

Executive Functioning Deficits in the Transdiagnostic Process of Multidimensional
Perfectionism

by

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Background: Recent research has demonstrated that a variety of types of psychopathology, including depression, anxiety, eating pathology, and obsessive-compulsive disorder, are characterized by cognitive deficits in executive functioning, as measured by standardized neuropsychological assessment measures in a clinical setting. Multidimensional perfectionism serves as a transdiagnostic process across all of these different types of psychopathology.

Purpose: The current research seeks to understand the possible relations between multidimensional perfectionism, objective and subjective measures of executive functioning, and psychopathology symptoms.

Methods: 2,157 healthy undergraduate students were asked to complete a series of online self-report inventories related to perfectionism and symptoms of psychopathology. One hundred and one eligible students were then asked to complete an approximately two to two-and-a-half-hour neuropsychological assessment battery, which included both objective and subjective measures of executive functioning.

Results: Results indicated that scores on objective neuropsychological assessment measures of attention, fluency, planning and decision making, working memory, and

processing speed were unrelated to perfectionism classification. This was true regardless of whether or not the covariates of age, history of head injury, past or present mental health concerns, current psychotropic drug use, currently experienced cognitive symptoms, and scores on measures of depression, anxiety, eating pathology, and obsessive-compulsive disorder were controlled for. Additional results indicated that there were no significant differences between adaptive and maladaptive perfectionists on the Behavioral Regulation Index, Metacognition Index, or Global Executive Composite of the BRIEF-A (a self-report measure of executive functioning) once the covariates were controlled for. Further results demonstrated that there were significant differences between multidimensional perfectionism groups for symptom levels of eating pathology, depression, and anxiety. These significant effects of perfectionism classification on self-reported symptoms of depression, anxiety, and eating pathology disappeared entirely though when scores on the mini-IPIP, a measure of Big Five personality traits, were controlled for.

Discussion: The current research found that there were no significant differences on objective neuropsychological assessment measures of executive functioning between multidimensional perfectionists. Furthermore, there were no significant differences on self-report measures of executive functioning between multidimensional perfectionists once covariates were controlled for. However, there were some interesting differences between multidimensional perfectionists in terms of the Big Five personality traits of Conscientiousness and Neuroticism.

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Perfectionism

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by

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CHAPTER I: INTRODUCTION

Perfectionism is a construct that has been conceptualized as both a lower-order personality trait and a long-standing cognitive style; it is characterized by the tendency of individuals to set high standards for themselves, frequently in combination with concerns about making mistakes (DiBartolo & Rendon, 2012; Richardson, Rice, & Devine, 2014). Perfectionism comes in both adaptive and maladaptive forms, and the ability to assess for it accurately is critical because maladaptive perfectionism is associated with a variety of negative outcomes, such as poorer psychological functioning, decreased positive affect, and increased levels of psychopathology (Andrews, Burns, & Duelling, 2014). Furthermore, perfectionism can be conceptualized as a transdiagnostic process across a variety of mental health disorders, including eating disorders, anxiety disorders, obsessive-compulsive disorders, and depression, as it not only serves as both a risk and maintaining factor for these disorders, but has also been related to the co-occurrence of such pathology (Egan, Wade, & Shafran, 2011).

Despite the fact that maladaptive perfectionism is associated with such a variety of disorders and negative outcomes, the routine clinical assessment of perfectionism is still commonly carried out solely via self-report measures, such as the Revised Almost Perfect Scale (Slaney, Rice, Mobley, Trippi, & Ashby, 2001). However, research conducted in laboratory settings suggests that maladaptive perfectionism is typified by deficits in the neuropsychological domain of executive functioning, indicating potential for a more objective way to assess for the presence of perfectionism (Aldea & Rice, 2006; Brand & Alstotter-Gleich, 2008; Desnoyers & Arpin-Cribbie, 2015). Unfortunately, most laboratory tasks are too time-consuming and financially expensive to be used in

regular clinical practice; they are also typically lacking in the published normative data that allows for the comparison of clients to other individuals. However, there are objective measures of executive functioning that are already in common use in clinical neuropsychology practice; thus, these measures might possibly be used to identify executive functioning deficits in perfectionists, thereby yielding a more objective and precise measure of perfectionism that can be used to supplement currently available self-report measures (Slade, Coppel, & Townes, 2009). This could lead to the more accurate diagnosis and treatment of maladaptive perfectionism, and subsequently better treatment of the various disorders this type of perfectionism characterizes.

