Exploring Perfectionism as a Cognitive Vulnerability to Psychological Distress: The Mediating Role of Cognitive Distortions

Jennifer Caso Tolliver
Philadelphia College of Osteopathic Medicine, jennifercaso@pcom.edu

Follow this and additional works at: http://digitalcommons.pcom.edu/psychology_dissertations

Part of the Psychology Commons

Recommended Citation

This Dissertation is brought to you for free and open access by the Student Dissertations, Theses and Papers at DigitalCommons@PCOM. It has been accepted for inclusion in PCOM Psychology Dissertations by an authorized administrator of DigitalCommons@PCOM. For more information, please contact library@pcom.edu.
EXPLORING PERFECTIONISM AS A COGNITIVE VULNERABILITY TO PSYCHOLOGICAL DISTRESS: THE MEDIATING ROLE OF COGNITIVE DISTORTIONS

Jennifer Caso Tolliver

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Psychology

June 2016
PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE
DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by JENNIFER CASSO TOLLIVER on the 2nd day of May, 2014, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

Committee Members’ Signatures:

Elizabeth A Gosch, PhD, ABPP, Chairperson

Stephanie H Felgoise, PhD, ABPP

Stephanie E Yoder, PsyD

Robert A DiTomasso, PhD, ABPP, Chair, Department of Psychology
Acknowledgements

I would like to thank dissertation committee members, Dr. Elizabeth Gosch, committee chair, Dr. Stephanie Felgoise, and Dr. Stephanie Yoder, for their commitment to this project and for their support and encouragement along the way. Despite their busy schedules, they made numerous important contributions to my study, and their feedback enhanced the quality of the research. A truly exceptional role model and mentor, Dr. Gosch’s dedication, patience, guidance, and encouragement were vital in transforming my ideas into a viable research dissertation. Dr. Felgoise’s knowledge about research methodology was particularly helpful. Dr. Yoder’s insightful questions and comments helped me to refine the literature review and the study. This dissertation evolved into a research endeavor that facilitated significant personal and professional growth. Without the help of my committee, it would not have been possible. I am eternally grateful.

I would also like to recognize Dr. DiTomasso and Dr. Poteau for their help with the statistical analyses. Although they were not members of the dissertation committee, they were always willing to meet in order to discuss questions and ideas. Their guidance proved invaluable.

I would like to thank my husband, family, and friends for their unwavering support over the years. I am grateful to my husband, Matt, for his love and encouragement along the way. His patience, optimism, and continuous reassurance were instrumental to the success of this project. To my parents, thank you for believing in me and for your help in achieving this milestone. You are an inspiration, and without you, I
would not be where I am today. To my friends, I cannot thank you enough for your moral and emotional support over the years.

Finally, I would also like to thank my classmates and dear friends, especially Michael Unger, Tara Scirrotto Drames, and Beau Brendley. We were told that no one would ever understand the challenges we face and that repeatedly proved true. We shared endless jokes and laughter during the long hours spent at Evans lab and many trips to Starbucks. These are among my fondest memories.
Abstract

In this study, perfectionism was examined as a potential disposition for psychological distress, and cognitive distortions were evaluated as a mediator. Three hundred fifty-two graduate students from the Philadelphia College of Osteopathic Medicine were recruited to participate in the study during the 2015 summer and fall terms, of which a total of 147 completed the surveys on both occasions. Using a two-wave longitudinal design, we assessed perfectionism, cognitive distortions, stressors, and symptoms of psychological distress using the following self-report measures: the Clinical Perfectionism Questionnaire, the Cognitive Distortions Scale, the Life Experiences Survey, and the Brief Symptom Inventory-18. Findings revealed that perfectionism was moderately stable over time and predicted psychological distress at Time 2; moreover, the relationship was mediated by cognitive distortions. Significant differences emerged between participants reporting low, average, and high levels of perfectionism. Taken together, this study expanded upon existing literature by further clarifying the construct of perfectionism, and it also contributed to empirical support for the cognitive model.

*Keywords:* cognitive vulnerability, diathesis-stress, perfectionism, cognitive distortions
Table of Contents

List of Figures .............................................................................................................. viii
List of Tables ................................................................................................................ ix
Chapter 1: Introduction ................................................................................................. 1
Statement of the Problem ............................................................................................. 1
Background and Significance of Perfectionism .......................................................... 5
Theoretical Framework ................................................................................................. 13
Cognitive Vulnerability Stress-Interaction Model of Perfectionism .......................... 20
Review of Empirical Evidence .................................................................................... 50
Purpose of the Study ................................................................................................... 59
Chapter 2: Hypotheses ................................................................................................. 61
Hypothesis 1 .................................................................................................................. 61
Hypothesis 2 .................................................................................................................. 61
Hypothesis 3 .................................................................................................................. 62
Chapter 3: Methodology ............................................................................................... 63
Design .......................................................................................................................... 63
Participants .................................................................................................................... 64
Recruitment ................................................................................................................... 66
Measures ....................................................................................................................... 66
Procedures ................................................................................................................... 72
Chapter 4: Results ........................................................................................................ 77
Preliminary Analyses and Descriptive Statistics ......................................................... 77
Hypothesis 1 .............................................................................................................. 82
Hypothesis 2 .............................................................................................................. 83
Hypothesis 3 .............................................................................................................. 87
Posthoc Analysis ..................................................................................................... 89
Chapter 5: Discussion .............................................................................................. 96
Perfectionism as a Vulnerability to Psychological Distress ........................................ 96
Cognitive Distortions as a Mediator ......................................................................... 103
General Discussion .................................................................................................. 104
Limitations of the Current Study ............................................................................ 108
Implications and Clinical Relevance ....................................................................... 110
Implications Related to Diversity and/or Advocacy ................................................ 111
Suggestions for Future Research ........................................................................... 113
References .............................................................................................................. 116
List of Figures

Figure 1. The mediating role of cognitive distortions.......................................................... 88

Figure 2. Between-groups comparison of scores on dependent measures at Time 1 and Time 2 .......................................................................................................................... 91
List of Tables

Table 1 Demographic Characteristics of Sample............................................................ 78
Table 2 Bootstrapped Bivariate Correlations and Descriptive Statistics for Time 1 and
Time 2 ................................................................................................................................ 80
Table 3 Independent Samples Test: Comparison of Mean Scores on the CPQ at Time 1
and Time 2 ............................................................................................................................ 82
Table 4 Hierarchical Multiple Regression Analyses Predicting Psychological Distress
from Perfectionism, Stress, and Interaction........................................................................ 86
Table 5 Descriptive Statistics Based on Level of Perfectionism........................................ 90
Table 6 Descriptive Statistics Sorted by Scores on the CPQ................................................ 91
Table 7 MANOVA – Between-Group and Within-Group Differences............................... 92
Table 8 Mean Differences on Dependent Measures .......................................................... 95
Chapter 1: Introduction

Statement of the Problem

Perfectionism has been implicated in the development and maintenance of a wide variety of mental disorders, to the extent that it is conceptualized as a transdiagnostic phenomenon (Egan, Wade, & Shafran, 2011). For example, elevated levels of perfectionism have been found among individuals suffering from general symptoms of psychological distress, anxiety disorders, depression, and eating disorders (e.g., Egan et al., 2011; Harris, Pepper, & Maack, 2008; Kawamura, Hunt, Frost, & DiBartolo, 2001; Rice & Aldea, 2006; Wimberly & Stasio, 2013). Additional research has identified perfectionism as a mechanism underlying somatic disorders (e.g., Flett, Molnar, Nepon, & Hewitt, 2012), insomnia (e.g., Jansson-Frojmark & Linton, 2007), and chronic fatigue in the presence of certain stressors (e.g., Magnusson, Nias, & White, 1996). A number of studies confirm the potential for deleterious effects of perfectionism on life satisfaction (e.g., Ashby, Noble, & Gnilka, 2010; Hill, Huelsman, & Araujo, 2010), negative affect (e.g., Besser, Flett, & Hewitt, 2004; Flett, Hewitt, Endler, & Tassone, 1995), hopelessness and suicidal ideation (e.g., Hamilton & Schweitzer, 2000; O’Connor & O’Connor, 2003; Shafran & Mansell, 2001), and burnout (e.g., D’Souza, Egan, & Rees, 2011). Longitudinal studies demonstrated that perfectionism prospectively predicted increased symptoms of depression (e.g., Enns, Cox, Sareen, & Freeman, 2001) and suicidal ideation after six months (Beevers & Miller, 2004). Finally, perfectionism has been identified as a significant barrier in treatment, as well as an important predictor in
PERFECTIONISM

Treatment outcome overall (e.g., Blatt & Zuroff, 2002; Hawley, Ho, Zuroff, & Blatt, 2006).

Studies also suggest that perfectionism is moderately stable over time. For example, perfectionism, as measured by scores on personal standards and evaluative concerns factor scales, were unchanged across six weeks in a sample of 113 college students (Wimberly & Stasio, 2013). Using the Almost Perfect Scale – Revised (APS-R; Slaney, Rice, Mobley, Trippi, & Ashby, 2001), a dimensional measurement of perfectionism, all three dimensions of perfectionism showed greater absolute and relative stability compared to measures of depression (Rice & Aldea, 2006). In a path analysis, Chang and Sanna (2012) concluded that the influence of perfectionism was highly stable during adulthood and predictive of greater experiences of stress and psychological distress, as well as of less life satisfaction. Finally, levels of perfectionism were elevated in graduate students with histories of chronic depression although perfectionism failed to predict future episodes; however, authors noted the findings might be the result of the conservative statistical analysis used, in which a large portion of variance was removed (Mongrain & Blackburn, 2006).

The abundance of research linking perfectionism to various forms of psychological distress highlights the importance of its study; however, the nature of the construct itself remains unclear for a number of reasons, thereby making difficult an understanding of the way it operates (e.g., Shafran, Cooper, & Fairburn, 2002; Stairs, Smith, Zapolski, Combs, & Settles, 2012). Nonetheless, the increasingly substantial body of literature finding that perfectionism not only predicts a number of psychological issues
but also persistently impacts well-being suggests that it may act as a predisposing variable for psychological distress.

This study investigated this possibility by conceptualizing perfectionism according to a specific cognitive paradigm that is derived from diathesis-stress models. The cognitive vulnerability stress-interaction paradigm is an integrated cognitive theory that investigates factors contributing to the development, maintenance, and recurrence of psychological problems (Riskind & Alloy, 2006). This model postulates that certain cognitive structures (i.e., maladaptive schemas) increase one’s risk of experiencing psychological distress when faced with a relevant stressor; moreover, cognitive distortions mediate the relationship between the stressful event and psychological distress (Beck, 1967, as cited in Riskind & Alloy; Clark, Beck, & Brown, 1989). Since schemas containing perfectionistic beliefs have been identified across a wide range of mental disorders, one can plausibly theorize that they are a vulnerability factor for psychological distress (e.g., Brown & Beck, 2002; Egan et al., 2011; Shafran et al., 2002).

Furthermore, evidence supporting the mediating role of cognitive distortions (e.g., Abramowitz, Nelson, Rygwall, & Khandker, 2007) suggests that perfectionism could be related to distress through a cognitive pathway. However, the constructs discussed in cognitive literature are largely descriptive in nature (Ingram, 1984), which points to the importance of empirically evaluating the ways in which the mechanisms identified by Beck’s cognitive model operate. This paper evaluated how perfectionistic schemas function to distort experience by integrating information-processing principles.
PERFECTIONISM

The purpose of this paper is to discuss a study that investigated the following questions: Does perfectionism operate according to the cognitive vulnerability stress-interaction paradigm; that is, are perfectionistic schemas stable over time, and do they create vulnerability to develop psychological distress? Furthermore, do cognitive distortions mediate the relationship between perfectionism and psychological distress? The goal was to investigate perfectionism and cognitive processes in a sample of graduate students prior to and immediately following an academic stressor to determine if perfectionism is stable over time and operates as a preexisting vulnerability for psychological distress. It was hypothesized that students with perfectionism will develop greater distress as the result of an academic stressor and that cognitive distortions will mediate the relationship, which will provide support for the cognitive vulnerability stress-interaction model.

To support this study, relevant literature was reviewed to unpack perfectionism conceptually and empirically. To lay the foundation, the following section focuses on perfectionism and provides an overview of the theoretical framework that is referenced throughout this paper and in the study. Then, a model of perfectionism is presented based on the cognitive vulnerability stress-interaction framework, which includes an in-depth cognitive conceptualization. The purpose of the cognitive conceptualization is to highlight the interface between cognitive structure, content, and processes, as well as the stressors most likely to elicit psychological distress for graduate students with perfectionism. In addition, it is intended to put into context how perfectionism develops and the ways in which it fits within the cognitive vulnerability stress-interaction
framework as a diathesis. Linking these elements together also illustrates the role of cognitive distortions in the development of psychological distress. This paper will then critically review a number of studies linking perfectionism to distress, as well as to cognitive mediation. In Chapter 3, a study is introduced that investigated the viability of a cognitive vulnerability stress-interaction model of perfectionism and the role of cognitive distortions as a mediator between perfectionism and psychological distress.

**Background and Significance of Perfectionism**

This paper sought to provide a clear definition and operationalization of perfectionism, as well as to reconceptualize it as a predisposing, or vulnerability, factor for psychological distress within the context of Beck’s cognitive theory. Although numerous different definitions and conceptualizations are discussed in the literature (e.g., Burns, 1980; Frost & Marten, 1990; Hewitt & Flett, 1991; Slade & Owens, 1998; Slaney, Ashby, & Trippi, 1995), the definition of perfectionism referenced in this paper is based on the construct of clinical perfectionism developed by Shafran et al. (2002). Clinical perfectionism is defined as “the overdependence of self-evaluation on the determined pursuit of personally demanding, self-imposed standards in at least one highly salient domain, despite adverse consequences” (Shafran et al., 2002, p. 778). The core component of clinical perfectionism is the negative impact of mistakes on self-evaluation, which distinguishes the combination of self-criticism and high standards from healthy, positive striving (Shafran et al., 2002). It is intended to describe only a specified clinical construct rather than a multidimensional personality trait; for this reason, Shafran et al. (2002) emphasize its unidimensionality and pathological components.
For the sake of clarity and consistency, the terms *perfectionism* and *healthy striving* will be distinguished throughout this paper. Clinical perfectionism is similar to maladaptive perfectionism when the measurement includes high standards (e.g., Lundh, Saboonchi, & Wangby, 2008), negative perfectionism (e.g., Slaney et al., 1995), and neurotic perfectionism (e.g., Hamachek, 1978 as cited in Hanchon, 2010). High standards will be referred to as either healthy aspiration or healthy striving, which is operationalized by the setting of high personal standards and ability to tolerate falling short of meeting them (e.g., Lundh, 2004). Having high standards is analogous to “normal” perfectionism (e.g., Hamachek as cited in Hanchon, 2010)), positive perfectionism (e.g., Slaney et al., 1995), and adaptive perfectionism (Frost & Marten, 1990) but will not be equated with or referred to as perfectionism.

Shafran et al.’s (2002) model of clinical perfectionism is based on the cognitive model and focuses heavily on its cognitive and behavioral components, which can facilitate predictions about how it relates to psychological distress, as well as generate research and treatment programs. Clinical perfectionism has been primarily investigated within clinical samples with existing Axis I disorders and consistently demonstrated predictive validity and stability (e.g., Glover, Brown, Fairburn, & Shafran, 2007; Riley, Lee, Cooper, Fairburn, & Shafran, 2007; Riley & Shafran, 2005; Steele, O’Shea, Murdock, & Wade, 2011). Although Egan, Wade, Shafran, and Antony (2014) briefly highlighted shared connections between perfectionism and obsessive-compulsive personality disorder, clinical perfectionism has not yet been explored in personality disorders. Similarly, as a new, evolving construct, clinical perfectionism has yet to be
investigated in nonclinical populations as a predisposing variable to developing psychological distress.

**Developmental antecedents.** In order to conceptualize perfectionism as a cognitive vulnerability, one must consider its developmental antecedents. Specifically, in thinking about the cognitive model and the influence of early learning in shaping schemas, the development of perfectionism appears to result from both biological predispositions and learning through interactions with caregivers.

Such variables as temperament, frustration tolerance, and behavioral orientation play a vital role in shaping personality organization by providing parameters for behavior and influence over perception (Gomez & Gomez, 2002; Shadel, 2004). With that in mind, perfectionistic beliefs develop, in part, from a pervasive and dispositional sense of insecurity and low tolerance for negative emotions (e.g., Dunkley, Blankstein, & Berg, 2012). Evidence suggests that perfectionism is associated with avoidant and anxious attachment styles, which are characterized by negative beliefs about oneself and others, respectively (Ulu & Tezer, 2010). The association between perfectionism and personality traits (i.e., neuroticism and dispositional negative affect) suggests that individuals are born with an increased sensitivity to anxiety and depression (e.g., Clark, Lelchook, & Taylor, 2010; Ulu & Tezer, 2010). As a result, these individuals have a lower threshold for frustration and greater difficulty self-regulating under conditions of stress (e.g., Dunkley et al., 2012). Supporting these assumptions, studies have found that perfectionists experience an increased propensity to experience anger, frustration, and
Sensitivity to the environment and stress are believed to influence one’s susceptibility to anxiety and negative affect; such sensitivity is regulated by approach or avoidance orientations (e.g., Carver & White, 1994; Gomez & Gomez, 2002). Traits related to behavior inhibition system (BIS) and behavior approach system (BAS) guide motivation behaviors and predict processing of unpleasant and pleasant emotional cues, as well as facilitate cognitive elaboration and memory retrieval for unpleasant or pleasant material, respectively (Gomez & Gomez, 2002). BIS activation reflects anticipatory stress and anxiety created by a bias toward negative or threatening information (Gomez & Gomez, 2002). In perfectionists, high BIS scores are believed to reflect high standards and patterns of avoidance in response to the threat of failure, which lead to greater negative affect and emotionality in response to stressors (e.g., Pickett, Lodis, Parkhill, & Orcutt, 2012; Randles, Flett, Nash, McGregor, & Hewitt, 2010). Taken together, this body of research suggests that perfectionistic beliefs develop through a heightened sensitivity to certain negative events, thereby creating vulnerability to the effect of negative events on mood (Kopala-Sibley & Santor, 2009; Zuroff, Mongrain, & Santor, 2004).

Environmental transactions, such as parent-child interactions and conditioning, also appear to contribute to the development of perfectionism. Some evidence suggests that perfectionism is associated with highly controlling, directive, and critical parenting styles (e.g., McArdle, 2009). Psychological control, which refers to withdrawal of love
and induction of guilt in order to control a child’s behavior, leads to internalizing states, such as anxiety and depression (McArdle, 2009). The combination of high parental standards and psychological control teaches a child that acceptance depends on performance, which is shown to predict greater self-doubt (e.g., Frost, Marten, Lahart, & Rosenblate, 1990; McArdle, 2009). Some researchers did not find increased parental criticism but rather increased child reactivity when criticized by parents, implicating the role of perception in development of beliefs (e.g., Clark & Coker, 2009). Nonetheless, perceived or actual conditional acceptance from caregivers in response to performance appears to lead to contingent self-worth based on the ability to meet standards (Burns, 1980).

The experience of intense negative affect (e.g., anxiety, shame) sets the stage for conditioned learning responses: The child learns to strive for perfectionism in order to avoid the upset that follows failure (Burns, 1980; Speirs-Neumeister, Williams, & Cross, 2004). The effect of conditioning is evident in findings that fear of experiencing shame and embarrassment fully mediated perfectionistic concern over mistakes and negative affect and also statistically predicted increased experiences of internalized shame and later episodes of depression (e.g., Ashby, Rice, & Martin, 2006; Sagar & Stoeber, 2009). Difficulty tolerating negative emotions leads to increased anxiety elicited by fear of failure (Harrington, 2005). These early events create a sensitization effect for future events that are similar in nature (Beck, 1976 as cited in Scher, Ingram, & Segal, 2005). Taken together, whether acquired through early learning experiences or originating from
inborn characteristics, these bodies of research suggest that perfectionism is endogenous (Ingram & Price, 2010).

**Emotional sequelae associated with perfectionism.** Perfectionism is associated with a range of emotional and behavioral reactions that appear to contribute to the development and maintenance of such disturbances as depressed mood, increased suicidal ideation, and anxiety (e.g., Egan et al., 2011; O’Connor, 2007). Consistent with Shafran et al.’s (2002) conceptualization, evidence suggests that individuals with perfectionism tend to set and rigidly adhere to excessively high personal standards, then react to perceptions of failure to meet those standards with self-criticism (e.g., Dunkley & Blackstein, 2000). Perceptions of failure and self-criticism often lead to experiences of depression, hopelessness, and rumination in both clinical and nonclinical populations (e.g., Clara, Enns, & Cox, 2007; Lynd-Stevenson & Hearne, 1999; McGrath et al., 2012; O’Connor, 2007; Zuroff et al., 2004). Individuals with perfectionism also appear to react emotionally and behaviorally to situations with the potential for failure. Studies report that these reactions often involve increased and even pathological worrying, as well as anticipatory anxiety (e.g., Handley, Egan, Hane, & Rees, 2014; Stoeber & Joorman, 2001). One notable reaction shared among individuals with perfectionism is the tendency to continually strive and maintain high standards despite negative consequences; this reaction appears to result from beliefs that negative consequences reflect one’s efforts (e.g., Riley & Shafran, 2005; Shafran et al., 2002).

