1979). Reductions in perfectionistic con-

cerns and in catastrophic thinking may thus bring about reductions in depressive symptoms. This possibility, although provocative, should be viewed cautiously, as it goes beyond the data presented in our study.

Other interventions, belonging to the third wave of cognitive-behavioral therapy (Hayes, 2004), are also potentially relevant to clients struggling with PCs, cognitive distortions, existential concerns, and/or depressive symptoms. Whereas the second wave of cognitive-behavioral therapy encourages rational control, reappraisal, or elimination of cognitive errors, the third wave of cognitive-behavioral therapy emphasizes mindfulness (i.e., fully experiencing present moments without judgment or evaluation), living a value-driven existence, acceptance of life experiences, deepening relationships, and spirituality (Hayes, 2004).

Mindfulness-based cognitive therapy for depressive symptoms (Segal, Williams, & Teasdale, 2002), which is seen as part of the third wave of cognitive-behavioral therapy (Hayes, 2004), integrates cognitive therapy techniques with skills training in meditation. With respect to the present study, this intervention might be used to encourage clients high in PCs to observe negative thoughts (e.g., catastrophic thinking) and to adopt an attitude of openness and acceptance toward such thoughts, thereby allowing negative thoughts to come and to go without clients experiencing emotional distress or engaging in avoidance. Rather than treating catastrophic thoughts as targets to be challenged and restructured (a technique used in the second wave of cognitive-behavioral therapy), counselors may find it useful to encourage clients high in PCs to treat their catastrophic thoughts as events to be observed and accepted (a technique used in the third wave of cognitive-behavioral therapy). By emphasizing contact with (rather than withdrawal from) purposeful, present-centered awareness, mindfulness-based cognitive therapy for depressive symptoms may also discourage clients high in PCs from dwelling on their past. Moreover, mindfulness-based cognitive therapy for depressive symptoms actively promotes self-acceptance, which may help clients high in PCs to accept their past and to abandon unrealistic goals and interpretations in favor of more realistic alternatives (Crane et al., 2008). Finally, we concede our observations about interventions are largely conjectural and should be viewed both with considerable caution and as an impetus for future research on the EMPDS.

## Concluding Remarks

Consistent with the EMPDS, persons high in PCs seem to think in a rigid, extreme, and catastrophic manner in which relatively minor setbacks are magnified into seemingly major disasters. Such distorted cognitions appear to represent one reason why persons high in PCs are prone to depressive symptoms. Our study also suggests persons high in PCs are vulnerable to depressive symptoms because they struggle to accept their life experiences and to negotiate a sense of purpose, meaning, and satisfaction in their lives. With a catastrophic view of their present and a dark view of their past, persons high in PCs are at risk for depressive symptoms.

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