Despite the seeming plausibility of using neuropsychological measures of executive functioning to objectively identify maladaptive perfectionists, there remains a dearth of research on whether or not these assessment measures can, in fact, reliably detect executive functioning deficits in perfectionists. Therefore, it remains to be explored whether or not these standardized neuropsychological measures can detect executive functioning deficits in perfectionistic individuals, as well as to discern whether or not such assessment measures demonstrate adequate discriminant validity between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. Finally, it still remains to be seen whether or not such objective executive functioning measures demonstrate concurrent validity with the self-report measures of perfectionism that are currently in widespread use. Thus, the goal of the current research is to explore these questions.

CHAPTER II: LITERATURE REVIEW

Overview of Multidimensional Perfectionism

Perfectionism is a construct that has been conceptualized as both a lower-order personality trait (as a manifestation of the higher-order traits of conscientiousness, and potentially neuroticism if goals are not met) and a long-standing cognitive style; it is characterized by the tendency of individuals to set high standards for themselves, frequently in combination with concerns about making mistakes (DiBartolo & Rendon, 2012; Richardson, et al., 2014). Although perfectionism was historically regarded as a unitary construct, with solely maladaptive connotations, several modern theorists conceptualize it as being multidimensional in nature, with both adaptive and maladaptive factors; the adaptive factor, Achievement Strivings, describes the setting of high standards, while the maladaptive factor, Evaluative Concerns, has to do with self-criticism, failure, and feeling as though one is falling short of their own or others' expectations (DiBartolo & Rendon, 2012). When individuals are high in perfectionistic strivings, but low in evaluative concerns, they are considered to be adaptive perfectionists; however, when they are high in both facets they are thought to be maladaptive perfectionists and when they are low in both facets they are non-perfectionists (Stoeber & Otto, 2006).

The four most commonly used scales for measuring multidimensional perfectionism, the Frost Multidimensional Perfectionism Scale (FMPS) (Frost, Marten, Lahart, & Rosenblate, 1990) the Hewitt and Flett Multidimensional Perfectionism Scale (HMPS) (Hewitt & Flett, 1991), the Child and Adolescent Perfectionism Scale (CAPS) (Flett, Hewitt, Boucher, Davidson, & Munro, 2000), and the Almost Perfect Scale-

Revised (APS-R) (Slaney, et al., 2001), all have factors that map on well to a multidimensional conceptualization of perfectionism (DiBartolo & Rendon, 2012). The broad factor of Achievement Striving encompasses all of the following measure subscales: the Personal Standards and Organization scales from the FMPS, the Self-Oriented Perfectionism subscale from the HMPS, the Self-Oriented Perfectionism—Striving subscale from the CAPS, and the Standards and Order subscales from the APS-R. Concurrently, the factor of Evaluative Concerns contains all of the following measure subscales: the Concern over Mistakes, Doubts about Actions, Parental Criticism, and Parental Expectations subscales of the FMPS, the Socially Prescribed Perfectionism subscale of the HMPS, the Socially Prescribed Perfectionism and Self-Oriented Perfectionism—Critical subscales of the CAPS, and the Discrepancy subscale of the APS-R (DiBartolo & Rendon, 2012).