Undergraduate and graduate student populations represent one group sampled frequently in the literature since the stressors of an academic setting make it an ideal
environment to study perfectionism. Elevated levels of psychological distress and impairment observed in graduate students with perfectionism appear to follow a pattern similar to that observed in the general population (i.e., predictive of distress, stable over time); the difference is that the distress appears to emerge in response to academic stressors. For example, students who placed greater emphasis on grade point average (GPA) reported increased academic-related stress (Myers et al., 2012). Moreover, perfectionism predicted hopelessness, suicidal ideation, and greater depressive symptoms in undergraduate students (e.g., Enns et al., 2001; Hamilton & Schweitzer, 2000; Henning, Ey, & Shaw, 1998). Perfectionists reported experiencing elevated levels of anxiety, confusion, and emotional exhaustion before tasks even begin (Hamachek, 1978 as cited in Frost & Marten, 1990). Further, perfectionism increased anticipatory stress, resulting in an emotional reaction as though the failure already had occurred (Hewitt & Flett, 2002). Persistent fears of failure and self-doubt regarding the perfectionist’s ability to master material produced higher levels of test anxiety and more severe physiological symptoms, such as heart racing, sweaty palms, and muscle tension, compared to healthy strivers (Eum & Rice, 2011; Flett et al., 1995; Gnilka, Ashby, & Noble, 2012). Finally, perfectionists responded to performance tasks with greater negative affect and increased tension regardless of task difficulty, a response that significantly differed from that of healthy strivers, who displayed slight increases in tension (e.g., Altstotter-Gleich, Gerstenberg, & Brand, 2012; Frost & Marten, 1990).

Following academic stressors, students reporting higher levels of perfectionism displayed significantly increased psychological distress and less well-being compared to
PERFECTIONISM

healthy strivers (e.g., Flett & Hewitt, 2002; Geranmayepour & Besharat, 2010). Furthermore, some studies reported that perfectionism was also the best predictor of depression and emotional distress toward the end of a semester, despite similar performance compared to that of healthy strivers (e.g., Rice & Dellwo, 2001). Perfectionism was associated with reduced academic efficacy and significantly less self-confidence compared to those of healthy strivers (Hanchon, 2010). Evaluative situations, such as public speaking, exams, and writing tasks, elicited greater negative affect in students with high perfectionism (DiBartolo, Frost, Dixson, & Almodovar, 2001; Dunkley, Zuroff, Blankstein, 2006; Frost & Marten, 1990). Highlighting perfectionism’s latency, perfectionists reported feeling more relaxed and positive during a holiday break without exposure to achievement stressors compared to their healthy striving counterparts; however, their well-being deteriorated rapidly upon return to the academic environment (Flaxman, Menard, Bond, & Kinman, 2012).

Taken together, perfectionism was the shared connection among students who experienced a greater degree of psychological distress related to academic performance compared to students who did not. Additionally, such findings as the persistent negative influence of perfectionism on decreased satisfaction with performance regardless of actual outcome (e.g., Alstotter-Gleich et al., 2012; Besser, Flett, Hewitt, & Guez, 2008; Enns et al., 2001) strongly suggest the involvement of cognitive processes. Thus, in order to better understand the relationship between perfectionism and psychological distress and to inform prevention and intervention efforts, cognitive and behavioral processes that contribute to the onset and maintenance of perfectionism must be identified.
Theoretical Framework

To begin investigating cognitive and behavioral mechanisms, this paper developed a model of perfectionism based on the cognitive vulnerability stress-interaction paradigm, which was derived from a diathesis-stress framework and elaborated on the existing paradigm by integrating information-processing principles. The purpose of the following section is to provide a general overview of the models in order to create the foundation for the model of perfectionism presented by the investigator.

Diathesis-stress models were developed in order to attempt to understand why some individuals develop psychological disorders and when problems are most likely to emerge (Ingram & Price, 2010). More specifically, these models focus on the combination of antecedent factors (i.e., predispositions) and stress to gain insight into the processes leading to a given psychological disorder (Ingram & Luxton, 2005). Originally, these models investigated genetic and biological factors that contributed to the development of schizophrenia but have been expanded in recent years to include cognitive factors (Ingram & Price, 2010). In previous literature, the terms diathesis and vulnerability referred to a single concept, namely a cognitive, or psychological, predisposing factor to develop psychological distress (Ingram & Luxton, 2005).

Previous and current diatheses models suggest that the variables contributed to psychological distress in specific ways. Regardless of the particular type of factor, diathesis models share the postulation that certain preexisting variables predispose an individual to develop psychological distress (Ingram & Price, 2010). The implicit assumption is that diatheses act as a causal mechanism, which distinguishes them from
correlation-based risk factors (Ingram & Luxton, 2005). To separate diatheses from other variables, these models outline certain core features. First, the diathesis, or vulnerability, must demonstrate predictive validity (Riskind & Alloy, 2006). Demonstrating predictive validity would establish the vulnerability as an endogenous, or internal, source contributing to a disorder, as opposed to an external source, such as a specific stressor (Ingram & Luxton, 2005). In research, one would expect that high levels of a given vulnerability prospectively predict an outcome assessed at a later time. Second, vulnerability factors must be stable over time (Ingram & Luxton, 2005); thus, scores yielded from a measure of a vulnerability are not expected to fluctuate significantly when assessed at a later date, regardless of psychological state. Temporal stability distinguishes the vulnerability as its own entity apart from the symptoms of psychological distress (Riskind & Alloy, 2006). Finally, vulnerability factors are believed to remain latent, or inconsequential, until activated by stress (Ingram & Luxton, 2005; Ingram & Price, 2010). Although the vulnerability may be latent, it temporally precedes the onset of a psychological disorder, which is important to the establishment of causality (Riskind & Alloy, 2006).

The second focus of diathesis-stress models is the role of stress, the complexity of which extends beyond the scope of this review. Broadly, stress is defined as an external event that “disrupts those mechanisms that maintain the stability of individuals’ physiology, emotion, and cognition” (Ingram & Luxton, 2005, p. 33). Stress varies greatly in terms of magnitude (major vs. minor events), length of exposure (acute vs. chronic), and qualitative impact (desirable vs. undesirable events; Monroe & Simmons,
Understanding how stress can vary is important when investigating why a single stressful event does not unequivocally produce a psychological disorder (Monroe & Simons, 1991), which points to the contribution of a diathesis.

Diathesis-stress models provide a unified theory that connects a diathesis and stressful event and attempt to predict the nature of that relationship. The critical component is the assumption that individuals who develop psychological distress differ premorbidly from those who do not and that stressful events activate the diathesis, or vulnerability, to transform the predisposition into an episode of psychological distress (Monroe & Simmons, 1991). Equally as important to the diathesis framework, stressful events are believed to specify the conditions under which a vulnerable individual will develop distress (Riskind & Alloy, 2006). Numerous models exist to explain how diatheses are activated, with the explicit goal to predict when an episode of distress is most likely to occur based on the combined influence (i.e., interaction) of the diathesis and type of stressor (Ingram & Luxton, 2005). Many researchers use an ipsative model, which identifies risk for distress based on high or low levels of a given vulnerability and high or low levels of stress (e.g., Abramson et al., 1998; Alloy & Abramson, 2005; Ingram & Luxton, 2005). In the ipsative model, an inverse relationship exists in which the greater the diathesis or stressor, the less of the other factor is required to activate the diathesis and elicit psychological distress (Ingram & Luxton, 2005). Consistent with previous literature, this study is also based on an ipsative framework.

**Beck’s model of cognitive vulnerability.** The concept of cognitive vulnerability is based on both the diathesis-stress model and Beck’s cognitive model. Consistent with a
diathesis-stress framework, the cognitive vulnerability stress-interaction paradigm suggests that cognitive variables (i.e., belief systems) act as predisposing factors that function in a similar fashion to genetic or biological predispositions. Cognitive diatheses must meet similar requirements to become established as a vulnerability, namely they must demonstrate predictive validity, temporal stability, and latency (Ingram & Price, 2010; Riskind & Alloy, 2006). In addition to these criteria, vulnerability factors must predict certain disorders and not others (i.e., demonstrate discriminative validity). These guidelines are helpful in understanding the ways in which a cognitive vulnerability is expected to function both statistically and theoretically.

More descriptive in nature, Beck’s cognitive model presumes that two broad types of cognition impact emotional states. First, cognitive structures (i.e., schemas) function as a cognitive diathesis that predisposes an individual to develop psychological distress under certain circumstances. Cognitive vulnerabilities are proposed to be rigid, trait-like beliefs that develop through early person-environment transactions and become deeply embedded into personality (Clark & Beck, 2010). By organizing experiences and expectations, the learning process guided by schemas is integral in shaping one’s perceptions and becomes incorporated into personality style, which offers insight into the impact of experience on psychological functioning (Beck, Freeman, & Davis, 2004a; Dweck, 2008; Nuttin, 1955; Teglasi, Simcox, & Na-Young, 2007).

Schemas direct self-evaluation through the identification, interpretation, and understanding of experience through various levels of hierarchically organized cognition (i.e., the cognitive set) related to a central theme (Beck, Emery, & Greenberg, 2005;
Covin, Dozois, Ogniewicz, & Seeds, 2011; Needleman, 1999; Steele et al., 2011; Teglasi et al., 2007). The deepest levels of cognition are core and intermediate beliefs, which comprise the content within the schematic structure (Beck et al., 2005). Core and intermediate beliefs are unconditional and longstanding and may be strengthened over time through reinforcing experiences (Covin et al., 2011). Schemas containing negative beliefs create a frame of reference that has implications for the second type of cognition, namely information processing (Covin et al., 2011).

The most surface level cognition is cognitive processing, also referred to as automatic thoughts or information processing, which describes the flow of information through schematic structures (Beck et al. 2005; Needleman, 1999). Beck’s model assumes that underlying schemas guide the entire range of information-processing activities, specifically the ways in which information is attended to, encoded, and retrieved from memory (Beck et al., 2005). Thus, automatic thoughts occur spontaneously in response to specific situations and reflect the ways in which information is filtered by existing schemas (Beck et al., 2005). By simplifying and summarizing important information, the cognitive set helps to reduce the cognitive load on attentional resources and to coordinate responses efficiently, as well as promotes a sense of predictability and cohesion (Needleman, 1999). In sum, data derived from the environment are interpreted hierarchically through underlying schemas and processes to create a cognitive representation that provides the basis for emotional, cognitive, and behavioral reactions (Calvetea, Oreua, & Hankin, 2013; Kopala-Sibley, & Santor, 2009).
Schemas have the potential to lead to psychological distress when they are activated, if they are maladaptive. The relationship between the schema and the stressor specifies the conditions under which activation is most likely to occur (Riskind & Alloy, 2006). To become activated, there must be a stressful event that is congruent with the schema, and the schema must surpass its threshold in order for it to exert its influence on information processing (Ingram & Price, 2010); for example, an individual with an abandonment schema is theoretically more sensitive to stressors involving interpersonal relationships. Still, even under the supposed conditions, the schema may not reach its threshold since its activation exists on a continuum. On one end, it may be completely dormant and, therefore, exert no influence on cognitive processing; on the other end, it may be hypervalent and dominate the system (Ingram & Price, 2010). The probability of activating a schema depends on how close it is to its threshold (Ingram & Luxton, 2005). Triggering events refer to events that push a schema to reach its threshold for activation (Ingram & Luxton, 2005). Events may act as a primer by bringing a schema closer to activation, and once primed, it may be activated by a minor event (Ingram & Luxton, 2005). Thus, if activated in a given situation, relevant schemas select and extract important information from the environment and from memory in order to coordinate a response (Beck et al., 2005).

Schemas become a vulnerability to develop psychological distress when they are “poorly grounded in social reality or otherwise dysfunctional” (Riskind & Alloy, 2006, p. 708). When schemas are maladaptive, they act as a filter that biases incoming information in favor of the schema; as a result, contradictory information is overlooked,
ultimately leading to distortions in the ways in which events are processed and interpreted (Needleman, 1999). Therefore, by guiding attention in a systematically biased, rigid, and arbitrary manner, maladaptive schemas create a vulnerability to distress by distorting information and further compromising subsequent reasoning, problem solving, and interpretations (Brown & Beck, 2002; Riskind & Alloy, 2006). According to Beck’s cognitive model, this distorted cognitive processing (i.e., cognitive distortions) is the crucial element of distressed states (Beck et al., 2005). Stated differently, cognitive distortions potentially explain how the vulnerability leads to outcome (i.e., psychological distress; Riskind & Alloy, 2006).

Although Beck’s model is largely descriptive, neurological imaging studies provide indirect support for the role of cognition by illuminating the mechanisms of change during treatment. Studies confirm cognitive change mediates recovery and reduces the likelihood of relapse through improvements in regulation over top-down processes that encode and retrieve negative memories and produce rumination (Casey, Newcombe, & Oei, 2005; Clark & Beck, 2010; Garrett, Ingram, Rand, & Sawalani, 2007). Specifically, during depressive and anxious episodes, bottom-up processes (i.e., conceptually considered negative schemas) involve activation of the amygdalohippocampal region and simultaneous inhibition of top-down processing in areas of the prefrontal cortex that facilitate cognitive reflection (Clark & Beck, 2010). Studies revealed that symptom improvement following cognitive restructuring corresponded with reduced activity in brain regions involved with bottom-up emotional processing and improved activity in regions associated with cognitive control of emotion.
(Clark & Beck, 2010). If cognitions mediate outcome, cognitions likely mediate onset as well. The fact that cognitive-behavioral therapy (CBT) has been used and found to be helpful indirectly suggests the importance of cognitive distortions and highlights the need to understand more about them it.

**Cognitive Vulnerability Stress-Interaction Model of Perfectionism**

The model of perfectionism used in this study is based on the cognitive vulnerability stress-interaction paradigm; the goal is to provide a comprehensive analysis of the way perfectionism leads to psychological distress. This model identifies a maladaptive system (i.e., perfectionistic schemas) for evaluating self-worth that creates a heightened sensitivity to achievement, performance, or evaluative stressors (Beck, Rush, Shaw, & Emery, 1979 as cited in Kwon & Oei, 1992; Frost & Marten, 1990; Hewitt & Flett, 1991; Scher et al., 2005). It was proposed in this study that the perfectionistic schema would interact with achievement-related events to distort internal and external information and that through this process thinking would become impaired (Beck et al., 2005; Beck, 1967 as cited in Garrett et al., 2007; Beck, Rush, Shaw, & Emery, 1979 as cited in Kwon & Oei, 1992; Riskind & Alloy, 2006). The end result would be an experience of increased psychological distress. To support this model, the following sections outline the cognitive and behavioral processes responsible for the onset and maintenance of perfectionism.
**Perfectionistic schema and beliefs.** Consistent with the concept of a cognitive diathesis, many researchers agree that perfectionism is best characterized as a personality disposition (e.g., Macedo, Marques, & Telma Pereira, 2014). In the context of a cognitive vulnerability stress-interaction model of perfectionism, the vulnerability is defined as a cognitive schema containing pervasive themes of worthlessness and/or inadequacy (Beck et al., 2005). Perfectionistic schemas create a frame of reference in which a significant discrepancy exists between ability, performance, and standards and that provides the basis for stringent self-evaluation (Frost & Marten, 1990). Responsible for structuring internal and external experiences, these schemas become overactive when threats of failure are present (Beck et al., 2005). Incoming data are then processed according to one’s deficits rather than strengths, causing self-confidence to diminish (Beck et al., 2005). Consequently, despite persistent efforts to meet personal standards in an attempt to reduce the discrepancy, perfectionists lack confidence in their ability to succeed (Eum & Rice, 2011; Rice, Bair, Castro, Cohen, & Hood, 2003).

Schematic contents, or core beliefs, refer to stable mental representations of self, others, and the future (Clark & Beck, 2010; Needleman, 1999). Rooted in perfectionistic schema, perfectionistic core beliefs in high-achieving individuals often involve feeling unintelligent, causing them to feel like imposters among other high-achieving persons (Clance & Imes, 1978). Furthermore, core beliefs also include perceptions that one’s inadequacies or worthlessness will prevent achievement of personally important goals and become evident during performance tasks (Beck et al., 2005; Shafran et al., 2002). Some researchers suggest that perfectionistic beliefs are best captured by the concept of
PERFECTIONISM

conditional acceptance; in other words, one must be perfect to gain acceptance from others or for self-acceptance (e.g., Campbell & DiPaula, 2002). Their negative self-perception fuels beliefs that their skills are overestimated by others and, ultimately, that they will fail (Thompson, Foreman, & Martin, 2000). For example, high-achieving college students rated significantly greater unfavorable self-views and reported believing that others view them unfavorably as well compared to average-achieving students (Leary, Patton, Orlando, & Wagoner Funk, 2000).

The beliefs and perceptions associated with perfectionism have negative consequences and appear to play a significant role in the generation, perpetuation, and anticipation of stress (Ashby et al., 2010). For example, the intense fear of failure that characterizes perfectionism reveals assumptions about its consequences. Failure has significant implications for self-evaluation as evidenced by such statements as, “If I make a mistake, then I am a total failure” (Frost & Marten, 1990; Shafran et al., 2002). In essence, failure means that the core beliefs are true (Frost & Marten, 1990). As a result, perfectionists assign equal importance to every performance task, reflecting beliefs that every task carries with it a threat of failure; however, this is unsurprising considering that performance situations threaten their sense of self-worth (Frost & Marten, 1990).

Additionally, individuals with perfectionism tend to endorse rigid beliefs about their performance. Cognitive rigidity manifests through a dichotomous view of success versus failure (i.e., either standards are met or they are not), as well as strict adherence to standards (e.g., Egan, Piek, Rees, Hagger, & Dyck, 2013; Shafran et al., 2002; Tangney, 2002). Underlying rigidity is the assumption that less-than-perfect performance means
failure (Frost & Marten, 1990) and that full effort is required to succeed (Rice et al., 2003). However, their efforts are never good enough to warrant satisfaction, and successes have little impact because the vulnerable individual strongly believes that future failures are still highly probable and will have far more drastic consequences (Beck et al., 2005; Frost & Marten, 1990). Unfortunately, rigid standards impair one’s ability to generate alternatives, such as lowering standards and switching attention, which leads to rumination (Davis & Nolen-Hoeksema, 2000). For example, perfectionists in one study were unwilling to reduce or change their standards when performance was unsatisfactory (Besser et al., 2004). Taken together, impaired self-regulation evident in individuals with perfectionism leads to perceptions of more stress and, in conjunction with rigid thinking patterns, creates additional adjustment difficulties (Rice, Vergara, & Aldea, 2006).

Perfectionism also appears maintained by an attitude that it is actually helpful in attaining goals and that less effort would result in failure. Individuals with perfectionism perceive it as part of themselves, and their perfectionistic attitudes and behaviors are viewed positively as evidence for high aspirations and ability to work hard (e.g., Egan et al., 2013; Rice et al., 2003; Shafran & Mansell, 2001). Students with perfectionism stated that they would not change their perfectionism since it motivates them to achieve high goals despite the aversive experience of increased stress and pressure it creates (Egan et al., 2013). Furthermore, perfectionism reflects discipline and may be entrenched with negative beliefs about indulgence (Shafran et al., 2002). Such consequences as limited time spent engaging in other activities and lost social connections may be construed as
evidence of working hard (Shafran et al., 2002). Finally, perfectionism appears maintained by beliefs that changing it would lead to catastrophic consequences; for example, perfectionistic students expressed fear that they would fail to achieve anything without it (Egan et al., 2013). Thus, despite negative consequences, individuals with perfectionism are more likely to opt not to change it (Egan et al., 2013).

**Cognitive processing in perfectionism.** A central point of focus in this paper is the role of cognitive processing in perfectionism, and it is argued that cognitive distortions mediate the relationship between perfectionism and psychological distress. This argument is based on evidence that individuals with perfectionism report experiencing greater cognitive distortions compared to those without perfectionism, including healthy strivers and nonperfectionists. This information is important in identifying the presence of a problem with thinking patterns, but again, it is primarily descriptive. Descriptive information, while important, is potentially insufficient when attempting to account for these findings. Thus, following a brief overview of evidence, the purpose of the following section is to evaluate the sequence and execution of cognitive events that occurs before, during, and after stressful situations, particularly the nature of various information-processing biases and how they translate into cognitive distortions commonly discussed in clinical practice.

Consistent with the cognitive vulnerability stress-interaction framework, numerous studies identified a relationship between increased cognitive distortions and perfectionism, as well as a shared association with greater psychological distress. For example, compared to healthy strivers and nonperfectionists, perfectionists reported
significantly more depressive cognitive distortions, appearing to distort information in a depressive way, which reflected an increased propensity to interpret environmental and internal information in a manner consistent with feeling depressed (Rice et al., 2003). Perfectionistic subjects reported thinking more about mistakes and feeling significantly more bothered by them compared to nonperfectionists (Frost et al., 1997). Higher frequencies of cognitive distortions were related to perfectionism and also positively correlated with greater negative affect (e.g., Davis & Wosinski, 2012; Nyland, 2004). Perfectionistic and general negative automatic thoughts were both significantly associated with lower self-esteem and greater negative affect during and after performance situations (Besser, Flett, Guez et al., 2008). Furthermore, frequent perfectionistic automatic thoughts were significantly correlated with symptoms of both depression and anxiety (Flett, Hewitt, Whelan, & Martin, 2007). Using a multidimensional measure of cognitions that assesses positive, negative, and ambivalent perfectionistic automatic thoughts, Stoeber, Kobori, and Tanno (2010) found that negative automatic thoughts predicted variance above the variance explained by dispositional perfectionism. Finally, the interaction between negative cognitions and stressors predicted depressive symptoms after 5 days (Hilsman & Garber, 1995).

These findings can be understood within an information-processing context. Guided by existing perfectionistic schemas and underlying cognitive content, cognitive distortions (i.e., errors in thinking) reflect the way the flow of information is changed by perfectionistic schemas. Through this cognitive process, perfectionism and triggering events elicit psychological distress (Joiner, Metalsky, Lew, & Klocek, 1999). Often
expressed as negative automatic thoughts, cognitive distortions occur reflexively and often go unchecked, which permits the perfectionism vulnerability to exert continuous control over an individual’s experience (Beck et al., 2005; Needleman, 1999). Further, attending primarily to personal flaws, deficits, or weaknesses, as well as the inability of perfectionists to experience satisfaction, are some ways in which perfectionistic beliefs are maintained (Beck et al., 2005; Frost & Marten, 1990).

**Stage 1: Initial registration.** The first stage of information processing involves recognizing and orienting toward a stimulus and occurs automatically outside of conscious awareness (Beck & Clark, 1997). As stimuli are registered, or perceived, they are evaluated according to valence (i.e., positive or negative) and personal relevance and then assigned an information-processing priority (Beck & Clark, 1997). Although little cognitive processing occurs in this stage, biases toward personally relevant stimuli are based on existing schemas and can lead to increased attention paid to negative information (Beck & Clark, 1997). In perfectionism, biases toward personally relevant information, such as threats of failure and mistakes, appear primed by expectations of failure most often triggered by performance-related stressors (Beck et al., 2005).

**Stage 2: Schema activation.** Once a personally relevant stimulus is recognized, the perfectionistic schema dominates the system and triggers changes in the nature of information processing, thereby causing attention, memory, and interpretive biases (Beck & Clark, 1997; Clark & Beck, 2010; Garrett et al., 2007; Kendall, 1992; Matthews, 2009; Riskind & Alloy, 2006).
Attention bias. Attention bias refers to selectively attending to negative information or threat cues, as well as to impaired disengagement from such information (Beck et al., 2005). In perfectionism, attention bias can take the form of hypervigilance to potential errors. The meaning derived from the context (i.e., performance tasks) prompts increased monitoring of mistakes, or threats, as a means to cope (Matthews, 2009). Induced attention biases also influence the interpretation of subsequent cues, thereby creating vulnerability to stress (Mathews & MacLeod, 2005). Although these strategies are designed to restore control over outcomes and reduce performance-induced distress, they ultimately maintain perfectionism by preventing new learning associations; further, greater attentional focus on perceived deficits actually increases psychological distress (Shafran, Lee, & Fairburn, 2004). In clinical practice, this type of information bias is often referred to as selective abstraction, or mental filter.

Attention bias in perfectionism has been captured by neurological research. Neurological studies report enhanced error negativity generated in the anterior cingulate cortex, which acts as a filter and amplifier for emotional and self-referential information via neuroanatomical connections (Clark & Beck, 2010). Not surprisingly, perfectionism was associated with amplified awareness and evaluation of errors, greater self-doubt related to ability to complete the task, and selective attention for failure (Clark & Beck, 2010; Schrijvers, De Bruijin, Destoop, Hulstijn, & Sabbe, 2010). In addition, individuals with high concern over mistakes showed increased error orientation preceding feedback, reflecting anticipatory responses to potentially upsetting feedback (Tops, Koole, & Wijers, 2013). In the same study, high concern over mistakes was associated with greater
attention orienting to emotionally relevant stimuli, which suggested that anticipatory avoidance may reduce distress (Tops et al., 2013).

Individuals with perfectionism also appear to struggle more with shifting their attention from potential threats. Perfectionists responded to Stroop Color-Word tasks with impaired disengagement, more anxiety, increased negative affect, and greater concern over their performance compared to non-perfectionists (e.g., Thompson et al., 2000). Subjects with high socially prescribed perfectionism, or great concern about meeting the expectations of others, showed significantly higher levels of worry and physiological symptoms of anxiety in an anagram task designed to induce attention biases compared to subjects with low socially prescribed perfectionism (Flett et al., 1995). Finally, perfectionistic subjects took significantly more time than nonperfectionistic subjects to complete a precision task (Rheaume et al., 2000) and when copying complex information (Yiend, Savulich, Coughtrey, & Shafran, 2011), highlighting one way in which attentional biases in perfectionism interfere with performance. Taken together, enhanced engagement, as well as impaired disengagement from threatening stimuli, indicates that the subjects with perfectionism actively looked for potential threats and remained focused on them (Mathews & MacLeod, 2005). This evidence suggests that learning to more quickly attend to threat cues, such as errors, influences the way later tasks are processed and increases emotional reactivity. Thus, when perfectionistic standards are met successfully, hypervigilance to mistakes may be intermittently reinforced and can potentially indicate that the standards were not sufficiently demanding (Shafran et al., 2002).
Self-directed attention and self-criticism triggered in performance situations correspond with withdrawal of attention to positive cues, i.e., selective abstraction or mental filter (Beck et al., 2005). Selective abstraction refers to greater attention paid to perceived or actual errors more so than to those portions of performance that were error free (Shafran et al., 2002). This type of thinking error reflects tendencies to extract data consistent with perfectionistic beliefs, leading to confirmatory biases and ultimately to psychological distress (Beck et al., 2005). To illustrate, one student with perfectionism stated, “If I got a B, that would cancel out everything else I did well” (Speirs-Neumeister, 2004, p. 320). The inability of perfectionistic students to include positive aspects of their performance or to maintain a balanced perspective keeps them entrenched in their beliefs; in the previous example, the student who appraised a B grade as a failure walks a much tighter line than students who can tolerate less-than-perfect grades and is more likely to experience “failure.” In another example in which task difficulty and feedback were experimentally manipulated, perfectionistic subjects experienced increased negative affect and focus on errors despite positive feedback (Besser et al., 2004). This experiment highlights the effect of selective abstraction on mood: Focusing on errors leads to heightened negative mood for perfectionists.

Memory bias. Biased memory refers to recall of specific negative events and is a function of the vulnerability involving retrieval, implicit, and encoding processes (Beck et al., 2005; Mathews & MacLeod, 2005). Perfectionists do not fully encode actual feedback, which facilitates retrieval of negative memories and reflects expectations of failure (Beck et al., 2005). Furthermore, encoding information according to emotional
meaning enhances recall when the same emotion is triggered as a result of increased conceptual processing (Mathews & MacLeod, 2005). In the case of perfectionism, perceived failure to meet standards is personally salient, which increases the likelihood that such information would be selectively encoded, elaborated through rumination, and easily recalled. For example, students with high levels of perfection recalled instances of failure easily and attached great importance to those situations (Speirs-Neumeister, 2004). In clinical practice, memory biases are often expressed through overgeneralizations.

Despite their persistent efforts, perfectionists rarely experience a sense of satisfaction in their performance (Shafran et al., 2002), which is evidence that they selectively remember aspects of their performance that did not meet their standards. Chronic disappointment in performance results, in part, from an exclusive focus on failure to achieve an impossible standard or for the amount of effort required to reach the goal (Hewitt & Flett, 2002). Perfectionists may even raise their standard in the event that it is met (e.g., Kobori, Hayakawa, & Tanno, 2009; Shafran et al., 2002) or view their success as part of a routine expectation (Speirs-Neumeister, 2004). The underlying message is that their performance is never good enough and likely perpetuates negative mood states activated during performance situations (Enns et al., 2001; Eum & Rice, 2011).

Overgeneralization, or the thought that one negative event reflects a never-ending pattern of defeat (e.g., Burns, 1980), appears prompted by biases in memory. Beliefs that one is a fraud and/or incompetent lead to selective cognitive appraisals in which evidence
is integrated that confirms what the perfectionist already believes to be true (Beck et al., 2005). Overgeneralization of failure stems from self-criticism, in which one’s entire self-concept is threatened (Thompson et al., 2000), and perceived or actual errors are interpreted as signs of endless patterns of personal inadequacy (Beck et al., 2005). As a result, perfectionists feel increasingly emotionally vulnerable after a particular mistake (Beck et al., 2005).

Interpretive bias. Interpretive biases describe the way in which information from an event is organized to create a meaningful experience; these biases are influenced by context and reflect orientations toward specifically relevant information (Mathews & MacLeod, 2005). Anticipated outcomes are identified more readily, allowing interpretations to occur automatically and, often, to go unquestioned (Mathews & MacLeod, 2005). Not surprisingly, interpretive biases emerged for perfection-relevant information but not for emotionally ambiguous information (Yiend et al., 2011). As noted previously, perfectionistic individuals display increased error awareness by searching more for potential errors and continually doubting the quality of their performance; however, finding errors or focusing on problematic elements of their performance leads to confirmation bias and maintains the behaviors. In clinical practice, interpretive biases may manifest in cognitive distortions, such as catastrophizing and magnification/minimization.

Unfortunately, the anticipation of errors and less-than-perfect performance created by confirmatory negative interpretation biases may have a deleterious effect on mood. Indeed, evidence suggests that a central problem in perfectionism is the impact of
mistakes (Shafran et al., 2002). Importantly, perfectionists do not typically differ from healthy strivers on objective performance criteria, such as GPA, the actual number of errors, or the nature of the mistakes made during a task, but significant differences emerged in their interpretations (e.g., Frost et al., 1995; Frost et al., 1997; Grzegorek, Slaney, Franze, & Rice, 2004; Sevlever & Rice, 2010). Highlighting the difference in interpretation and perception between groups, individuals highly concerned with mistakes reported increased negative affect, lower self-confidence, stronger beliefs that they should have done better and that others would believe they were less intelligent, and more embarrassment about performance (Frost et al., 1995). Furthermore, positive feedback given to perfectionists had little impact on their performance self-evaluation; rather, they were more likely to emphasize the importance of performance when they made more mistakes (e.g., Besser et al., 2004). Finally, persistent disappointment in performance was linked to increased suicidal preoccupation (Adkins & Parker, 1996). The strong positive association found between perfectionism and emotional dysregulation reflects the tendency to magnify perceived failures and respond to them with increased negative affect (Aldea & Rice, 2006).

Catastrophizing, or significantly overestimating the consequences of a perceived mistake or failure (e.g., Shafran et al., 2002), appears to reflect interpretive biases and to perpetuate perfectionistic beliefs. First, the exaggerated interpretation leads to further arousal and psychological distress; specifically, thinking about the worst possible outcome makes the possibility of failing or being identified as a fraud more imminent and, ultimately, more salient (Beck et al., 2005). For example, although actual
PERFECTIONISM

performance did not differ, perfectionists rated the significance of performing well much higher, estimated a higher probability of failure and more catastrophic negative consequences (i.e., fear of judgment by others that they were not intelligent), evaluated their performance more critically, and reported feeling much more bothered by thoughts of their performance than nonperfectionists (e.g., DiBartolo et al., 2001; Frost & Marten, 1990; Frost et al., 1997). Furthermore, perfectionistic subjects believed their mistakes to be more morally wrong and believed them to cause more personal harm compared to subjects low in perfectionism (Frost et al., 1997). Students with perfectionism reported beliefs that failures would ruin their future opportunities, causing them to ruminate excessively (Speirs-Neumeister, 2004). Understanding the implications of failure puts catastrophic thoughts into context. Failure threatens the entire future, in terms of the ability to succeed; therefore, one’s survival is essentially in danger (Beck et al., 2005). As a result, an individual with perfectionism experiences more intense evaluative anxiety and negative affect before, during, and after tasks (e.g., Frost & Marten, 1990).

Magnification and minimization, or patterns of overestimating perceived flaws and minimizing strengths or successes, respectively (Beck et al., 2005), also reflect interpretive biases. When the perfectionism vulnerability is active during evaluative situations, each mistake is perceived as a “gaping hole,” and the potential for success is underestimated (Beck et al., 2005, p. 68). Furthermore, students with higher levels of perfectionism minimized academic success by considering it routine (Speirs-Neumeister, 2004). This type of thinking reflects the greater salience of failure for perfectionists and leads to selective recall of perceived or actual errors (Speirs-Neumeister, 2004). Thus,
PERFECTIONISM


_Emotionally association bias._ Theoretically, emotional vulnerability is created by organized schema (Mathews & MacLeod, 2005). Consequently, perfectionists attend to a negative self-impression that is based on prior beliefs, feelings, and self-image, which influences subsequent self-evaluations in performance situations as opposed to external feedback (Beck et al., 2005). During a state of vulnerability, biased information processing maintains perfectionistic beliefs by facilitating recall of schema-relevant data; consequently, past events, such as instances when standards were not achieved, exert more influence over a perfectionistic than a nonperfectionist individual. The automatic nature in which perfectionistic individuals experience greater negative affect, hostility, tension, and anxiety is suggestive of coherent, organized self-schemas that are accessed easily in performance contexts. In clinical practice, emotional association biases may be evident in emotional reasoning.

Evidence suggests that performance situations act as conditioned stimuli, automatically prompting negative emotions and eliciting biased associations. Specifically, perfectionistic individuals showed a greater recall of negative and perfectionistic words under conditions of stress, as well as greater perfectionistic automatic thoughts, illustrating the tendency to selectively attend to and remember negative, schema-congruent stimuli (Besser, Flett, Guez, et al., 2008). Negative mood inductions enhanced memory recall for perfectionistic content (e.g., Besser, Flett, Guez, et al., 2008), suggesting a more fragile self-image (Dozois & Dobson, 2001; Mathews &
Increased negative affect, such as greater hostility, anxiety, and anger occurring regardless of positive or negative feedback, task difficulty, or performance (Besser et al., 2004), illustrates emotional association biases that are dominant in perfectionism.

The experience of greater negative affect in response to mistakes (Frost et al., 1997) sets the stage for emotional association biases in which negative self-representations are reinforced and may be expressed through emotional reasoning. Self-criticism following perceived or actual failures is one way in which negative self-schemas are strengthened (e.g., Ashby et al., 2006; Fairburn, Cooper, & Shafran, 2003a; Stoeber, Harris, & Moon, 2007). Specifically, the impact of mistakes on perfectionists is generally perceived as indicative of a pattern of failure that has implications for their sense of self (Tangney, 2002). Consequently, the interpretation of mistakes not only maintains self-criticism but also strengthens the existing connection between performance and self-evaluation (Shafran & Mansell, 2001). In performance situations, self-criticism compromises self-esteem and results in depressed mood, anxiety, and fatigue (Pritchard, Wilson, & Yamnitz, 2007). This effect is evident in greater test anxiety, confusion, fatigue, depression, and anticipatory stress and in decreased satisfaction in performance regardless of outcome (e.g., Sevlever & Rice, 2010; Stoeber & Eysenck, 2008; Weiner & Carton, 2012). Thus, although evidence from actual performance may be to the contrary, perfectionists continue to believe they have failed because they feel that way.
**Stage 3: Secondary elaboration.** Unlike the preceding stages, secondary elaboration involves effortful, concentrated cognitive processing in which semantic processing is fully engaged (Beck & Clark, 1997). In this stage, elaborative processing and reflection occur to make sense of an event. Three outcomes are possible: (a) continued escalation of distress caused by failure to constructively reappraise the situation and thereby allowing the perfectionistic schema to dominate; (b) realistic reappraisal, leading to long-term decreases in distress; or (c) avoidance (i.e., the failure to reflect), which temporarily alleviates distress but ultimately maintains it (Beck & Clark, 1997). In perfectionism, intrusive ideation and biased inhibitory-control processes impair elaborative processing.

**Intrusive ideation.** Intrusive ideation refers to cognitive fixation on certain thoughts or states of mind, which permits easier access to negative memories and creates a self-perpetuating feedback loop between the perfectionistic schema and cognitive-processing biases; the content of the ideation may differ and influence which symptoms and mood states, such as depression or anxiety, emerge (Beck et al., 2005; Mathews & MacLeod, 2005). In the context of important goals (i.e., meeting high personal standards), diminished self-confidence triggers repeated negative thoughts centered on the ability to accomplish goals and concerns over incompetence (Beck et al., 2005). In clinical practice, intrusive ideation may be expressed through “should” statements.

For an individual with perfectionism, intrusive ideation is often experienced as rumination and worry about past and future performance, respectively (Matthews, 2009). When goals are threatened, individuals with perfectionism may be unable to detach and
consequently create a vicious cycle of worry and rumination, thereby preventing disengagement from disappointing experiences (Flaxman et al., 2012; Mongrain & Blackburn, 2006). For example, intolerance for uncertain outcomes manifests in excessive time spent worrying (Dugas, Gosselin, & Ladouceur, 2001). Furthermore, rumination is associated with impairment in adapting one’s cognitive set to environmental changes and with tendencies to rigidly stick to an existing response style regardless of consequences (Davis & Nolen-Hoeksema, 2000), which provides a cognitive pathway to rigid adherence to standards despite adverse consequences. This intrusive ideation, whether about past mistakes or concern over future mistakes, prolongs the stressor and leads to sustained emotional activation (Flaxman et al., 2012).

Not surprisingly, perfectionism has been strongly associated with increased worry, rumination, experiences of stress, and persistent negative affect (e.g., Chang, 2000; O’Connor & Noyce, 2008; Short & Mazmanian, 2013; Stoeber & Joorman, 2001). For example, during a precision task, perfectionistic subjects reported greater preoccupation with the quality of their performance than with solving the problem (Rheaume et al., 2000). Perfectionistic individuals also spent more time thinking about mistakes and believed mistakes to be more bothersome compared to healthy strivers and nonperfectionists (Frost et al., 1995). The tendency for individuals with perfectionism to ruminate about mistakes or perceived failures is believed to affect the severity and course of psychological disorders, such as depression (e.g., Chang & Sanna, 2001; Harris et al., 2008). Similarly, cognitive preoccupation with their inability to meet personal standards and focus on past failures contributed to decreases in mood (e.g., Besser et al., 2004;
Olson & Kwon, 2008; Speirs-Neumeister, 2004). Finally, rumination involving self-critical content predicted suicidal ideation in perfectionists (O’Connor & Noyce, 2008).

The self-perpetuating nature of the feedback loop between perfectionistic schemas and cognitive biases is created, in part, by the consequences of intrusive ideation exerting a strong effect on automatic actions (Beck et al., 2005). Hypervigilance to potential errors may manifest in compulsive checking and rechecking work and may increase rumination and worry when mistakes are discovered (Rice et al., 2003; Shafran & Mansell, 2001).

Furthermore, attending to thoughts about personal failure and doubts and worries about competence creates cognitive interference by competing for attentional resources and inhibiting short-term memory; as a result, performance in such tasks as comprehension and strategic recall becomes impaired (Matthews, 2009). In perfectionism, anticipation of potential failure and the perception of inadequacy can actively inhibit existing skill sets, even with tasks for which an individual is well suited (Beck et al., 2005). Moreover, persistent cognitive preoccupation with meeting performance standards increases the importance of the standards (Flett et al., 1995; Shafran et al., 2002), which subsequently increases the likelihood of interference from intrusive ideation. In sum, the consequences of performance impairment, as well as of persistent emotional, cognitive, and autonomic arousal, contribute to the maintenance of schemas.

Should statements refer to demands placed on oneself based on internal rules and often emerge in the form of self-criticism when standards are not fully met (e.g., Burns, 1980; Rice et al., 2003); for example, someone with perfectionism likely believes that performance should have been better. Should statements may arise automatically from
self-evaluation in which one’s performance is compared against a perfectionistic standard; therefore, should statements may represent a compensatory strategy to motivate perfectionists to avoid mistakes (Frost et al., 1997). For example, in students with high perfectionism, should statements appeared to reflect internal attributions in response to flawed performance and led to increased shame and guilt (Speirs-Neumeister, 2004). In another study in which participants were asked to log mistakes for 2 weeks, subjects with perfectionism as measured by the high concern over mistakes (CM) subscale from the Frost Multidimensional Perfectionism Scale (FMPS; Frost & Marten, 1990) expressed more should statements, specifically that they should have made fewer errors, compared to subjects with low CM (e.g., Frost et al., 1997).

*Biased inhibitory control.* Inhibitory control refers to the process in which emotional and cognitive responses are successfully suppressed in order to attend to other information (Hooker & Knight, 2006). However, when emotional information is not inhibited, it produces an exaggerated effect on attention and leads to psychological distress (Hooker & Knight, 2006; Mathew & MacLeod, 2005). Prolonged negative affect following performance tasks and responding to perceived failure by focusing on negative emotional states but maintaining high standards (e.g., Aldea & Rice, 2006; Hewitt, Flett, & Endler, 1995) highlights impaired inhibitory processes associated with perfectionism and may be expressed through dichotomous thinking patterns.