Research into the real-world correlates of adaptive and maladaptive perfectionism has also supported the existence of perfectionism as a construct that is both multidimensional and separate from other personality constructs. Stoeber and Otto (2006) noted in their review of the literature that perfectionistic strivings have been related to higher levels of endurance, positive affect, satisfaction with life, achievement, and the use of active coping styles, as well as lower levels of external locus of control and suicidal ideation. Further research has also shown the maladaptive HMPS, FMPS, and APS-R dimensions of Socially Prescribed Perfectionism, Concern Over Mistakes, Doubts About Actions, Parental Criticism, and Discrepancy to be related to, yet distinct from, the Five-Factor Model (FFM) dimension of Neuroticism, while the adaptive dimensions of Self-Oriented Perfectionism, Personal Standards, Organization, High

Standards, and Order are related to, yet distinct from, the FFM dimension of Conscientiousness (Rice, et al., 2007).

Factors Known to Influence the Development of Multidimensional Perfectionism

As a result of the potentially long-term negative impacts that maladaptive perfectionism can have on an individual's quality of life and lifespan, and the possible protective functions that adaptive perfectionism might contribute, it is important to understand what leads to the development of different types of perfectionism. There are a wide variety of factors that are known to influence the development and maintenance of perfectionism in children and adults. These include biological factors, such as genetics/heritability and temperament, affective factors, such as the personality dimensions of neuroticism and conscientiousness, social/behavioral factors, including parenting and attachment styles, and cognitive-behavioral factors, including core schemas and cognitive biases.

Biological factors. There is evidence that children of parents who are perfectionistic may have a biological vulnerability to also develop perfectionism, and that perfectionism is moderately heritable (Tozzi, et al., 2004). One possible explanation for this vulnerability may be a result of assortative mating; research on this topic has demonstrated that perfectionistic individuals, particularly self-oriented perfectionists, tend to view other perfectionists as relatively more attractive, thus increasing the chances of two individuals high in perfectionism mating and creating offspring (Hoffmann, Stoeber, & Musch, 2015). As such assortative mating often leads to an increase in the frequency of genotypes that result in extreme phenotypes, this finding

suggests one pathway by which the children of two perfectionistic individuals may come to be equally, or even more, perfectionistic than their parents (Hoffmann, et al., 2015).

Additional research supports the assertion that perfectionism is moderately heritable, with Kamakura, Ando, Ono, and Maekawa (2003) finding that 37% of the variance in perfectionism for their eating disordered sample could be attributed to additive genetic factors. However, the remainder of the variance in this study was explained by shared and individual specific environmental factors (Kamakura, et al., 2003). Of note, additive genetic factors appear to contribute more to the development of personal standards perfectionism, a form of adaptive perfectionism, as opposed to maladaptive perfectionism, which leaves more room for the contribution of other environmental factors to the development of maladaptive perfectionism (Tozzi, et al., 2004).

Wade and Bulik (2007) have also supported the idea that it is not genetic vulnerability alone that determines whether a child will develop perfectionistic tendencies, but a combination of additive genetic and non-shared environmental factors. These researchers investigated the proportion of the variance in perfectionism in identical and fraternal twins that could be explained by shared genetic vs. environmental risk factors; they found that in relation to the three dimensions of Frost's Multidimensional Perfectionism Scale (Frost, et al., 1990), shared genetic factors contributed 39% of the variance to the Concern over Mistakes subscale and 27% of the variance to the Doubts about Actions subscale, both which measure maladaptive perfectionism. Shared genetic factors also contributed 36% of the variance to the

Personal Standards subscale, which measures adaptive perfectionism (Wade & Bulik, 2007).

In addition to these findings, Wade and Bulik (2007) also discovered that the Doubts about Actions and Concern over Mistakes subscales, which both measure maladaptive perfectionism, had 98% of the measured genetic factors in common, but only 13% of the measured environmental factors. In contrast, the Personal Standards subscale, which is a measure of adaptive perfectionism, only had 22% of the genetic factors and 7% of the environmental factors in common with Concern over Mistakes, and 24% of the genetic factors and 4% of the environmental factors in common with Doubts about Actions (Wade & Bulik, 2007). This study therefore not only sheds further light on the relative contributions of genetic vs environmental factors to the development of various types of perfectionism, but provides further evidence for the existence of multidimensional perfectionism.