Emotion regulation strategies, such as reappraisal and suppression, are used to modulate the experience of emotions; however, maladaptive strategies emerge when normal inhibitory processes fail to successfully regulate negative mood states (Hooker &
In perfectionism, behavioral avoidance and emotional suppression are common maladaptive emotional-regulation strategies driven by intolerance for discomfort and fear of failure elicited by difficult tasks (Harrington, 2005). Students with perfectionism may work harder rather than adjust standards in order to avoid intense negative affect (i.e., shame elicited by perceived failures). That is, by working hard to prevent failure and overcompensating for their perceived deficits through overpreparation or excessive time spent on academic tasks, students with perfectionism avoid being exposed as intellectual frauds (Clance & Imes, 1978; Shafran et al., 2002). The correlation between anticipation of negative feedback and decreased emotional arousal suggests that preemptively searching for errors is one way in which individuals with perfectionism avoid emotional upset (Rheaume et al., 2000; Tops et al., 2013). Such behaviors as checking and rechecking or redoing completed tasks, searching for errors, and working long hours may temporarily stave off the possibility of failure and shame, as well as represent efforts to deny or distract from unwanted feelings of inadequacy, doubts, and anxiety (Randles et al., 2010; Santanello & Gardner, 2007). Drinking and procrastination are other behavioral avoidance strategies that temporarily regulate negative emotions (e.g., Gnilka et al., 2012; O’Connor & O’Connor, 2003).

Emotional suppression is a form of emotional avoidance and may manifest through worry and rumination (Burns & Fedewa, 2005). Specifically, persistent worry and rumination afford some sense of control over uncertain outcomes and over the uncomfortable emotions associated with potential failure (Flaxman et al., 2012). Indeed, worry appears to temporarily decrease distress and is not associated with increased
physiological activation; instead, worry restricts emotional activation in ways that are negatively reinforcing (Roemer, Salters, Raffa, & Orsillo, 2005). For example, high test anxiety represents efforts to avoid failure through mental preparation for future performance and simultaneously distracts from more upsetting thoughts involving the consequences of failure for students with perfectionism (e.g., Eum & Rice, 2011; Park, Heppner, & Lee, 2010; Santanello & Gardner, 2007). Moreover, rumination is considered a passive avoidance strategy that reduces discomfort elicited by shifting to different, more proactive behaviors; instead, focusing on frustration prompted by perceptions of failure allows perfectionists to maintain their current response style (Burns & Fedewa, 2005). Unfortunately, attempting to regulate potential feared outcomes appears to play a role in exacerbating distress (Pickett et al., 2012).

Although maladaptive emotion regulation strategies may temporarily provide relief, long-term consequences include reduced attentional flexibility and affective regulation (Roemer et al., 2005). Conditional self-acceptance combined with emotional investment in academic goals manifests, for example, as tireless devotion to studying and persistently high levels of anxiety and tension (Ellis, 2002; Mitchell, 1959). Emotional suppression prevents reappraisal of a stressful situation and ultimately fails to neutralize negative emotional experiences (Bergman, Nyland, & Burns, 2007). In essence, avoidance efforts emphasize exhaustive efforts to prevent a negative outcome and lead to low-self-esteem, poor quality of life, feelings of incompetency, increases in distress, and impaired well-being (Flaxman et al., 2012; Mathews & MacLeod, 2005; Smits, 2011).
Dichotomous thinking, or all-or-nothing thinking, refers to viewing events in black-or-white terms and reflects cognitive rigidity (e.g., Burns, 1980; Egan, Piek, Dyck, & Rees, 2007; Yurica & DiTomasso, 2005). Perfectionistic beliefs impair one’s ability to maintain a balanced self-view or perspective on performance; rather, self-worth is evaluated based on performance and defined according to absolute terms (Beck et al., 2005). Failure is the central point of focus, and anything less than perfect is not offset by success but rather defined accordingly (Beck et al., 2005). As a result, mistakes have greater negative impact, and the available options for thinking and behaviors are limited (e.g., Burns, 1980; Frost et al., 1990; Rice et al., 2003). For example, students with high perfectionism frequently used such phrases as “must be right” and “all of the time” and did not view partial effort as an option, thereby illustrating patterns of absolute thinking (Rice et al., 2003). Dichotomous thinking was not found in healthy strivers but predicted a significant amount of variance in perfectionism (Egan et al., 2011). The differential relationship observed between perfectionism compared to healthy striving (Egan et al., 2011) captures the differences in self-evaluation and cognitive flexibility between groups.

Attributions. Attributions refer to determinations made regarding the cause of certain events (Weiner, 1985). Although an unlimited number of causal inferences are available in memory, only ability and effort appear salient in the achievement domain (Weiner, 1985). Whereas success is generally attributed to hard work and high ability, failure is attributed to an absence of trying and low ability (Weiner, 1985). Perfectionism is associated with perceptions that ability is internal and stable, creating the expectation that working hard will lead to success (Weiner, 1985). However, as previously discussed,
perfectionists chronically doubt their abilities and competence; therefore, when outcomes such as failure are attributed to internal and stable causes (i.e., low ability), similar outcomes involving failure will be anticipated (Weiner, 1985). The caveat, however, is that success is rarely (if ever) attributed to ability (McGregor, Gee, & Posey, 2008). Moreover, behavioral avoidance strategies to manage fear of failure, such as extreme over-preparation and procrastination, result in attributions of success to effort or luck, respectively (Thompson et al., 2000). In clinical practice, attributions may be expressed through disqualifying the positive, personalization, and labeling.

The difference in attributional style observed between perfectionists and healthy strivers (Egan et al., 2013) suggests that this process contributes to the experience of repeated episodes of psychological distress. The response to academic stressors involves two phases: The first emotional response is elicited directly from the outcome (i.e., grade) and the second is dependent on the attributional style (Weiner, 1985). The implication is that a less-than-acceptable grade or performance is likely to generate feelings of disappointment; attributions of incompetence result in more persistent distress because of the perceptions that the performance will have implications for the future (Weiner, 1985). Indeed, negative attributions involving achievement failure were related to greater propensity to experience recurrent depressive episodes (Mongrain & Blackburn, 2006). Perfectionism predicted increased depressive symptoms in a 2-month follow-up, and negative attributions accounted for a significant portion (16 - 24%) of the variance in depressive symptoms (Chang & Sanna, 2001). In particular, negative inferential style for academic failure substantially increased the risk for major depression in a sample of
graduate students (Mongrain & Blackburn, 2006). The perception of incompetence and lack of academic control elicited greater distress in elementary-school students after receiving unacceptable grades (Hilsman & Garber, 1995). Finally, perfectionistic students who attributed negative outcomes to internal, stable, and global causes were significantly more likely than others to report suicidal ideation more than 2 years later (Beever & Miller, 2004).

Disqualifying the positives refers to the process of attributing success to external factors, such as luck (Yurica & DiTomasso, 2005). For example, a student with perfectionism may discount a high score on an exam by attributing the success to easy grading. Indeed, students high in perfectionism reported feeling as though they did not earn academic successes (Speirs-Neumeister, 2004). Dismissing positive evidence perpetuates perfectionistic beliefs because successes are not attributed to skill or intelligence; instead, perfectionistic individuals report feeling as though they are fooling others or that they are held to low expectations (Clance & Imes, 1978). Consequently, students with perfectionism who feel like academic frauds report greater symptoms of psychological distress, such as depression (e.g., McGregor et al., 2008).

Personalization describes the tendency to believe that one is solely responsible for negative outcomes regardless of evidence to the contrary (Covin et al., 2011) and is captured by self-criticism associated with perfectionism. Self-criticism reflects greater controllability in preventing failure: If the perfectionist had worked hard enough, he would not have failed. For example, students stated that their failures were caused by laziness and excuses (Egan et al., 2013). Perfectionists believed they were responsible for
inadequate effort in attaining their standards, which motivated them to work harder and refuse to accept less-than-perfect performance (Egan et al., 2013; Rice et al., 2003). Moreover, perfectionistic subjects reported feeling greater responsibility for negative consequences following task completion, which resulted in significantly more time spent on precision tasks (Rheamue et al., 2000).

Labeling refers to defining oneself in a certain way following a negative event (Covin et al., 2011). For perfectionists, internalizing perceived failures and interpreting mistakes as evidence of personal failure results in greater self-criticism, which leads to labeling oneself as weak and/or incompetent (e.g., Fairburn et al., 2003a; Rice et al., 2003; Speirs-Neumeister, 2004). Furthermore, students with perfectionism reported feeling inadequate and as a failure as a person when they did not meet their standards (Egan et al., 2013). However, the combination of excessive self-focus and low tolerance for a perceived mismatch between their behavior and standards has adverse consequences (Frost & Marten, 1990; Shafran et al., 2002). Namely, their sense of worth is unstable and vulnerable to damage in the event that perfectionists are unable to meet their standards.

In sum, the information-processing biases commonly associated with perfectionism provide an explanation for cognitive distortions reported by perfectionists. That is, their patterns of negative thoughts make sense given the ways in which they attend to, encode, retrieve, and ascribe meaning to internal and external events.

**Activation of perfectionistic schemas.** Thus far, perfectionism has been conceptualized as a cognitive vulnerability involving a set of negative beliefs within a maladaptive schema that exerts influence on cognitive processing to bring about
PERFECTIONISM

psychological distress. However, in order to trigger changes in thinking, the perfectionism vulnerability must be activated by an external source (i.e., stress; Ingram & Luxton, 2005). Stress is operationalized as major or minor life events that disrupt one’s homeostatic mechanisms responsible for regulating emotional and cognitive stability (Ingram & Luxton, 2005). Ongoing, or chronic, stress refers to exposure to stressful events for a period longer than 12 months and is considered a stronger predictor of psychological distress compared to acute stress, which refers to a discrete event (Hammen, 2005). Although stress is an external force, internal processes influence the way stressors are experienced (Ingram & Luxton, 2005). Specifically, an individual’s subjective appraisal of events often based on existing schemas is an important factor in whether the events are considered stressful or not (Ingram & Luxton, 2005). Furthermore, vulnerable individuals, like perfectionists, may generate their own stress by, for example, engaging in excessive self-criticism.

The model proposed in this study suggests that an individual with perfectionism may feel confident in a number of domains other than performance or achievement, but once these types of tasks are introduced, self-confidence significantly diminishes (Beck et al., 2005). This reduction may be caused by reactions to the evaluative context of graduate school that creates a greater sense of vulnerability and concern about failure (Beck et al., 2005). Interpreting one’s inadequacies in response to life stress can transform a negative affective state into an episode of depression, anxiety, or other psychological problems (Scher et al., 2005).
The following section will highlight the interaction between perfectionism and stress, with particular attention paid to context, kindling and priming, and the influence of the perfectionism vulnerability in generating stress. The goal is to better predict which conditions (i.e., events) are stressful for perfectionists and to clarify the nature of the perfectionism-stress interaction as it relates to changes in cognitive processing.

**Continuum of schema activation.** The interaction between perfectionism and stress appears contingent on the degree of perfectionism and magnitude of the stressor, which may account for individual differences in terms of who is more likely to develop psychological distress. The interaction also appears complementary: The likelihood of experiencing stress appears greater in highly perfectionistic individuals, and these individuals also appear to play a part in generating their own stress as a result of maladaptive reactions and coping skills (Ingram & Luxton, 2005). In other words, a highly perfectionistic individual may develop distress following a minor stressor (i.e., less-than-perfect score), whereas a major stressor (i.e., failing a course) may be required to elicit distress in someone low in perfectionism (Ingram & Luxton, 2005). Thus, the highly perfectionistic individual is considered at a higher risk for distress since a lower magnitude stressor can push the schema beyond its threshold for activation.

**Kindling.** Kindling refers to increased sensitivity resulting from repeated neuronal activation during episodes of psychological distress; thus, less stress is needed to produce psychological distress (Ingram & Luxton, 2005). According to the cognitive vulnerability stress-interaction model, schemas that are repeatedly activated over time become more organized and more easily accessed by a broader range of stressors, which increases the
probability of experiencing psychological distress (Clark & Beck, 2010). Consequently, vulnerable individuals have a greater risk of experiencing recurrent episodes of distress prompted by increasingly mild stressors (Safford, Alloy, Abramson, & Crossfield, 2007).

The chronic stress and evaluative context of graduate school may create a kindling effect that leads to impaired psychological functioning over time, which appears more detrimental for perfectionists. Students who report previous episodes of psychological distress will be more likely to experience recurrent symptoms in the absence of an acute stressor (Hammen, 2005). Accordingly, perfectionism was positively correlated with greater distress and the perception that minor events were more stressful in perfectionistic students than in nonperfectionists (e.g., Dunkley & Blankstein, 2000; Flett et al., 2012). Students with perfectionism also perceived greater stress overall and reported significantly lower life satisfaction compared to healthy strivers, who reported lower perceived stress and high life satisfaction (e.g., Ashby et al., 2010).

**Priming.** Prolonged reactions to stressful events may create a priming effect for perfectionistic schemas operating through impaired disengagement from the stress. Evidence suggests that the effect of mistakes, whether perceived or actual, appears more persistent in those with perfectionism compared to healthy strivers and nonperfectionists. Perfectionists reported significant increases in negative affect and decreases in positive affect from baseline both during and immediately following an evaluative task, regardless of their performance or of feedback (Besser et al., 2004). After an exam, perfectionism was significantly related to greater negative affect and lower positive affect (Flett, Blankstein, & Hewitt, 2009). Finally, perfectionists thought more frequently about
mistakes and were persistently more bothered by them for longer periods of time compared to healthy strivers and nonperfectionists following evaluative tasks (e.g., DiBartolo et al., 2001; Frost et al., 1997).

**Stress generation.** Vulnerability factors like perfectionism play an active part in shaping experience, highlighting the interplay between personality and environment (Zuroff et al., 2004) and may explain the ways in which individuals with perfectionism generate their own stressful experience; for example, work- and client-related burnout in clinical psychologists was a function of the influence of perfectionism on stress (D’Souza et al., 2011). Furthermore, preexisting personality characteristics likely influence an individual’s choices and behaviors to eventually affect their context and maintain existing vulnerabilities (Zuroff et al., 2004). To illustrate, individuals with perfectionism may be more likely than others to apply to graduate programs, based on their tendency to set high standards, which consequently provides a context for perfectionistic beliefs to thrive. Moreover, perfectionistic students impose pressure on themselves to perform perfectly, in addition to the inherent stress of graduate school, which may exacerbate their experience of stress. The significant importance placed on performance likely triggers increases in negative affect since such situations represent a threat to self-worth (Besser et al., 2004; Flaxman et al., 2012). Indeed, perfectionistic schemas, measured by Young’s Schema Questionnaire-Short Form (Young, 1998), predicted greater depressive symptoms and positively correlated with stress generation after 6 weeks (Eberhart, Auerbach, Bigda-Peyton, & Abela, 2011). Authors noted that patterns of stress generation were better predictors of depressive symptoms compared to the occurrence of
stressful events, highlighting the reciprocal relationship shared between perfectionism and stress.

The perfectionism vulnerability appears to influence the way students respond to stress, which can also precipitate psychological distress (Ingram & Luxton, 2005). This effect appears to occur in two broad ways. First, failure to engage in regular self-care as a result of excessive engagement in academic tasks may be one way in which perfectionism contributes to stress generation. Although regular exercise and sleep are considered two of many self-care activities that increase overall health, the fast pace of graduate school often leads to neglecting self-care (Kushner, Kessler, & McGaghie, 2011). In one study, two thirds of psychology graduate students cited limited time as the most significant barrier to engaging in self-care (El-Ghoroury, Galper, Sawaqdeh, & Bufka, 2012). The consequences of self-neglect are evident in findings like those reported by McKinzie, Bishop, Altamura, and Burgoon (2006), in which negative mood, poor exercise habits, and disrupted sleep patterns predicted increased student stress. Second, maladaptive coping strategies may reflect the influence of perfectionism on the response to stress. For example, perfectionistic students were more likely to cope with academic stressors by focusing on emotional upset related to perceived or actual failures and self-blame, which led to greater and more persistent negative affect (e.g., Dunkley & Blackstein, 2000; Stoeber & Janssen, 2011).

**Review of Empirical Evidence**

Although conceptually plausible, the questions as to whether or not perfectionism is a vulnerability factor and whether cognitive distortions act as a mediating variable
remain unanswered. To the investigator’s knowledge, few studies have investigated the role of perfectionism as a vulnerability factor to psychological distress and cognitive distortions as a mediating variable; thus, the following section will provide a review of relevant empirical evidence, beginning with studies directly testing perfectionism as a diathesis and then providing an overview of research investigating cognitive distortions as a mediator.

**The perfectionism-stress interaction.** Longitudinal studies that include assessment periods following achievement-related stressors provide evidence supporting a perfectionism-stress interaction. In a series of three studies, Hankin, Abramson, Miller, and Haeffel (2004) found support for a vulnerability-stress interaction in predicting depression in a sample of undergraduate students in the prospective follow-up period of 5 weeks and 2 years. Results from the first and second studies indicated that the highest elevations in depression measured at Time 2 (after 5 weeks and 2 years, respectively) were associated with higher levels of cognitive vulnerability, measured by the Dysfunctional Attitude Scale (DAS; Weissman & Beck, 1978) and Cognitive Style Questionnaire (CSQ; Alloy et al., 2000), and a greater number of stressors (Hankin et al., 2004).

In their third study, Hankin et al. (2004) utilized a more rigorous test of the stress interaction by assessing depression and anxiety following a specific stressor, namely a midterm exam. This type of design has been called the *academic midterm study* in previous research and involves incorporating a naturally occurring stressor (Hankin et al., 2004). It is considered a better test of the temporal precedence of the stressor over
symptoms because one can carefully document the timing of the stressor and changes in symptoms (Hankin et al., 2004). Subjects were assessed 2 weeks before a midterm, upon receiving their grades, and again 5 days later. Results from the third study indicated that the combination of a stress (i.e., failing an exam) and cognitive vulnerability, measured by the DAS, predicted greater depressive symptoms at Time 3. Furthermore, the DAS was a better predictor of depression than the CSQ, which suggested that dysfunctional attitudes might pose more of a vulnerability than a negative cognitive style when achievement stressors are involved (Hankin et al., 2004). While these studies lend support to the cognitive vulnerability stress-interaction model and particularly to the impact of maladaptive cognitive structures as measured by the DAS, the authors did not report whether perfectionistic or dependency attitudes were elevated. Thus, whether perfectionism, as measured by the Perfectionism subscale of the DAS, was responsible for the increases in depressive symptoms following the midterm remains to be seen.

Conceptualizing the diathesis as negative attributions in the achievement domain, two studies confirm the interaction between the vulnerability and the academic stressor in prospectively predicting depressive symptoms. In the first study, undergraduate students who attributed poor performance on a midterm to internal, stable, and global causes, measured by the Attributional Style Questionnaire (ASQ; Seligman, Abramson, Semmel, & von Baeyer, 1979), displayed increased depressive symptoms immediately following receipt of their grade and continued to display symptoms 2 days later (Metalsky, Halberstadt, & Abramson, 1987). In a later study, Metalsky, Joiner, Hardin, and Abramson (1993) reported similar findings; they extended the previous study to include
the construct of self-esteem, measured by the Extended Self-Esteem Questionnaire (Metalsky, 1992), and found the interaction between attributional style and failure predicted depressive symptoms 5 days after receiving grades for undergraduate students with low self-esteem. Although perfectionism was not measured directly, the notion of attributing poor performance to internal, stable, and global causes in conjunction with low self-esteem appears conceptually and thematically consistent with this study.

Negative achievement schemas that were organized and coherent, as measured by the Psychological Distance Scaling Task (PDST; Dozois & Dobson, 2001), interacted with negative life events to predict depression in undergraduate students at the prospective 1-year follow-up; conversely, less organized achievement schemas failed to predict depression (Seeds & Dozois, 2010). In addition, the patterns of schematic organization were highly stable 1 year later, indicating that the connectedness of negative achievement schemas endured over time (Seeds & Dozois, 2010). The PDST is believed to measure the degree of schema organization based on placement of self-referent adjectives on a grid, which offers a unique assessment of schema structure. Assessing the schematic structure is important since it demonstrates the vulnerability to depression conferred by tightly connected achievement schemata as opposed to more loosely organized schema (Seeds & Dozois, 2010).

Compared to other potential vulnerability factors measured by the DAS, high perfectionism and poorer-than-expected exam performance interacted to predict greater depressive symptoms in college students; however, authors noted that the effects were relatively weak (Brown, Hammen, Craske, & Wickens, 1995). Similarly, high levels of
perfectionism predicted greater depression, hopelessness, and suicidal ideation at a 2-month follow-up in a sample of medical students; further, the distress was significantly associated with ratings of falling below standards of acceptable performance (Enns et al., 2001). One of the interesting aspects of these studies involved the direct assessment of performance discrepancy. Consistent with the conceptualization of perfectionism in which a central feature is a perception of a significant discrepancy between ability, performance, and standards, higher perfectionism was associated with a greater discrepancy (Brown et al., 1995).

Further supporting the cognitive vulnerability stress-interaction model, higher scores on a composite of subscales from multidimensional measures of perfectionism (i.e., socially prescribed perfectionism subscale from the Hewitt Multidimensional Perfectionism Scale [HMPS; Hewitt & Flett, 1992] and concern over mistakes [CM] and doubts about actions [DA] from the FMPS [Frost et al., 1990]) predicted increased hopelessness and depression 2 weeks after a midterm exam in a sample of first-year medical students (Enns, Cox, & Clara, 2005) and college students (Rice & Aldea, 2006). Notably, lower scores were not associated with an increase in distress (Enns et al., 2005), highlighting the negative impact created by the combination of perfectionism and achievement stressors. Following a classroom test and using the HMPS, undergraduate students reporting high levels of perfectionism related to interpersonal issues experienced greater negative affect compared to students scoring higher on other dimensions (i.e., perfectionism related to achievement of personal standards or related to expectations of others’ behavior; Flett et al., 2009). Unfortunately, the authors did not assess for baseline
mood, making difficult a determination as to whether perfectionism was a significant predictor in the increased negative affect.

**Cognitive mediation in perfectionism.** Although few studies have evaluated perfectionism and the cognitive distortions as a mediator within the cognitive vulnerability stress-interaction framework, some support exists. In a longitudinal study assessing the impact of negative life events, negative automatic thoughts, as measured by the Automatic Thoughts Questionnaire (ATQ; Hollon & Kendall, 1980), mediated the relationship between perfectionism measured by the DAS and depression assessed by the Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979) in a sample of 226 college undergraduate students (Kwon & Oei, 1992). Furthermore, negative automatic thoughts were consistently predicted by dysfunctional attitudes measured by the DAS and predictive of depressive symptoms (Kwon & Oei, 1992). Using a structural equation analysis, authors noted that the causal paths between the DAS and depression and between negative life events and depression appeared unstable; however, the ATQ consistently mediated the relationship. Taken together, findings suggested that negative life events or the cognitive vulnerability is insufficient without cognitive distortions to produce depression.

Similarly, in a 4-week prospective study, Kopala-Sibley and Santor (2009) examined whether negative automatic thoughts explained the effects of vulnerability factors (i.e., self-criticism and dependency), life events, and positive mood on negative affect. The vulnerability factor, “self-criticism,” was analogous to perfectionism, as it tapped into beliefs about achievement and self-evaluation, making it an appropriate study.
to include. Findings showed that negative automatic thoughts, as measured by the ATQ, fully mediated the effect of self-criticism on negative mood in a sample of 115 college students (Kopala-Sibley & Santor, 2009). Negative automatic thoughts only partially mediated the effect of dependency and daily hassles on mood and the effect of positive affect on negative mood. These results further suggested that persistent perfectionistic beliefs impact mood through the activation of negative thoughts (Kopala-Sibley & Santor, 2009). Authors concluded that automatic thoughts were an important mechanism for self-critical individuals.

Metalsky et al. (1987) found that the relationship between general negative attribution style, as measured by the ASQ (Seligman et al., 1979), and depressed mood, measured by the Multiple Affect Adjective Checklist (Lefcourt, von Baeyer, Ware, & Cox, 1979), was mediated by specific types of attributions, namely thoughts of personal failure as assessed by the Particular Attributions Questionnaire (Metalsky et al., 1987), in a sample of 226 college students in response to a midterm. Students were assessed five times over the course of 3 weeks, first prior to the midterm, then 7 days and 3 days prior to receipt of their grades, and then immediately after and 2 days after receiving their grades. In support of the cognitive vulnerability stress-interaction model, greater scores on the ASQ interacted with the midterm outcome to predict the most enduring depressive reactions to perceived failure, and these effects occurred through the operation of specific attributions (Metalsky et al., 1987). Although the Personal Attributions Questionnaire is not considered a measure of cognition per se, it shares similar properties since it was designed to tap into attributions that emerge in response to a stressor.
Another longitudinal study found that the interaction with perfectionistic beliefs and depressive symptoms following midterm outcome, a specific stressor, was mediated by cognitive distortions as measured by the Cognitions Checklist (Beck, Brown, Steer, Eidelson, & Riskind, 1987) in a sample of 119 college students (Joiner et al., 1999). To calculate the midterm outcome, the standard midterm methodology was used. This design involved measuring what grade students hoped to earn on the exam (i.e., “What grade would you consider a failure on the exam?”; A = 1 through F = 13) at Time 1 and measuring students’ actual grades 2 weeks later at Time 2 using the same 13-point Likert scale (Joiner et al., 1999). A discrepancy between student expectations and actual performance in which expectations were higher than actual performance was conceptualized as a negative life event (i.e., stressor; Joiner et al., 1999). An interaction emerged between midterm grade and depressive symptoms as measured by the BDI; specifically, students who earned high grades reported similar decreases in depression compared to students who received lower grades irrespective of DAS scores (Joiner et al., 1999). Conversely, students with greater dysfunctional beliefs and who scored lower on the exam reported the most significant increases in depressive symptoms, an effect that was mediated by depressive cognitions (Joiner et al., 1999). Interestingly, the authors noted that changes in affect were contingent on the outcome of the midterm, which is somewhat inconsistent with other literature (e.g., Altstotter-Gleich et al., 2012; Besser, Flett, Guez, et al., 2008; Enns et al., 2001). The findings may reflect characteristics of the sample used in this study or may have been influenced by the measures used. Although the BDI is a well-established instrument, its range of items is restricted to assess a
particular clinical construct; thus, one can argue that using the BDI to assess functioning may have resulted in missed information.

Although cross-sectional studies report similar findings, establishing temporal precedence and stability of perfectionism is impossible (Riskind & Alloy, 2006). Perfectionistic cognitions, as measured by the Perfectionism Cognitions Inventory (PCI; Flett et al., 2007), fully mediated the relationship between trait perfectionism and psychological distress in a sample of college freshmen (Wimberly & Stasio, 2013). Furthermore, cognitive distortions influenced depressed mood independently of perfectionism (Wimberly & Stasio, 2013). Interestingly, using factor-analysis-derived subscales, Wimberly and Stasio (2013) reported that the relationship between personal standards, which is typically “adaptive,” and anxiety and negative mood was fully mediated by perfectionism cognitions. However, evaluative concerns, which is typically maladaptive, and anxiety were only partially mediated by perfectionism cognitions (Wimberly & Stasio, 2013). The results highlight the pathogenesis of cognitive distortions but also suggest the possibility of other variables.

**Conclusion**

This paper has argued that perfectionism follows the cognitive vulnerability stress-interaction paradigm, conceptualizing perfectionism as a diathesis to developing psychological distress with cognitive distortions acting as a mediating variable. Consistent with the construct of a maladaptive schema described by Beck’s cognitive theory, perfectionism is a long-standing, rigid schema for self-evaluation that distorts experience by biasing the way internal and external information is processed. Changing
the way information is attended to, encoded, and retrieved causes thinking to become impaired and is reflected in cognitive distortions commonly expressed by perfectionists. Empirically, a growing body of literature supports the stability of perfectionism over time, its ability to predict a number of different psychological issues following exposure to a stressor, and the role of cognitive distortions as a mediator. These findings are conceptually consistent with the cognitive vulnerability stress-interaction model discussed throughout this paper.

**Purpose of the Study**

The purpose of this study was twofold. The first aim of this study sought to investigate whether perfectionism operated under the cognitive vulnerability stress-interaction theory by increasing the likelihood of developing psychological distress in graduate students during times of stress. Although perfectionism has been identified as a common mechanism shared across a variety of disorders (e.g., Egan et al., 2011), its relationship with psychological distress is not fully understood partly because of ongoing disagreements regarding its conceptualization and measurement (e.g., Shafran et al., 2002). Therefore, the current study attempted to clarify the nature of perfectionism, namely its role as a predisposing factor, or vulnerability, and the way it interacts with stress, based on a cognitive vulnerability stress-interaction framework.

The second aim of this study was to extend the current body of literature by determining if cognitive distortions mediate the relationship between the proposed vulnerability (i.e., perfectionism) and psychological distress. Many studies have linked perfectionism and distress, but relatively few have examined cognitive distortions; still, a
case can be made for the cognitive component of perfectionism. Investigating functional mechanisms, such as cognitions, in the development and maintenance of psychological distress is an important endeavor for both theoretical and treatment planning purposes (Kopala-Sibley & Santor, 2009; Yiend et al., 2011). Mediational analyses helped to specify the role of cognitive distortions empirically, permitting either refinement or confirmation of Beck’s cognitive theory (Kopala-Sibley & Santor, 2009).

To accomplish these aims, perfectionism and cognitive distortions were assessed in a sample of graduate students at two points in time. The first assessment occurred early in an academic trimester, which was intended to represent a time of low stress; the second assessment occurred immediately following an academic stressor, which was intended to represent a higher stress time. The longitudinal design permitted the investigator to determine if perfectionism is stable over time, to test its predictive validity, and to evaluate cognitive distortions as a mediating variable.
Chapter 2: Hypotheses

Hypothesis 1

The purpose of this study was to explore whether perfectionism functions as a vulnerability to psychological distress, in which case it would be a stable, trait-like construct; identifying perfectionism as a trait-like construct required that it demonstrate a degree of stability that is independent of psychological distress in order to establish that it is more than a manifestation or consequence of the distressed state (Ingram & Price, 2010; Riskind & Alloy, 2006). Consequently, scores on a measure of perfectionism are not expected to decrease significantly over assessment periods. Thus, for this study, it was hypothesized that graduate students’ scores on the Clinical Perfectionism Questionnaire (CPQ; Fairburn, Cooper, & Shafran, 2003b) at Time 1 would not be significantly different from their scores at Time 2; more specifically, scores at Time 2 would not be significantly lower compared to scores obtained at Time 1.

Hypothesis 2

Similarly, as a vulnerability, perfectionism was believed to predict distressed states, which required that it precede episodes of a disorder (Ingram & Price, 2010; Riskind & Alloy, 2006). That is, higher scores on a measure of perfectionism were expected to accurately predict scores on a measure of psychological distress assessed at a later time. Therefore, it was hypothesized that scores on the CPQ obtained at Time 1 would predict scores on the Brief Symptom Inventory-18 (BSI-18; Derogatis, 2000) at Time 2. Similarly, the cognitive vulnerability stress-interaction model specifies that distress should emerge in the presence, and not absence, of a stressor (Joiner et al., 1999);
therefore, it was expected that the Perfectionism x Stress interaction would contribute to predictive validity.

**Hypothesis 3**

Further, this study sought to examine the mechanism through which perfectionism is related to psychological distress; specifically, the mechanism of interest in this study was cognitive distortions. In this study, it was hypothesized that the relationship between perfectionism and psychological distress would be explained by their relationship to a third variable, namely cognitive distortions (Field, 2013). It was hypothesized that graduate students’ scores on the Cognitive Distortions Scale (CDS; Covin et al., 2011) at Time 2 will mediate the relationship between perfectionism at Time 1 and psychological distress at Time 2.

As a mediating variable (i.e., mechanism), cognitive distortions were expected to exert an indirect effect that significantly reduced the relationship between the perfectionism vulnerability and outcome (i.e., psychological distress; Baron & Kenny, 1986; Preacher & Hayes, 2004). In other words, the strength of the relationship between perfectionism and psychological distress was expected to decrease when cognitive distortions were included in the model; mediation would be evident by a smaller regression parameter for $c’$ (the strength of the relationship between perfectionism and distress when including cognitive distortions) compared to $c$ (the strength of the relationship between the perfectionism and distress; Field, 2013).
Chapter 3: Methodology

Design

This study used a longitudinal repeated measures design with two assessment periods. Similar to the design employed by Hankin et al. (2004), the first assessment (Time 1) took place on the first day of class, which was assumed to be a lower stress time; the second assessment (Time 2) occurred immediately after an academic stressor (i.e., a midterm or final exam), which was considered a higher stress time (e.g., O’Connor & O’Connor, 2003). Subjects were administered each measure on both assessment periods to thoroughly evaluate changes.

The design accomplished a number of objectives. First, it incorporated a naturally occurring stressor, namely an exam that was experienced by all participants (Hankin et al., 2004), which created an opportunity to measure a potential interaction between perfectionism and stress. Second, the use of two assessment phases allowed the investigator to establish the abilities of perfectionism and cognitive distortions to predict psychological distress at Time 2 after controlling for initial levels of distress. Third, this design permitted the investigator to evaluate changes both within and between groups over time because the timing of the stressor and subsequent changes in symptoms of distress could be documented. The longitudinal design and timing of assessments also allowed the investigator to evaluate whether individuals high in perfectionism experienced greater psychological distress when faced with achievement stressors compared to individuals scoring lower in perfectionism. Fourth, assessing for other life stressors allowed for a clearer understanding of the impact of other types of stressful
events (e.g., relationship issues), which helped clarify how the perfectionism vulnerability interacted with stressful events. Finally, the investigator could evaluate changes in information processing as measured by the CDS and the impact they had on the relationship between perfectionism and psychological distress (Kopala-Sibley & Santor, 2009).

Participants

A total of 352 graduate students from the Philadelphia College of Osteopathic Medicine (PCOM) were recruited to participate in the study during the 2015 summer and fall terms. Of those recruited, 228 students completed the survey at Time 1. The sample was largely female ($n = 171$). Approximately 58% of the participants were between the ages of 18 and 24 years ($n = 131$); 37% were between the ages of 25 and 34 years ($n = 84$); 4% were between the ages of 35 and 44 years ($n = 9$); and the remaining 1% were between the ages of 45 and 54 years ($n = 1$). The racial/ethnic composition of the sample was largely White/Caucasian. Nearly 40% of participants were enrolled in the Physician’s Assistant program ($n = 87$); 22% were in the Counseling M.S. program ($n = 50$); 19% were from the Clinical Psy.D. program ($n = 44$); 10% were from the BioMed M.S. program ($n = 23$); 8% were from the Ed.S. program ($n = 18$); and the remaining 2% were from the School Psychology M.S. program ($n = 4$).

Of the 228 students who completed the surveys at Time 1, 147 students completed the surveys on both occasions. Similar to Time 1, the sample of students at Time 2 was mostly female ($n = 105$). Approximately 61% of the sample ranged in age from 18 to 24 years ($n = 89$); 35% of participants were between the ages of 25 and 34 years ($n = 51$); the
remaining 4% were between the ages of 35 and 44 years (n = 6). Nearly three quarters of the sample were White/Caucasian (n = 110). The majority of participants (43.5%) were enrolled in the Physician’s Assistant program (n = 64); 26% were in the Counseling M.S. program (n = 38); 18% were in the Clinical Psy.D. program (n = 26); 7% were in the Ed.S. program (n = 10); and the remaining 6% were in the BioMed M.S. program (n = 9). The demographic statistics are outlined in Table 1 in Chapter 4.

**Inclusion criteria.** Eligibility to participate was based on enrollment status as a student at PCOM on the Philadelphia campus in the following programs: DO/MBA Dual Degree, DO/MPH Dual Degree, DO/PhD in Health Policy Dual Degree, DO/MS Forensic Medicine, DO/MS in Organizational Development & Leadership, Clinical Master of Science, MS in Biomedical Sciences, MS in Health Sciences - Physician Assistant, PsyD in Clinical Psychology, PsyD in School Psychology, MS in School Psychology, Ed.S. in School Psychology, MS in Mental Health Counseling, MS in Organizational Development and Leadership, Post-Doctoral Certificates in Clinical Health Psychology and Clinical Neuropsychology, and Certificate of Advanced Graduate Studies (CAGS).

**Exclusion criteria.** Students were excluded from the study if their program was not at the Philadelphia campus (i.e., the Pharmacy program) or if their program was primarily online (i.e., M.S. Forensic Science). Similarly, students were excluded if the department chair did not permit the primary investigator to survey students (i.e., the D.O. program). Students were also excluded if they declined participation or were absent from class during either assessment period.
Recruitment

The primary investigator entered approved classrooms between 5 to 10 minutes before class in order to recruit subjects. Students were informed about the availability of a study examining perfectionism within a cognitive vulnerability stress-interaction framework. Informed consent was not required since subjects were anonymous.

Measures

**Demographic questionnaire.** The demographic questionnaire was administered at Time 1 only. It requested information about age, gender, ethnicity, marital status, employment status, highest level of education completed, year and program of study, current course, and current cumulative GPA.

**Cognitive vulnerability.** The Clinical Perfectionism Questionnaire (CPQ; Fairburn, Cooper, & Shafran, 2003b) is a 12-item, self-report measure of clinical perfectionism that specifically assesses for the pursuit of high personal standards in conjunction with negative self-evaluations related to the impact of failure to meet standards. Sample items include “Have you pushed yourself really hard to meet your goals?” and “Have you judged yourself on the basis of your ability to achieve high standards?” Subjects rated the extent to which each item described them over the prior month on a 4-point Likert scale; responses range from 1 (*not at all*) to 4 (*all of the time*), and higher scores indicate greater levels of clinical perfectionism in adults. Items 2 and 8 are reverse scored.

A recent factor analysis reported two underlying factors, specifically Personal Standards and Emotional Concerns and Consequences (Chang & Sanna, 2012; Dickie,
Surgenor, Wilson, & McDowall, 2012). Alpha coefficient has been reported ranging from .71 to .83 (Dickie et al., 2012; Stoeber & Damian, in press), suggesting a moderate degree of internal consistency. Finally, test-retest reliability has been reported ranging from .67 to .83, indicating that the CPQ is moderately stable over time (Chang & Sanna, 2012; Dickie et al., 2012; Steele et al., 2011; Steele et al., 2013). In this study, internal consistency was moderate at Time 1 and Time 2 (α = .76 and .72, respectively).

The CPQ was developed based on the Clinical Perfectionism Examination (CPE; Riley, Cooper, Fairburn, & Shafran, 2007), which is a 12-item interview assessing cognitive and behavioral aspects of perfectionism. Cronbach’s alpha is .90, suggesting a strong degree of internal consistency (Riley et al., 2007). Furthermore, test-retest reliability has been reported at .85, indicating that the CPE is stable over time (Riley et al., 2007). Convergent validity with the CPQ has been reported as .57 (Riley et al., 2007), suggesting a moderate correlation between proposed factors measured by both instruments.

When compared against other popular measures of perfectionism, such as the Frost Multidimensional Perfectionism Scale (FMPS), the Hewitt Multidimensional Perfectionism Scale (HMPS), and the DAS, the CPQ added unique variance to depressive symptoms, negative affect, and perceived stress above and beyond these measures (Kim et al., 2009). The additional variance suggested that, while the CPQ is positively correlated with these measures (e.g., r = .42), it provides additional information (e.g., Kim et al., 2009; Stoeber & Damain, 2014).
To date, the literature has not established clinically significant cut-off scores for the CPQ. In a previous study, Riley et al. (2007) reported that identified participants with clinical perfectionism had a mean score of 35.53 ($SD = 5.6$). In two studies using nonclinical samples, Dickie et al. (2012) found that the mean CPQ score reported by Riley et al. comprised the 95th percentile rank and reported a mean of 25.10 ($SD = 4.95$) and 25.67 ($SD = 5.10$), respectively. Similarly, in a nonclinical sample of college students, Chang and Sanna (2012) reported a mean score of 26.40 with a standard deviation of 4.76. The sample selected for this study was expected to score similarly to studies that used a nonclinical sample.

However limited, the available research on the CPQ supports its utility above and beyond the widely used multidimensional scale developed by Hewitt and Flett (1991) since it accounted for additional variance in measures of depression, anxiety, and stress (Chang & Sanna, 2012).

**Cognitive distortions.** The Cognitive Distortions Scale (CDS; Covin et al., 2011) is a 20-item, self-report measure that assesses the tendency to make 10 common cognitive distortions within interpersonal and achievement domains. Participants were presented with different scenarios that illustrated a particular cognitive distortion and then were asked to rate how often they used a specific type of thinking on a 7-point Likert scale ranging from 1 (never) to 7 (all the time). Sample items included “Please estimate how often you engage in ‘mind reading’ when in social situations (like when you’re with friends, partners, or family).” Overall, the CDS demonstrated strong internal consistency (Cronbach’s alpha = .85 to .91); the Interpersonal and Achievement subscales were also
PERFECTIONISM internally consistent ($\alpha = .75$ and .79, respectively; Covin et al., 2011). However, following a factor analysis from which one factor emerged, authors of the instrument recommended using a total CDS score rather than separating subscale scores (Covin et al., 2011). In this study, internal consistency was high for both Time 1 and Time 2 ($\alpha = .92$ and .95, respectively).

Initial validation studies indicated that higher scores on the CDS share a moderate positive correlation with state measures of depression ($r = .39$ to .45 on the Beck Depression Inventory, 2nd edition [BDI-II]; Beck, Steer, & Brown, 1996) and anxiety ($r = .48$ on the Anxiety subscale of the Depression Anxiety Stress Scale [DASS-A]; Lovibond & Lovibond, 1995), as well as other well-established measures of biased thinking, such as the Automatic Thoughts Questionnaire (ATQ; $r = .37$ to .40) and DAS ($r = .40$ to .45) (Covin et al., 2011). The Achievement subscale correlated more strongly with DAS-Perfectionism (Covin et al., 2011), which is theoretically consistent. Errors made most often in achievement situations included catastrophizing, emotional reasoning, dichotomous thinking, and should statements (Covin et al., 2011), which is also theoretically consistent. Whether certain cognitive distortions predict negative emotional states better than others remains unclear (Covin et al., 2011).