A final biological factor affecting the development of perfectionism is temperament. Kobori, Yamagata, and Kijima (2005) found that adaptive perfectionism is more highly related to the temperamental characteristics of low novelty seeking, high reward dependence, and high persistence. In contrast, maladaptive perfectionism is associated more with the temperamental characteristics of low novelty seeking and high harm avoidance (Kobori, et al., 2005). That low novelty seeking is present in both adaptive and maladaptive perfectionists is interesting, as it suggests that both types of perfectionists share an underlying predisposition to be able to maintain goal-oriented behavior, rather than becoming distracted by novelty. However, the high reward dependence of adaptive perfectionists, juxtaposed against the high harm avoidance of

maladaptive perfectionists, provides support for the idea that perfectionism is multidimensional. While both groups are perfectionistic, the two appear to be differentiated from one another in that adaptive perfectionists are temperamentally driven to pursue reinforcement, while maladaptive perfectionists are driven by a desire to avoid punishment.

Taken together, the literature on the biological factors that impact perfectionism appears to suggest that while perfectionism is moderately heritable, and its development is influenced to some degree by biologically based temperament, other factors of a more environmental nature, such as growing up in a home with perfectionistic parents, appear to also play a major role in the emergence of perfectionism. This is particularly true for the development of maladaptive perfectionism.

Affective factors. Temperament in childhood, combined with a variety of environmental factors, is thought to lead to the development of personality in adolescence and adulthood; in keeping with this, two higher order personality factors, neuroticism and conscientiousness, have been found to be strongly associated with perfectionism (Hill, McIntire, & Bacharach, 1997). More specifically, higher levels of conscientiousness, particularly the achievement striving facet, and lower levels of neuroticism, particularly the vulnerability facet, have been associated with various types of adaptive perfectionism, while higher levels of neuroticism, particularly the depression facet, have been associated with increased maladaptive perfectionism (Hill, et al., 1997; Rice, et al., 2007; Stumpf & Parker, 2000). Furthermore, conscientiousness has been found to predict longitudinal increases in adaptive perfectionism in adolescents over a period of 5-8 months (Stoeber, Otto, & Dalbert, 2009).

Social/Behavioral factors. A number of social/behavioral factors also contribute to the development of maladaptive and adaptive perfectionism. A primary one has to do with parenting styles and the way in which parents bond with their children and the attachment styles that result. For example, Enns, Cox, and Clara (2002) conducted research in which they discovered that perfectionistic parenting, which is characterized by parents having high expectations for both themselves and their children, is related to the development of both adaptive and maladaptive perfectionism. However, harsh parenting, which is characterized by criticalness, over-control, lack of care, and excessive expectations, was only related to the development of maladaptive perfectionism (Enns, et al., 2002).

Additional research has shown that authoritative parenting (i.e., reasonable demands + high responsiveness) is also associated with the development of adaptive perfectionism, while authoritarian parenting (i.e., high demands + low responsiveness) is related to the development of maladaptive perfectionism (Enns, et al., 2002; Kawamura, Frost, & Harmatz, 2002; Speirs-Neumeister, 2004b). Overall, research on parenting practices and the subsequent development of perfectionism appears to suggest that perfectionistic parents who are both highly responsive and demanding will engender adaptive perfectionism in their children via means of secure attachment relationships, while those perfectionistic parents who are highly demanding, but not very responsive, will engender maladaptive perfectionism in their children via insecure attachment relationships (Speirs-Neumeister, Williams, & Cross, 2009). Furthermore, children who are maladaptively perfectionistic are typically this way due to perceiving parental approval as contingent on performing well; they also tend to believe that if they

do not achieve perfection their parents will punish them harshly. Alternatively, adaptively perfectionistic children tend to have internalized their parent's achievement orientation, and thus seek perfection and achievement as means unto themselves (Speirs Neumeister, Williams, & Cross, 2009).