This measure differs from previous instruments assessing cognitive distortions in ways that make it the most suitable for the purposes of this study. First, it is the first published measure that evaluates 10 common cognitive distortions identified in cognitive behavioral literature and clinical work (Covin et al., 2009). Second, although the initial factor analysis yielded one factor, the CDS measures the presence of individual cognitive
PERFECTIONISM

distortions across contexts (Covin et al., 2009). Third, the CDS items reflect tendencies to make cognitive distortions using vignettes illustrating the various information-processing biases as opposed to prepackaged and potentially restrictive thought items.

**Stressors.** The Life Experiences Survey (LES; Sarason, Johnson, & Siegel, 1978) was included in order to examine the type and impact of stressful events reported by participants. The LES is a 57-item, self-report measure designed to assess both positive and negative life events, as well as their impact on the individual. Subjects indicated whether the event occurred in two time frames prior to the taking of the survey: 0 to 6 months or 7 months to 1 year (Sarason et al., 1978). Section 1 of the LES taps into experiences common to the general population and Section 2 taps into experiences common to students (Sarason et al., 1978). Subjects rate each event on a 7-point Likert scale, ranging from -3 (*extremely negative*) to +3 (*extremely positive*); the sum of scores for the positive and negative experiences is calculated separately to represent their respective impact and is referred to as positive change and negative change (Sarason et al., 1978). The total change score, calculated by summing the absolute value of all items, measures the total amount of change in one’s life (Sarason et al., 1978). Higher scores on the negative-change subscale correlates positively with measures of depression and anxiety (Sarason et al., 1978). Test-retest reliability over a 5- to 6-week period ranged from .19 to .53 for positive change, .56 to .88 for negative change, and .63 to .64 for total change (Sarason et al., 1978). This study used the total change score. Internal consistency was high for Time 1 and Time 2 (α = .97 and .94, respectively).
**Psychological distress.** Psychological distress was operationalized as the presence of symptoms of mental and/or physical upset. For this study, these symptoms did not have to reach clinical threshold for a specific disorder. Since perfectionism has been conceptualized as a transdiagnostic construct, assessing a broad range of symptoms seemed most fruitful. The Brief Symptom Inventory-18 (BSI-18; Derogatis, 2000) is an 18-item, self-report measure designed to assess symptoms of psychological distress across three dimensions, namely Somatization, Depression, and Anxiety. Subjects rate symptom severity over the prior week on a 5-point Likert scale, ranging from 0 (*not at all*) to 4 (*extremely*). The Global Severity Index yielded from the sum of items provides a broad estimate of distress and can range from 0 to 72; dimension scores can be evaluated to determine the specific nature and intensity of an individual’s distress (Derogatis, 2000).

For clinical interpretation, raw scores obtained on the BSI-18 are transformed to area *t* scores; in community samples, the clinically significant cut-off is a *t* score of 63 or higher. The transformed scores are truncated at 52; that is, any participants scoring 52 and above (through to the highest possible score of 72) would receive a transformed score of 81. Similar to other studies using the BSI-18, this study used the raw scores for the statistical analyses (e.g., Andreu et al., 2008; Asner-Self, Schreiber, & Marotta, 2006; Carlson et al., 2004; Jacobsen et al., 2005; Piersma, Reaume, & Roes, 1994; Wang et al., 2010). In this study, raw scores were used for the analyses to avoid losing data.

The internal consistency ranged from moderate to strong for the dimensions and total score (Somatization = .74; Depression = .84; Anxiety = .79; Total [Global Score] =
PERFECTIONISM

.89; Derogatis, 2000). Test-retest reliability is .90 (Derogatis, 2000), suggesting that scores on the BSI-18 are consistent over time. Finally, construct and convergent validity were both reported to be good; interested readers should consult Derogatis (2000) for further information. In this study, internal consistency was high at Time 1 and Time 2 (α = .92 and .92, respectively).

Procedures

The primary investigator e-mailed department chairs in order to request permission to contact professors teaching in the summer and fall terms. With permission, the primary investigator contacted professors to explain the study approximately 1 month before the start of the term. Professors were asked for permission to enter their classroom on two occasions: the first day of class to solicit participation and to administer measures and again when the first exam was scheduled.

One should note that the number of days between each time period differed for students assessed during the summer term and fall term. The summer term is significantly shorter and more condensed compared to the fall term; consequently, students taking summer classes were given their first exam only 2 weeks after their initial assessment, whereas students taking fall classes were administered the first exam approximately 6 weeks after their initial assessment. Despite the difference in elapsed time between assessments, the decision to assess students immediately after their first exam was made to minimize inconvenience for professors and students; additionally, assessing students after more than one exam may have introduced significant confounds to the study.
Fortunately, no significant differences emerged between students assessed in the summer and fall terms (discussed in Results).

**Time 1.** With permission, the primary investigator entered classrooms on the first day of the trimester and solicited participation a few minutes before the start of class. Students were told that the primary investigator was conducting a two-part study on perfectionism and stress in graduate students. The primary investigator explained that participation was completely voluntary and anonymous and would require approximately 5 to 8 minutes to complete. Participants were informed that they could choose to enter a raffle for one of four $50 Visa gift cards by providing their preferred method of contact on a slip provided by the primary investigator, who explained that they needed to complete the slip on both occasions to be eligible for the raffle.

Students were asked to create a pseudonym and given a prompt to write it on each measure (explained later in further detail). They were encouraged to choose an identification that they would remember if they chose not to use the example prompt given by the investigator (i.e., mother’s maiden name and last four digits of their social security number). The primary investigator explained that the ID was required to retain a connection between assessments and would not be used to identify them.

Packets were distributed to every student in the class in order to prevent the investigator from knowing who completed the study. Participants were asked to complete the study at some point before the end of class and to leave their packets by the door or on their chair, regardless of their decision to complete them. Participants were asked to place completed measures back into the envelope provided by the primary investigator.
The primary investigator provided additional packets by each room exit to serve as a reminder for participants to leave their packets.

**Time 2.** The primary investigator returned to each class when the first exam was scheduled. Rather than distributing packets to each student, packets were left by each room exit. The primary investigator announced the second part of the study a few minutes before the exam started. Students were quickly reminded about the study and asked to complete the surveys after they completed the exam. The primary investigator reminded students that their participation was voluntary and anonymous. Students were to use the same ID they used for the first assessment in order to retain a connection to their previous survey. Students were asked to leave the packets in a pile by the exit and reminded that they could choose to enter into the raffle if they provided their contact information on the slip inside the envelope. After the exam period was over, the primary investigator retrieved the packets.

To ensure confidentiality, as well as to retain a connection between assessment periods, subjects were asked to refrain from writing their name and to write only the last four digits of their SSN and their mother’s maiden name. The primary investigator created a prompt at the top of each measure in the envelope ("Mother’s maiden name and last four digits of SSN"). This technique has been used to identify participants’ respective repeated measures data, such as tracking attendance, and to look for change over time per each individual. The goal was to create a unique code that prevented the identification of participants but that each of them would remember for the second assessment. Data were
PERFECTIONISM

stored in a locked cabinet in the psychology department at PCOM during the entire course of the study.

To control for order effects, the primary investigator randomized the order of the measures for each packet for both assessments. To accomplish this, the investigator used a research randomizer tool on www.randomizer.org. For the first assessment period, the investigator input 150 sets of five unique numbers per set with an unsorted range of one to five, unsorted. The number of sets was chosen based on the number of participants approved by the Internal Review Board. The result was an Excel spreadsheet that contained a randomized order for the measures. To follow the randomized order as outlined by the tool, the primary investigator assigned a corresponding number to each measure: 1 = demographic questionnaire; 2 = CPQ; 3 = LES; 4 = CDS; and 5 = BSI-18. The investigator compiled each envelope (i.e., packet) accordingly and marked off each series to minimize the potential for error (i.e., repeating a series). For the second assessment, the investigator followed a similar procedure without including the demographic questionnaire. Specifically, the primary investigator input 150 sets of four unique numbers per set with an unsorted range of two to five. The corresponding numbers used for the first assessment remained the same.

Since the number of students who would participate was unknown, the primary investigator created enough envelopes for each student based on the estimated number of students enrolled in each class. This information was obtained from PCOM’s Nucleus webpage. The investigator created the same number of envelopes for both assessment periods to account for lost packets (e.g., if a student threw it in the garbage or
accidentally did not return it). The investigator created 150 packets for the summer term and 300 packets for the fall term.

Each envelope was checked for completion upon pick-up. First, each slip for the raffle was removed and placed in a separate envelope labeled “Raffle;” the purpose was to ensure no connection between identifiable participant information and completed surveys. Then, the primary investigator reviewed each survey in the packet to check for missing items. Blank surveys were gathered and reused for later data collection. Completed surveys were entered into SPSS. Incomplete surveys were tracked as well; a survey was considered incomplete and not included in the final analyses if it was missing an ID or if there was more than one incomplete survey. A survey was considered incomplete but usable if at least 90% of each questionnaire was completed.
Chapter 4: Results

Preliminary Analyses and Descriptive Statistics

All statistical analyses were performed using statistical software, SPSS version 21. The demographic questionnaires provided information about race, gender, program type, and year of study (see Table 1). Data derived from the demographic questionnaire were analyzed and reported using descriptive statistics in order to evaluate any significant differences (e.g., between gender, year of study). A repeated-measures MANOVA showed no differences between participants in different programs, $\Lambda = .83, F(20, 452) = 1.34, p = .15$, or between participants in different years, $\Lambda = .99, F(4, 139) = .34, p = .85$. Finally, no differences emerged between genders, $\Lambda = .95, F(8, 440) = 1.51, p = .15$. A chi-square analysis revealed no differences between race and perfectionism at Time 1, $\chi^2(14) = 14.44, p = .42$. 
Table 1

*Demographic Characteristics of Sample*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Time 1</th>
<th></th>
<th>Time 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>%</td>
<td>$n$</td>
<td>%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>54</td>
<td>23.8</td>
<td>41</td>
<td>27.9</td>
</tr>
<tr>
<td>Female</td>
<td>171</td>
<td>75.0</td>
<td>105</td>
<td>71.4</td>
</tr>
<tr>
<td>Rather not say</td>
<td>2</td>
<td>.9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>131</td>
<td>57.5</td>
<td>89</td>
<td>60.5</td>
</tr>
<tr>
<td>25-34</td>
<td>84</td>
<td>36.8</td>
<td>51</td>
<td>34.7</td>
</tr>
<tr>
<td>35-44</td>
<td>9</td>
<td>3.9</td>
<td>6</td>
<td>4.1</td>
</tr>
<tr>
<td>45-54</td>
<td>1</td>
<td>.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>55+</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rather not say</td>
<td>2</td>
<td>.9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Asian</td>
<td>20</td>
<td>8.8</td>
<td>12</td>
<td>8.2</td>
</tr>
<tr>
<td>African-American</td>
<td>22</td>
<td>9.6</td>
<td>13</td>
<td>8.8</td>
</tr>
<tr>
<td>Hispanic</td>
<td>11</td>
<td>4.8</td>
<td>7</td>
<td>4.8</td>
</tr>
<tr>
<td>White</td>
<td>162</td>
<td>71.1</td>
<td>110</td>
<td>74.8</td>
</tr>
<tr>
<td>Multiple</td>
<td>4</td>
<td>1.8</td>
<td>1</td>
<td>.7</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>.9</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td>Rather not say</td>
<td>5</td>
<td>2.2</td>
<td>1</td>
<td>.7</td>
</tr>
<tr>
<td><strong>Year</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>123</td>
<td>53.9</td>
<td>78</td>
<td>53.1</td>
</tr>
<tr>
<td>Second</td>
<td>103</td>
<td>45.2</td>
<td>68</td>
<td>46.3</td>
</tr>
<tr>
<td><strong>Program</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MS School Psychology</td>
<td>4</td>
<td>1.8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>EdS</td>
<td>18</td>
<td>7.9</td>
<td>10</td>
<td>6.8</td>
</tr>
<tr>
<td>Physician’s Asst.</td>
<td>87</td>
<td>38.2</td>
<td>64</td>
<td>43.5</td>
</tr>
<tr>
<td>PsyD Clinical</td>
<td>44</td>
<td>19.3</td>
<td>26</td>
<td>17.7</td>
</tr>
</tbody>
</table>
Pearson’s bivariate correlations were conducted for each measure at Time 1 and Time 2 (see Table 2). At Time 1, the CPQ was significantly correlated with the CDS, \( r = .328, p < .001\); the BSI-18, \( r = .387, p < .001\); and the LES, \( r = .164, p = .048\). Time 1 scores on the CDS were significantly correlated with Time 1 scores on the BSI-18, \( r = .43, p < .001\), but not the LES, \( r = .046, p = .58\). Time 1 scores on the BSI-18 were not significantly correlated with Time 1 scores on the LES, \( r = .15, p = .067\).

At Time 2, scores on the CPQ were significantly correlated with scores on the CDS, \( r = .375, p < .001\), and on the BSI-18, \( r = .40, p < .001\). Time 2 scores on the CPQ were not significantly correlated with scores on the LES at Time 2, \( r = .099, p = .237\). Time 2 scores on the CDS were significantly correlated with scores on the BSI-18, \( r = .52, p < .001\), and LES, \( r = .237, p = .004\), at Time 2. Scores on the BSI-18 at Time 2 were significantly correlated with scores on the LES at Time 2, \( r = .237, p = .004\).

Correlations on measures at Time 1 and Time 2 were also examined. Time 1 scores on the CPQ were also significantly correlated with Time 2 scores on the CPQ, \( r = .648, p < .001\); the CDS, \( r = .329, p < .001\); and the BSI-18, \( r = .298, p < .001\). Scores on the CPQ at Time 1 were not significantly correlated with Time 2 scores on the LES, \( r = .
.151, \( p = .07 \). Time 1 scores on the CDS were significantly correlated with Time 2 scores on the CDS, \( r = .74, p < .001 \), and the BSI-18, \( r = .434, p < .001 \), but not with the LES, \( r = .129, p = .123 \). Time 1 scores on the BSI-18 were significantly correlated with Time 2 scores on the BSI-18, \( r = .735, p < .001 \), and on the LES, \( r = .239, p = .004 \). Finally, Time 1 scores on the LES were significantly correlated with Time 2 scores on the LES, \( r = .44, p < .001 \).

### Table 2

**Bootstrapped Bivariate Correlations and Descriptive Statistics for Time 1 and Time 2**

<table>
<thead>
<tr>
<th>Measure</th>
<th>( M (SD) )</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 CPQ</td>
<td>25.00 (5.22)</td>
<td>1</td>
<td>.33***</td>
<td>.39***</td>
<td>.16**</td>
<td>.65***</td>
<td>.33***</td>
<td>.3***</td>
<td>.15</td>
</tr>
<tr>
<td>T1 CDS</td>
<td>75.29 (20.43)</td>
<td>1</td>
<td>.43***</td>
<td>.05</td>
<td>.36***</td>
<td>.74***</td>
<td>.43***</td>
<td>.13</td>
<td></td>
</tr>
<tr>
<td>T1 BSI-18</td>
<td>12.28 (11.39)</td>
<td>1</td>
<td>.15</td>
<td>.37***</td>
<td>.43***</td>
<td>.74***</td>
<td>.24***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T1 LES</td>
<td>18.60 (23.04)</td>
<td>1</td>
<td>.66</td>
<td>.15</td>
<td>.14</td>
<td>.44***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 CPQ</td>
<td>27.07 (4.65)</td>
<td>1</td>
<td>.38***</td>
<td>.4***</td>
<td>.09</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 CDS</td>
<td>75.01 (21.71)</td>
<td>1</td>
<td>.52***</td>
<td>.24***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 BSI-18</td>
<td>11.91 (11.01)</td>
<td>1</td>
<td>.24***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 LES</td>
<td>14.72 (16.71)</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. n = 145. CPQ = Clinical Perfectionism Questionnaire; CDS = Cognitive Distortions Scale; BSI-18 = Brief Symptom Inventory-18; LES = Life Experiences Survey.*

**p < .05. ***p < .001.
**Analysis of missing data.** Prior to conducting the analyses for each hypothesis, missing data were analyzed. There were two types of missing data: (a) completed measures with missing items and (b) attrition from Time 1 to Time 2. Surveys with missing items were addressed first because total scores could not be calculated without a response to each item. A total of 10 items were missing responses from Time 1, and 16 responses were missing responses from Time 2. To replace missing values, linear interpolation was performed for each item that was missing a response. Linear interpolation replaced missing data by imputing the response value immediately before and following the missing response (Cokluk & Kayri, 2011).

The next task was to analyze attrition in order to determine if there was a significant difference between subjects who completed the surveys once versus participants who completed the surveys on both occasions. To accomplish this, a MANOVA was performed. First, the assumption of equality of covariance matrices was tested using Box’s test since the sample sizes were different (Field, 2009). Results from Box’s test were nonsignificant ($p = .097$), indicating that the matrices were equal and thereby satisfying the assumption of homogeneity (Field, 2009). Next, Wilks’s lambda was used to compare the means for participants who completed surveys at Time 1 versus participants who completed surveys at Time 1 and Time 2. There were no significant differences between participants who completed the measure at Time 1 compared to those who completed the measures on both occasions, $\Lambda = .995$, $F(3, 222) = .380$, $p = .767$. 
**Hypothesis 1.** To test whether perfectionism is a vulnerability, two analyses were performed that assessed its stability and predictive validity. First, to evaluate stability, a paired-samples t test was conducted to compare mean scores on the CPQ obtained at Time 1 and Time 2. The paired-samples t test was designed to detect differences in means in repeated measures designs, and consequently, it takes into account the fact that some constancy is expected in participant responses (Field, 2013). Results showed a moderate positive correlation in scores on the CPQ from Time 1 to Time 2 \( (r = .64) \), which was highly significant \( (p < .001) \) and had a bootstrapped confidence interval that did not include zero, BCa 95% CI \([.52, .73] \). Mean scores on the CPQ obtained at Time 1 \((M = 25.00, SD = 5.22) \) were different from scores obtained at Time 2 \((M = 27.07, SD = 4.65) \). This difference, \(-2.064 \) BCa 95% CI \([-2.75, -1.37] \), was significant, \( t(145) = -5.89, p = .001 \), and represented a small effect size, \( d = .44 \). Results are shown in Table 3.

### Table 3

*Independent Samples t Test: Comparison of Mean Scores on the CPQ at Time 1 and Time 2*

<table>
<thead>
<tr>
<th>Variable</th>
<th>( n )</th>
<th>( M )</th>
<th>( SD )</th>
<th>( t )</th>
<th>( df )</th>
<th>Sig. (two-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 – Time 2</td>
<td>146</td>
<td>2.06</td>
<td>4.23</td>
<td>-5.89</td>
<td>145</td>
<td>.001</td>
</tr>
</tbody>
</table>

*Note.* CPQ = Clinical Perfectionism Questionnaire.
Hypothesis 2. Second, a hierarchical multiple regression analysis was conducted in order to test whether the independent variables, perfectionism and life stress as measured by the CPQ and LES, could significantly predict the dependent variable (i.e., psychological distress as measured by the BSI-18) after controlling for Time 1 distress. In keeping with the cognitive vulnerability stress-interaction model, an interaction term was created in order to determine whether the interaction between perfectionism and stress added predictive value to the model (Schmidt & Joiner, 2004).

Prior to running the analysis, assumptions of the regression were checked. To determine whether there was multicollinearity among any of the variables, correlation matrices were analyzed across all variables. None of the correlation coefficients were above .90, indicating that multicollinearity was not an issue with the data. (See Table 2 for correlation matrixes.) Variance Inflation Factor (VIF) and tolerance values were within acceptable ranges for the first model (1.00 and 1.00, respectively). VIF and tolerance values were within acceptable ranges for all three predictors in Model 2 (Time 1 BSI-18 = 1.02 and .98; CPQ = 1.04 and .96; and LES = 1.03 and .98, respectively). VIF and tolerance values for Model 3 were also within acceptable ranges for each predictor and their interaction (Time 1 BSI-18 = 1.02 and .97; CPQ = 1.37 and .73; LES = 1.15 and .87; Interaction = 1.38 and .72, respectively). Tests of skewness and kurtosis found that the variables were not normally distributed; to compensate for this issue, bootstrapping was performed. The assumption of independence was satisfied as indicated by the Durbin Watson value of 2.119. Variables were also found to be homoscedastic.
The predictor variables were centered prior to computing their interaction (Field, 2013). Scores on the BSI-18 from Time 1 were entered into the model first in order to control for their effects on the dependent variable. Scores on the CPQ and LES were entered into the second block of the regression, followed by their interaction (CPQ x LES). This method permitted the investigator to determine the unique contribution of each independent variable to variation in psychological distress.

Results from the first step of the regression, with scores on the BSI-18 from Time 1 as the predictor, showed that Time 1 distress significantly predicted distress at Time 2, $b = -0.87$ 95% BCa [-1.59, -.29], $t(144) = -4.12, p = .007$. An ANOVA indicated that the first model was significant, $F(1, 144) = 16.98, p = .000$. Time 1 scores on the BSI-18 accounted for approximately 11% of the variance in scores on Time 2 BSI-18 scores. The Adjusted $R^2$ value decreased to .099, resulting in a shrinkage of 1%, meaning that the same model derived from the population would account for 1% less variance in the outcome (Field, 2013).

In Step 2, Time 1 distress, perfectionism, and stress were entered as the predictor variables; results revealed that Time 1 distress and perfectionism significantly predicted psychological distress at Time 2, $b = -.99$ 95% BCa [-1.64, -.48], $t(142) = -5.07, p = .004$, and $b = .67$ 95% BCa [.36, .97], $t(142) = 4.33, p = .001$, respectively. Stress was not a significant predictor, $b = .13$ 95% BCa [-.006, -.54], $t(142) = 2.64, p = .20$. An ANOVA indicated that the second model was significant, $F(3, 142) = 16.75, p = .000$. Scores on the BSI-18 at Time 1, CPQ, and LES accounted for 26% of the variance in scores on the BSI-18 at Time 2, which is an additional 16% of the variance ($\Delta R^2 = .16, p = .000$). The
Adjusted $R^2$ value decreased to .25, resulting in a shrinkage of 1.5%, meaning that the same model derived from the population would account for 1.5% less variance in the outcome (Field, 2013).

In Step 3, the interaction term, CPQ x LES, was added as a predictor in Block 3. The interaction was not a significant predictor, $b = -.02$ 95% BCa [-.07, .04], $t(141) = -1.47$, $p = .24$. Results from an ANOVA indicated that the third model was also significant, $F(4, 141) = 13.21$, $p = .000$. With each predictor and the Perfectionism x Stress interaction included in the model, the value for $R^2$ increased to .27, indicating that the interaction added .01, or approximately 1%, of the variance in Time 2 BSI-18 scores. In other words, interaction between perfectionism and stress accounts for an additional 1% of the variance in the outcome, which did not significantly improve the predictive value of the model ($\Delta R^2 = .1, p = .43$). The Adjusted $R^2$ value decreased to .252, resulting in a shrinkage of 2.1%, which indicates that the same model derived from the general population would account for 2.1% less variance in the outcome (Field, 2013). Please see Table 4 for the Regression Summary.
Table 4

*Hierarchical Multiple Regression Analyses Predicting Psychological Distress from Perfectionism, Stress, and Interaction*

<table>
<thead>
<tr>
<th>Predictor</th>
<th>(b)</th>
<th>(\text{SEB})</th>
<th>(\beta)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 BSI-18 (Centered)</td>
<td>.87</td>
<td>.31</td>
<td>-.33**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([-1.59, -.29]]</td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 BSI-18 (Centered)</td>
<td>-.99</td>
<td>.19</td>
<td>-.37**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([-1.64, -.48]]</td>
<td></td>
</tr>
<tr>
<td>CPQ (Centered)</td>
<td>.67</td>
<td>.17</td>
<td>.26***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([.36, .97]]</td>
<td></td>
</tr>
<tr>
<td>LES (Centered)</td>
<td>.13</td>
<td>.12</td>
<td>.19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([-0.06, -.54]]</td>
<td></td>
</tr>
<tr>
<td><strong>Step 3</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time 1 BSI-18 (Centered)</td>
<td>-.98</td>
<td>.29</td>
<td>-.36**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([-1.61, -.47]]</td>
<td></td>
</tr>
<tr>
<td>CPQ (Centered)</td>
<td>.54</td>
<td>.23</td>
<td>.26*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([-1.11, 1.01]]</td>
<td></td>
</tr>
<tr>
<td>LES (Centered)</td>
<td>.15</td>
<td>.12</td>
<td>.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([.007, .55]]</td>
<td></td>
</tr>
<tr>
<td>CPQ x LES</td>
<td>-.02</td>
<td>.02</td>
<td>-.13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>([-0.07, .04]]</td>
<td></td>
</tr>
</tbody>
</table>

Note: \(R^2 = .11, p = .000\); Step 2 \(\Delta R^2 = .16, p = .000\); Step 3 \(\Delta R^2 = .01, p = .14\).  
CPQ = Clinical Perfectionism Questionnaire; BSI-18 = Brief Symptom Inventory-18; LES = Life Experiences Survey

* \(p < .01\). ** \(p < .05\). *** \(p < .001\).
Hypothesis 3. To test the hypothesis that cognitive distortions mediate the relationship between perfectionism and psychological distress, a mediational analysis was performed using bootstrapping. Bootstrapping was preferred to the Baron and Kenny (1986) method because it uses intensive resampling (1,000 times in this study) to derive confidence intervals for the indirect effect, thereby permitting evaluation of the degree of mediation observed in the data (e.g., Field, 2013; Shrout & Bolger, 2002). Mediation is said to occur when the confidence interval does not include zero (e.g., Field, 2013; Fritz & MacKinnon, 2007).

Testing mediation required a four-part analysis. In Step 1 of the mediation model, perfectionism significantly predicted psychological distress when cognitive distortions were not included in the model (path c), $b = .6117$ 95% BCa [.28, .95], $t(145) = 3.61$, $p = .0004$, and accounted for approximately 8% of the variance in psychological distress. The positive $b$ value indicated that as perfectionism increased, so did psychological distress.

In Step 2 of the mediation model, results showed that perfectionism significantly predicted the mediator, cognitive distortions (path a), $b = 1.338$ 95% BCa [.69, 1.99], $t(145) = 4.1113$, $p = .0001$. Perfectionism accounted for approximately 10% of the variance in cognitive distortions. The positive $b$ value indicated that the relationship with cognitive distortions is also positive: As perfectionism increased, cognitive distortions also increased.

Step 3 of the mediation process showed that the mediator, cognitive distortions, significantly predicted psychological distress after controlling for perfectionism (path b), $b = .24$ 95% BCa [.16, .32], $t(144) = 6.24$, $p = .000$. When including cognitive
distortions in the model, perfectionism no longer significantly predicted psychological distress, $b = .29$, 95% BCa [-.02, .61], $t(144) = 1.82$, $p = .07$. This model accounted for approximately 28% of the variance in psychological distress. The positive $b$ value indicated that as perfectionism and cognitive distortions increased, so did psychological distress.

There was a significant indirect effect of perfectionism on psychological distress via cognitive distortions, $b = .32$, 95% BCa CI [.15, .54]. Since the bootstrapped confidence interval did not include zero, a true indirect effect was indicated; that is, the effect was significantly greater than zero at $\alpha = .05$. These results provided evidence that cognitive distortions mediated the relationship between perfectionism and psychological distress and represented a moderate-to-large effect, $\kappa^2 = .15$, 95% BCa CI [.07, 24] (Field, 2013). Please see Figure 1.

*Figure 1.* The mediating role of cognitive distortions.
Posthoc Analysis

It was of interest to explore whether students scoring higher on the CPQ at Time 1 would also score higher on the BSI-18, CDS, and LES at Time 2. The decision not to include this analysis with the original hypotheses was made to avoid losing too much data. The prospective behavioral high-risk design proposed by Riskind and Alloy (2006) would have required deleting the middle group to focus on “low-” and “high-” risk participants. While this design is methodologically rigorous, the purpose of this study was exploratory, and deleting a significant portion of the sample prior to the analyses would have limited the statistical power to detect differences.

Participants were sorted into low, middle, and high tertiles based on their scores on the CPQ at Time 1. The Time 1 mean on the CPQ was 25.00 with a standard deviation of 5.22. With that information, groups were differentiated as follows: the low tertile was comprised of participants scoring below one standard deviation from the mean (lowest scores through 19.6); the middle tertile was comprised of participants scoring within one standard deviation (19.61 through 29.87); and the upper tertile was comprised of participants scoring above one standard deviation from the mean (29.88 through highest scores). Creating levels within the independent variable allowed the primary investigator to determine more accurately the type of relationship that existed between variables. For descriptive statistics, please refer to Table 5.
A repeated-measures MANOVA was conducted to test the differences between the low, middle, and high groups of perfectionists on each dependent measure simultaneously. Results from the MANOVA using unequal group sizes showed that Box’s test was significant ($p = .000$), indicating that the assumption of equality of covariance matrices was violated. In this case, the rest of the analysis could not be interpreted. Field (2013) suggested two strategies when Box’s test is significant and group sizes are unequal: (a) randomly delete cases so that the group sizes are equal and then run the MANOVA again and (b) run three two-way ANOVAs with equalized groups and use a Bonferonni correction significance level adjusted to .02 to correct for the inflated alpha level for running three tests.

In order to equalize the groups, the primary investigator used a random numbers table to randomly delete 74 cases from the middle group and four cases from the high group. Deleting cases from the middle and high groups resulted in three groups with 23 participants who completed the measures at Time 1 and Time 2. The means and standard deviations on dependent measures for each group are shown in Table 6. Figure 2 (shown below) illustrates the group differences at Time 1 and Time 2.

<table>
<thead>
<tr>
<th>Group</th>
<th>$n$</th>
<th>$M (SD)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>39</td>
<td>17.20 (1.64)</td>
</tr>
<tr>
<td>Middle</td>
<td>148</td>
<td>24.58 (2.53)</td>
</tr>
<tr>
<td>High</td>
<td>41</td>
<td>32.46 (2.72)</td>
</tr>
</tbody>
</table>
Table 6

*Descriptive Statistics Sorted by Scores on the CPQ*

<table>
<thead>
<tr>
<th></th>
<th>Time 1</th>
<th></th>
<th>Time 2</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CDS</td>
<td>LES</td>
<td>BSI-18</td>
<td>CDS</td>
</tr>
<tr>
<td>Low</td>
<td>68.21</td>
<td>12.43</td>
<td>7.43</td>
<td>68.65</td>
</tr>
<tr>
<td></td>
<td>(15.85)</td>
<td>(7.07)</td>
<td>(7.51)</td>
<td>(18.63)</td>
</tr>
<tr>
<td>Middle</td>
<td>68.21</td>
<td>12.65</td>
<td>9.82</td>
<td>70.30</td>
</tr>
<tr>
<td></td>
<td>(19.27)</td>
<td>(9.09)</td>
<td>(11.33)</td>
<td>(22.69)</td>
</tr>
<tr>
<td>High</td>
<td>89.00</td>
<td>25.04</td>
<td>21.00</td>
<td>91.07</td>
</tr>
<tr>
<td></td>
<td>(75.14)</td>
<td>(13.45)</td>
<td>(11.88)</td>
<td>(24.18)</td>
</tr>
</tbody>
</table>

*Note. n = 69. CPQ = Clinical Perfectionism Questionnaire; CDS = Cognitive Distortions Scale; LES = Life Experiences Survey; BSI-18 = Brief Symptom Inventory-18.*

*Figure 2. Between-groups comparison of scores on dependent measures at Time 1 and Time 2. Standardized scores are presented for ease of review since the BSI-18, CDS, and LES each employed a different Likert Scale.*
Another repeated-measures MANOVA was conducted with the equalized groups. Again, Box’s test was significant \((p = .002)\); however, this statistic can be ignored when group sizes are equal because it is unstable and it is possible to assume Pillai’s statistics are robust, especially when there are violations of normality (Field, 2013). Results from the overall MANOVA using Pillai’s Trace revealed a significant difference between the low, middle, and high groups of perfectionists, \(V = .345, F(6, 130) = 4.55, p < .001\). The partial \(\eta^2\) value was .17 for the overall model, meaning that the effect for group differences in the MANOVA accounted for 17% of the group differences plus associated error variance and is considered to be a large effect (Rosnow & Rosenthal, 2003).

Results also showed that within-group differences were not significant; specifically, there were no significant main effects of time, \(V = .03, F(3, 64) = .76, p = .52\), and there was no interaction effect with Time x Perfectionism, \(V = .07, F(6, 130) = .78, p = .588\). Results are shown in Table 7.

<table>
<thead>
<tr>
<th>Source</th>
<th>Value</th>
<th>F</th>
<th>Hypothesis df</th>
<th>Error df</th>
<th>Sig. (two-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between groups</td>
<td>.35</td>
<td>4.54</td>
<td>6.00</td>
<td>130.00</td>
<td>.000</td>
</tr>
<tr>
<td>Within groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>.03</td>
<td>.76</td>
<td>3.00</td>
<td>64.00</td>
<td>.52</td>
</tr>
<tr>
<td>Time x Group</td>
<td>.07</td>
<td>.78</td>
<td>6.00</td>
<td>130.00</td>
<td>.588</td>
</tr>
</tbody>
</table>
A closer evaluation of the results from the within-groups analysis showed that means scores on the BSI-18, CDS, or LES at Time 2 were not significantly different from means obtained at Time 1 ($p = .752, .416, \text{and} .258$, respectively). Further, the effects of the interaction of Time x Perfectionism were not significant on the BSI-18, CDS, or LES ($p = .272, .918, .489$, respectively).

With regard to between-group differences, there were significant differences on each dependent measure, BSI-18 $F(2, 66) = 12.35, p < .001$; CDS $F(2, 66) = 9.67, p < .001$; LES $F(2, 66) = 6.89, p = .002$. Effect sizes attributable to between-group differences were within the moderate range: .27 for the BSI-18, .23 for the CDS, and .17 for the LES. The effect sizes mean means that 27% of the variance in the BSI-18, 23% of the variance in the CDS, and 17% of the variance in the LES were attributable to perfectionism. Power to detect differences was sufficient: .995 for the BSI-18, .978 for the CDS, and .911 for the LES.

Between-subject effects were examined for each dependent measure, the BSI-18, CDS, and LES, based on the level of perfectionism reported. Differences on the BSI-18 and CDS were analyzed using the Bonferroni correction, which is a conservative and robust test (Field, 2013). Because the LES variable did not meet the assumption of equal variance as measured by Levene’s test, the Games-Howell statistic was analyzed; this statistic is robust when there are unequal variances if group sizes are equal (Field, 2013). Findings indicated that there were significant differences in the means for each dependent variable for the different groups formed by categories of perfectionism. On the BSI-18, there was a mean difference of 12.89 between participants with high levels of
perfectionism and participants with low levels of perfectionism; this difference was significant \((p < .001)\). There was a mean difference of 12.21 between participants with high levels of perfectionism and participants scoring in the middle tertile, which was also significant \((p < .001)\). On the CDS, there was a significant mean difference of 21.60 between participants in the upper tertile and participants in the low tertile \((p = .001)\). Similarly, there was a significant mean difference of 20.77 between participants in the upper tertile compared to participants in the middle tertile \((p = .002)\). Finally, on the LES, there was a mean difference of 11.30 between participants with high levels of perfectionism compared to participants with low levels of perfectionism; this difference was significant \((p = .007)\). There was a significant mean difference of 10.19 between participants in the upper tertile compared to participants in the middle tertile \((p = .028)\).

Taken together, these results indicated that participants scoring in the upper tertile on the CPQ reported significantly greater distortions, psychological distress, and stressors compared to participants scoring in the low or middle tertiles. Results are shown in Table 8.
**Table 8**

*Mean Differences on Dependent Measures*

<table>
<thead>
<tr>
<th>Group</th>
<th>BSI-18</th>
<th>CDS</th>
<th>LES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1. Low</td>
<td>-</td>
<td>-.67</td>
<td>-12.9***</td>
</tr>
<tr>
<td>2. Mid</td>
<td>.67</td>
<td>-</td>
<td>-12.2***</td>
</tr>
<tr>
<td>3. High</td>
<td>12.9***</td>
<td>12.2***</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note.* CPQ = Clinical Perfectionism Questionnaire; CDS = Cognitive Distortions Scale; BSI-18 = Brief Symptom Inventory-18; LES = Life Experiences Survey.

*p < .01, **p < .05, ***p < .001
Chapter 5: Discussion

The present study sought to accomplish two overarching goals. The first goal was to establish perfectionism as a vulnerability to psychological distress by examining its stability over time and its predictive validity after controlling for initial levels of distress. The second goal was to evaluate cognitive distortions as a mediating variable in the relationship between perfectionism and psychological distress. Differences between low, average, and high levels of perfectionism were also explored.

One must consider the results from this study in the context of the cognitive vulnerability stress-interaction model. The model presupposes a causal chain of events, namely that a preexisting vulnerability interacts with stress to produce symptoms of a disorder; the model further specifies that the interaction contributes to a disorder through cognitive distortions (Joiner et al., 1999). Broadly, findings from this study yielded mixed results with regard to support for perfectionism as a vulnerability. Results from the posthoc analyses revealed significant differences between participants reporting high levels of perfectionism and participants reporting low and average levels of perfectionism. Finally, results also provided support for cognitive distortions as a mediator. Implications for treatment and future research, as well as limitations of this study, are discussed in the following sections.

Perfectionism as a Vulnerability to Psychological Distress

To be established as a vulnerability, perfectionism had to demonstrate temporal stability and predictive validity; to some degree, results showed that perfectionism satisfied these criteria. First, temporal stability was measured by examining the amount of
change in scores on the Clinical Perfectionism Questionnaire (CPQ) from Time 1 to Time 2, and it was hypothesized that scores would not significantly fluctuate over time. To clarify further, scores were not expected to significantly decrease from Time 1 to Time 2. The purpose of demonstrating temporal stability was to show that perfectionism endures over time and that it is independent from symptoms of distress; that is, perfectionism is not a manifestation of distress. Consistent with previous research, results showed that perfectionism was moderately stable over time, which supported the hypothesis (e.g., Egan et al., 2011; Enns et al., 2001; Enns et al., 2005; Shafran & Mansell, 2001). These findings supported the stability of perfectionism and are theoretically consistent with the cognitive vulnerability stress-interaction model. Schemas, such as perfectionism, are expected to endure over time, and research suggests that they remain intact unless addressed in treatment (e.g., Ingram & Price, 2010). In other words, scores on a vulnerability measure would not be expected to decrease significantly without treatment. In this study, this assumption held up: While treatment status was not assessed, scores on the CPQ did not decrease from Time 1 to Time 2.

Of note was a statistically significant increase in scores on the CPQ from Time 1 to Time 2. Without a clinically significant cut-off established for the CPQ, determining whether the increase of approximately two points was clinically meaningful was difficult, especially considering that the increase did not exceed one full standard deviation from the mean. Nonetheless, as noted by Ingram and Price (2010), vulnerability levels can change under the right circumstances. Thus, the increase in scores on the CPQ could have
represented further activation of the perfectionistic schema elicited by internal stressors, such as pressure to meet standards.

Second, predictive validity was measured by using Time 1 scores on the CPQ to predict future (Time 2) scores on the Brief Symptom Inventory-18 (BSI-18). The purpose of testing predictive validity was to determine whether perfectionism temporally preceded symptoms of distress (Riskind & Alloy, 2006). It was hypothesized that perfectionism would predict scores on the BSI-18 at Time 2. Results from this study supported this hypothesis; specifically, scores on the CPQ at Time 1 statistically predicted scores on the BSI-18 at Time 2 after controlling for scores on the BSI-18 at Time 1. As scores on the CPQ increased, scores on the BSI-18 also increased, which reflected the influence of perfectionism on a change in symptoms of psychological distress (Barnett & Gotlib, 1988). These findings contributed to an already expansive body of literature showing the direct influence of perfectionism on such symptoms as depression, anxiety, and burnout (e.g., D’Souza et al., 2011; Egan et al., 2011; O’Connor & O’Connor, 2003).

While perfectionism predicted psychological distress at Time 2, findings that participant scores on the BSI-18 did not significantly change over time and that the Perfectionism x Stress interaction was not significant were partially inconsistent with the model. Specifically, the cognitive vulnerability stress-interaction model requires that the vulnerability and stressor interact to produce an increase in symptoms. Further, the interaction should take particular form: The vulnerability should be associated with the onset/development of symptoms in the presence of stressors, not in the absence of
stressors (Joiner et al., 1999). Thus, the “form” of the relationship between perfectionism, stress, and psychological distress was not as expected.

First, in keeping with the cognitive vulnerability stress-interaction model, one would expect scores on the BSI-18 to increase at Time 2. An increase in scores on the BSI-18 would demonstrate that perfectionism prospectively predicted the onset of symptoms of distress (Riskind & Alloy, 2006). In light of evidence that scores on the BSI-18 did not significantly increase from Time 1 to Time 2, it was not possible for the primary investigator to conclude that perfectionism temporally preceded symptoms of distress (Riskind & Alloy, 2006). Consequently, by failing to demonstrate temporal precedence, perfectionism failed to meet a central criterion of the model, namely to show that it caused psychological distress in this study (Ingram & Price, 2010). Despite failing to demonstrate temporal precedence over distress, perfectionism significantly predicted psychological distress at Time 2, which indicated that it does have some effect on the development or course of psychological distress and may still have etiological significance (Barnett & Gotlib, 1988).

Second, the Perfectionism x Stress interaction was not statistically significant. Such a finding suggested that stress was not necessary to produce symptoms of distress or distorted thinking patterns. Support for the Perfectionism x Stress interaction has been mixed in the literature, highlighting the difficulty in accurately capturing the relationships between complex constructs (e.g., Eberhart et al., 2011; Enns et al., 2005; Joiner et al., 1999; Kopala-Sibley & Santor, 2009; Kwon & Oei, 1992; Metalsky et al., 1993; Milyavskaya et al., 2014). Inconsistencies in research have yet to be reconciled, but
Joiner et al. (1999) speculated that the time frame and nature of the stressor itself may not provide the parameters with which to understand why some studies yield findings in support of the model and some do not.

In this study, results may be attributable to the timing of the assessments or the measure used to assess stress. One possibility is that the LES measure failed to adequately capture perceptions of stress elicited by the exam. Only one item on the LES tapped into stress related to exams (i.e., “Failing an important exam”). It did not provide information about the work load or similar academic pressures. Future research may better capture the Perfectionism x Stress interaction by using an alternative measure to assess stress.

Another possibility for the insignificant findings is that participants were already sufficiently stressed when classes started and that the exam was not a stressor as initially anticipated. Participants in this study apparently were already experiencing symptoms of distress by the time of the first assessment. Although the first day of class was assumed to be a less stressful time compared to midterms or finals, participants with high levels of perfectionism reported as much distress, distorted thoughts, and stress on the first day of class as they did after an exam. This finding appeared consistent with findings that students with perfectionism experienced greater negative affect and less positive affect during the academic year, as well as during winter and summer break, compared to healthy strivers (Milyavskaya et al., 2014). Thus, the persistent distress reported by individuals with high levels of perfectionism might reflect anticipatory anxiety about the
start of the school term and/or difficulty disengaging from academic worries (e.g., Flaxman et al., 2012).

The post-hoc analysis revealed that participants with high levels of perfectionism scored significantly higher on measures of distress, cognitive distortions, and stress at Time 1 and Time 2 compared to participants with low and average levels of perfectionism. These differences were clinically relevant as well. Scores on the BSI-18 were transformed for clinical interpretation, and findings showed that participants with high levels of perfectionism reported, on average, clinically significant symptoms of distress at Time 1 and Time 2 ($M = 63$ for both assessments; $SD = 7.9$ and $8.74$, respectively), whereas participants with low and average levels of perfectionism reported symptoms that fell below the clinical threshold. These results suggested that participants reporting high perfectionism experienced greater distortions in their thinking, stress, and symptoms of psychological distress compared to participants reporting low and average perfectionism. These findings add to an abundance of existing research showing greater symptoms in individuals with elevated levels of perfectionism compared to nonperfectionist control groups (e.g., Egan et al., 2011; Enns et al., 2005; Shafran & Mansell, 2001).

Although the total scores were calculated and used for the statistical analyses, differences in “types” of cognitive distortions were evaluated between groups of perfectionists. The CDS has two scales, Social Situations and Achievement, which were calculated and subsequently compared. Findings showed that both high and average groups of perfectionists endorsed significantly more achievement-related cognitive
distortions compared to socially-related cognitive distortions at Time 1 and Time 2. No differences in types of distortions were found among individuals in the low group. Additionally, participants in the high group reported significantly more achievement-related cognitive distortions compared to the low and average groups. These findings confirm that individuals with elevated levels of perfectionism experience more distorted thoughts about achievement compared to individuals with low and average levels of perfectionism; however, in the absence of evidence supporting an increase in achievement-related distortions following an exam at Time 2, the triggering event remains unclear.

In addition to highlighting differences in symptoms, assessing participants immediately after an exam created an opportunity to evaluate their emotional state based on their perceptions of their performance rather than their actual performance. High perfectionism has been shown to produce greater negative affect and physiological stress reactions during and immediately following highly salient evaluative situations prior to evaluative feedback (and therefore regardless of actual performance; e.g., Besser, Flett, Hewitt et al., 2008; Frost & Marten, 1990). Taking into consideration similar findings from previous research, the significant distress reported by participants with high perfectionism may have reflected lower self-confidence and greater fear of failure. Taken together, these results suggested that participants with high levels of perfectionism were categorically different from students with low and average levels of perfectionism, which appeared conceptually consistent with the cognitive vulnerability stress-interaction model.
Cognitive Distortions as a Mediator

Consistent with previous research, the results from this study also provided strong support for cognitive distortions as a mediating variable in the relationship between perfectionism and psychological distress (e.g., Besser, Flett, Hewitt et al., 2008; DiBartolo et al., 2001; Kopala-Sibley & Santor, 2009). These findings align with clinical observations that perfectionism is maintained by biases in information processing, such as greater focus on negative information concerning performance (e.g., Shafran et al., 2002). Compared to nonperfectionists, individuals with high levels of perfectionism have reported greater frequency and intrusions of negative thoughts during evaluative situations, which interfered with their performance (e.g., Besser, Flett, Hewitt et al., 2008; DiBartolo et al., 2001). Furthermore, negative and worrisome thoughts about performance produced significant decreases in affect immediately following performance situations and in weeks after (e.g., Besser, Flett, Hewitt et al., 2008; Metalsky et al., 1993). Results from those studies and from the current study highlight the impact of cognitive distortions on one’s emotional state. Similarly, evidence from this study can help explain the effectiveness of cognitive-behavioral therapy (CBT) interventions designed to reduce or alter information-processing biases in perfectionism (e.g., Egan & Hine, 2008; Glover et al., 2007; Handley, Egan, Kane, & Rees, 2015; Riley et al., 2007; Steele & Wade, 2008; Steele et al., 2013). Establishing cognitive mediation in this study lends additional empirical support to the theoretical assumptions of the cognitive vulnerability stress-interaction model, namely that cognitive distortions are an important mediating factor involved in distress states.
General Discussion

The cognitive vulnerability stress-interaction model is a framework to identify who is most likely to develop a disorder and which circumstances are most likely to trigger a disorder (Riskind & Alloy, 2006). Results from this study found partial support for the cognitive vulnerability stress-interaction model of perfectionism. However, considering that the overarching purpose of cognitive vulnerability research is to understand how people with a vulnerability differ from people without a vulnerability, these findings provide convincing evidence that something is different about individuals with high levels of perfectionism. Results from this study provided insight into who is most likely to develop psychological distress, namely students with high levels of perfectionism. Further, evidence that perfectionism is related to psychological distress through a cognitive pathway offered additional support for the cognitive vulnerability stress-interaction model. Without evidence showing that symptoms increased after a stressor, the time when symptoms are most likely to emerge remains to be seen.

The mood-state hypothesis proposed by Persons and Miranda (1992) may provide an explanation for the findings from this study. According to the mood-state hypothesis, the ability to accurately identify and report elevated vulnerability levels is contingent on one’s current mood state. Although largely consistent with the cognitive vulnerability stress-interaction model, this hypothesis departed from the assumption that stress activates underlying vulnerability factors (Persons & Miranda, 1992). Rather, authors postulated that vulnerabilities are activated by negative mood, and without negative mood, latent vulnerabilities are not observable or reportable. As noted, findings from this
study showed that participants with high levels of perfectionism were already experiencing clinically significant symptoms of psychological distress at Time 1; however, coupled with evidence that the Perfectionism x Stress interaction was nonsignificant, distress elicited by the start of an academic term might have activated the perfectionistic schema. Future research that utilizes more assessment periods and follows up with participants after academic demands resolve completely (e.g., post graduation) may help to disentangle the course, fluctuations, and impact of perfectionism and psychological distress over time.

Alternatively, perfectionism might operate differently from the operation proposed in this study. For example, perfectionism might be more accurately conceptualized as an unhealthy compensatory strategy that mediates the relationship between a different maladaptive schemata and psychological distress (e.g., Boone, Braet, Vandereycken, & Claes, 2013). Also, perfectionism may represent scars of psychological distress rather than a vulnerability factor for future episodes (e.g., Mongrain & Blackburn, 2006). Finally, results may be explained by a reciprocal relationship between perfectionism and symptoms of psychological distress, in which both constructs influence each other (McGrath et al., 2012). Additional research is needed to clarify whether the relationship between perfectionism, stress, and psychological distress is unidimensional or bidirectional (i.e., reciprocal). Understanding whether perfectionism is an antecedent to symptoms of psychological distress or a “complication” of symptoms (i.e., symptoms of psychological distress contribute to perfectionism) is critical in developing treatment approaches (McGrath et al., 2012).
Contributions to Existing Research

This study contributed to the existing body of research in a number of ways. First, this study provided a model of perfectionism based on a clearly articulated definition and theoretical framework. Many studies have used a diathesis-stress framework to understand perfectionism (e.g., Ashby, Noble, & Gnilka, 2012); surprisingly few studies have evaluated perfectionism from a cognitive vulnerability perspective. While the cognitive vulnerability stress-interaction paradigm is an extension of the diathesis-stress model, there are important differences. A diathesis is considered to be a fixed trait or genetic factor that predisposes an individual to a given outcome. Aligning with this conceptualization, the vast majority of previous research has treated perfectionism as a personality trait (e.g., Flaxman et al., 2012; Henning et al., 1998; Milyavskaya et al., 2014; O’Connor & Noyce, 2008). Identifying a personality trait risks creating an assumption that it is a fixed characteristic, like eye color, and less amenable to change (Riskind & Alloy, 2006). Such conclusions have little usefulness in a treatment setting. Similarly, trait measures of perfectionism assess both adaptive and maladaptive features of perfectionism, which has made interpretation of results difficult and led to few advances in clinical practice (Rheaume et al., 2000). Thus, reconceptualizing and testing perfectionism using a cognitive model was an important goal for this study. As discussed in the Background and Significance of Perfectionism section of Chapter 1, a cognitive model of perfectionism suggests that perfectionism is a set of maladaptive beliefs and, while stable, is amenable to change with treatment (e.g., Dickie, 2012; Egan, van Noort et al., 2014; Handley et al., 2015).
PERFECTIONISM

It begs the question why perfectionism has not been studied from a cognitive vulnerability standpoint. Cognitive vulnerability research largely focuses on factors that predispose individuals to a specific type of outcome, such as depression or anxiety. The purpose of this research is to identify a common thread among vulnerable individuals to better predict an outcome. This research is incredibly useful from a scientific and treatment perceptive. Perfectionism has not been included in this research, potentially because it is associated with such a wide variety of issues, thereby limiting its discriminant validity. However, identifying perfectionism as a vulnerability may still be useful. Although symptoms may vary considerably, the common thread among vulnerable individuals is the increased symptoms in certain settings. As this study demonstrated, high levels of perfectionism can lead to clinically significant symptoms of distress in academic settings.

Second, this study used a longitudinal design, which has significant advantages over cross-sectional designs. A longitudinal design allowed the evaluation of differences between groups of perfectionists, as well as examination of within-group changes. Furthermore, the vulnerability (i.e., perfectionism) was measured at both Time 1 and Time 2, whereas many other studies have assessed a vulnerability only at Time 1, thereby inferring that it was stable over time (e.g., Abramson et al., 1998; Mongrain & Blackburn, 2006). Administering the CPQ on both assessments provided evidence that perfectionism was stable, rather than relying on an assumption of stability.

Third, this study extended the current literature by investigating cognitive distortions as a mediating variable. Including cognitive distortions as a mediating variable
is important for Beck’s cognitive model since doing so builds empirical support for the theoretical specifications. By testing the cognitive component of perfectionism, which is largely overlooked in the existing literature, this study contributed to the understanding of mechanisms linking perfectionism to psychological distress.

Fourth, the measure of cognitive distortions that was administered differs from current measures of cognition and, as a result, captured information that might have been otherwise missed. The majority of scales measuring cognitive distortions include items based on a general prototype, which may be too narrow and fail to capture the inherent idiosyncrasy of self-statements (Glass & Arnkoff, 1997). Conversely, the CDS was intended to measure the process as opposed to the product by providing examples to illustrate the error (Covin et al., 2011).

**Limitations of the Current Study**

This study should be considered within the context of a number of limitations. First, this study employed a two-phase longitudinal design in which individual differences in distress were statistically controlled; a major limitation of this design is that it was not possible to differentiate between the onset, increase, maintenance, and remission of symptoms (Barnett & Gotlib, 1988). Implementation of a prospective behavioral high-risk design, which is the most rigorous design for the cognitive vulnerability stress-interaction model, was not feasible. In that design, potential participants are excluded from the sample if they report symptoms exceeding the clinical threshold for a disorder (e.g., Abramson et al., 1998; Alloy, Just, & Panzarella, 1997). Screening and excluding participants with clinical disorders at Time 1 provides a more
PERFECTIONISM

direct way of examining the relationship between a vulnerability and an outcome by clearly establishing (or disconfirming) temporal precedence and independence prior to the onset of a disturbance; it also provides a more stringent test of mediation (Kopala-Sibley & Santor, 2009; Riskind & Alloy, 2006). While the prospective behavioral high-risk design has many advantages, it requires a large pool of potential participants in order to ensure a final sample that is large enough to analyze. For example, Abramson et al. (1998) recruited nearly 6,000 students for their initial screening and reported a final sample size of 349. Adopting this design was not feasible for the current study because of limited resources and access to larger student populations. Future research should consider expanding the current study to include other local universities in order to gain access to a population large enough to implement the prospective behavioral high-risk design.

Second, data were based entirely on subjective self-report measures. As a result, information provided by participants may not be entirely accurate; for example, self-report measures are subject to influences of mood, selective memory, and self-presentation biases (e.g., Glass & Arnkoff, 1997). Future research using both subjective and objective assessment methods may address this limitation. Third, the findings were limited to graduate students at the Philadelphia College of Osteopathic Medicine and not necessarily applicable to other populations. Including other sites for participant recruitment might have yielded a sample more representative of the population. Fourth, although promising, the measures that were administered to assess perfectionism and cognitive distortions are still in the process of being validated. To date, the investigator
was able to identify only seven studies that used the CPQ (e.g., Chang & Sanna, 2012; Dickie et al., 2012; Egan, Shafran et al., 2014; Egan, van Noort et al., 2014; Riley et al., 2007; Steele et al., 2011; Stoeber & Damian, 2014) and two studies that used the CDS (e.g., Covin et al., 2011; Özdel et al., 2014). An important component of sound research is the use of validated measures (Kopala-Sibley & Santor, 2009). Additional research is needed to validate these measures, and this study should be replicated using validated measures.

**Implications and Clinical Relevance**

Limitations notwithstanding, results from this study have implications for the theory and practice of cognitive therapy. Consistent with previous research, these findings facilitate predictions about behavior, particularly who has the highest propensity to develop psychological distress (i.e., students with high levels of perfectionism; e.g., Enns et al., 2005). Insight regarding who is most likely to experience clinically significant symptoms of distress can inform both prevention and treatment. Efforts to improve outreach and support for perfectionistic students experiencing psychological distress are imperative to reducing the negative consequences of perfectionism. For example, department faculty can provide psychoeducation to help students develop positive care plans and resources for students in need of counseling services.

Furthermore, currently there are few empirically supported treatments for perfectionism, and this study provided evidence supporting a cognitive approach to treatment. Targeting cognitive distortions in perfectionists via such techniques as cognitive restructuring has received preliminary support (e.g., DiBartolo et al., 2001).
These findings provide evidence that targeting cognitive distortions is an appropriate focus in treatment; moreover, findings offered preliminary support for targeting achievement-related cognitive distortions in particular. For example, in this sample, nearly 30% of participants reporting a high level of perfectionism reported engaging in should statements all the time compared to other types of cognitive distortions. However, additional research is needed to further explore the relationship between perfectionism and content-specific cognitive distortions. Nonetheless, since cognitive distortions emerged as a mediator, intervention efforts can focus accordingly on thinking patterns and belief systems.

**Implications Related to Diversity and/or Advocacy**

In this study, no differences were found with regard to perfectionism and gender, age, or race. Results concerning gender were consistent with the majority of existing literature that evaluated clinical perfectionism in student samples (e.g., Chang, 2006; Chang & Sanna, 2012; Shafran & Mansell, 2001; Stoeber & Damian, 2014). These results appear to align with the transdiagnostic conceptualization of perfectionism and suggest that there may actually be fewer differences among cultures, ages, and gender. However, as discussed in the Limitations section, the sample in this study was comprised entirely of graduate students attending a small institution. Findings of no cultural differences may not generalize to larger institutions with more diverse student populations.

Few studies have directly focused on aspects of cultural diversity as they relate to perfectionism. Among the available studies, general trends, such as higher scores on the
Parental Expectations and Parental Criticism subscales of the Frost Multidimensional Perfectionism Scale (FMPS), emerged for Asian American and African American students compared to Caucasian students (Castro & Rice, 2003; Chang, 1998). In another study, Chang, Watkins, and Banks (2004) administered the APS-R, which delineates between adaptive and maladaptive perfectionism, and found that Caucasian college students reported greater adaptive perfectionism than African American college students; there were no differences between groups with regard to maladaptive perfectionism, suggesting that African American and Caucasian students both experienced maladaptive perfectionism. Each of these studies found that perfectionism predicted depressive symptoms and greater maladjustment. One should note that authors investigating perfectionism as it relates to culture used multidimensional measures of perfectionism.

As discussed in the Introduction, these measures have confounded the construct of perfectionism by including variables associated with it, which makes interpreting the results of these studies difficult (Rheaume et al., 2000; Shafran & Mansell, 2001).

To the investigator’s knowledge, perfectionism has been largely studied in samples of convenience comprised of undergraduate students in psychology classes (e.g., Besser Flett, Guez et al., 2008; Flett et al., 2009), which is not necessarily problematic given the relationship between perfectionism and achievement. One implication of this approach is that samples tend to be rather homogenous, and as a result, the majority of existing literature on perfectionism pertains to college students. In addition, while numerous studies on perfectionism collected demographic data, few reported on that information (e.g., Besser, Flett, Hewitt et al., 2008; Chang & Sanna, 2012; Kopala-Sibley
Perhaps there were no differences among participants with regard to demographic characteristics, and therefore, the information was not provided. Unfortunately, conclusions are limited regarding perfectionism across different cultures and age groups.

Nonetheless, identifying perfectionism as a transdiagnostic construct has implications for assessment and treatment. First, despite the small number of studies that have investigated cultural factors and perfectionism, evidence suggests that it can be present in different races/ethnicities, and when elevated, it can be detrimental to mental and physical health. Therefore, including an assessment of perfectionism apparently is warranted as part of an intake procedure for students.

Second, while there is no evidence that perfectionism impacts students from various cultures differently, interventions should be culturally sensitive. For example, existing evidence shows that Asian American students experience greater perceived parental criticism and parental expectations; this pattern of results reflects a collectivist orientation that is consistent with Asian cultures. Integrating cultural factors, such as collectivism, when conceptualizing symptoms and understanding the meaning of perfectionism is a critical component of providing culturally sensitive treatment. Efforts to identify intervention strategies that effectively reduce the negative impact of standards on self-worth while remaining respectful of cultural variables are highly recommended.

**Suggestions for Future Research**

Continued efforts to clarify the construct of perfectionism and role of cognitive processes are strongly encouraged. The role of perfectionism as a vulnerability or
consequence of psychological distress has yet to be firmly established. Replication of the current study is highly recommended to determine if the same results will be found, particularly with other student populations. Using the prospective behavioral high-risk design to test the model is highly recommended. This study did not test the criteria for discriminant or convergent validity, which are two central criteria for the model. While discriminant validity may not be as applicable to a transdiagnostic construct like perfectionism, convergent validity should be explored. Including rater interviews to measure perfectionism is one way to establish its convergent validity.

Because of the conflicting findings in the research, future research needs to maintain a focus on clarifying the relationship between perfectionism, stress, and psychological distress. Findings are mixed concerning the temporal precedence of perfectionism and whether a stressful event is required to activate the schema. A central tenant of the cognitive vulnerability stress-interaction model is identifying when symptoms of a psychological disorder are most likely to occur; such an understanding can drive treatment and prevention efforts. Future research should work to clarify whether perfectionism schemas are independent from distressed states and how these schemas are activated. Future studies may shed more light on the relationship between perfectionism, cognitive distortions, stress, and psychological distress by using a longer time frame with more assessment periods; doing so may capture the relationship between the constructs more accurately. Finally, other studies using an experimental manipulation to examine the impact of distorted thoughts on mood have shown that perfectionistic students experience intrusive thoughts about failure during evaluative situations (e.g.,
Future research should consider using an experimental manipulation to help demonstrate the predictive validity and temporal stability of perfectionism.
References


PERFECTIONISM

doi:10.1016/j.jrp.2012.05.010


doi:10.1037/0022-3514.51.6.1173


doi:10.1007/s10608-005-3164-3


doi:10.1037//0022-0167.48.4.490


doi:10.1080/00223891.2011.627962


PERFECTIONISM

Personality and Individual Differences, 48(7), 786-791.
doi:10.1016/j.paid.2010.01.013


PERFECTIONISM


structures and negative life events. *Journal of Clinical Psychology, 66*(12), 1307-1323. doi:10.1002/jclp.20723


Stoeber, J., & Joorman, J. (2001). Worry, procrastination, and perfectionism:
Differentiating amount of worry, pathological worry, anxiety, and depression.
*Cognitive Therapy and Research, 25*(1), 49-60.