It should be noted that with both types of perfectionism though, children tend to model the perfectionistic behaviors they see their parents exhibiting; thus, social learning has a major impact on the development of perfectionism (Speirs-Neumeister, Williams, & Cross, 2009). Research has supported this social expectations model of perfectionism, with results demonstrating that adolescent's perceived parental expectations of achievement and/or perfectionism can predict longitudinal increases in a type of maladaptive perfectionism called socially prescribed perfectionism (Damian, Stoeber, Negru, & Baban, 2013).

Cognitive-Behavioral factors. There are two main theoretical models that have been put forth to explain the development and/or maintenance of perfectionism; the first of these is Slade and Owen's (1998) Dual Process Model and the second is Shafran, Cooper, and Fairburn's (2002) Cognitive Behavioral Model of Clinical Perfectionism (Lo & Abbott, 2013). The dual process model is based off of Skinnerian reinforcement theory and posits that adaptive perfectionists are driven by positive reinforcement, in that they pursue perfection in order to achieve positive outcomes and be successful, while maladaptive perfectionists are driven by negative reinforcement; they pursue perfection in order to avoid negative consequences and failing (Lo & Abbott, 2013).

In juxtaposition, the Cognitive Behavioral Model of Clinical Perfectionism posits that clinical perfectionism arises when an individual bases their entire self-evaluation on

whether or not they accomplish personally demanding, self-imposed standards, and when such a basis for self-evaluation results in emotional, social, physical, cognitive, or behavioral consequences (Lo & Abbott, 2013). Having one's self-worth based primarily on the attainment of achievement and success is thought to result in greater fear of failure, evaluating one's performance critically, and having doubts about being able to meet standards; when actual or perceived failure does occur, the result for clinical perfectionists is increased negative self-evaluation and reinforcement of perfection as their standard for positive self-evaluation (Lo & Abbott, 2013).

Unfortunately, clinical perfectionists also have a biased evaluation of their performance, due to the use of such information-processing biases as dichotomous thinking, selective attention, and overgeneralization, which only serve to maintain a vicious cycle for the perfectionist of striving for perfection, feeling as though they have failed, and then striving even harder (Lo & Abbott, 2013). A particularly salient example of this comes from the research of Pyryt (2004), who noted that maladaptively perfectionistic children often engage in dichotomous (all-or-none) thinking, whereby they endorse the belief that their work is either perfect and worthwhile, or imperfect and thus totally worthless. Perfectionistic children also have a tendency to transform their desires or wants into demands. Finally, such children often fall prey to the cognitive bias of only focusing on the goals and challenges that they have not yet met successfully, at the expense of savoring successes (Pyryt, 2004).

In addition to being characterized by the presence of information-processing biases, maladaptive perfectionism is also typified by a number of core maladaptive schemas. For example, DiBartolo, Li, and Frost (2008) found that the well-established

relationship between maladaptive perfectionism and mental health pathology was moderated by a maladaptive schema that is central to the Cognitive Behavioral Model of Clinical Perfectionism, that of Contingent-Self-Worth. Additional research in eating disordered patients has also found that the maladaptively perfectionistic patients in these studies endorse maladaptive cognitive schemas in several domains, including Disconnection/Rejection (Abandonment, Mistrust/Abuse, and Social Isolation), Impaired Autonomy and/or Performance (Vulnerability to Harm), Other-Directedness (Subjugation), and Overvigilance/Inhibition (Unrelenting Standards) (Waller, Dickson, & Ohanian, 2002). Boone, Braet, Vandereycken, and Claes (2013) found similar results in eating disordered patients; however, they found that all of the maladaptive schema domains they investigated, except for Impaired Limits, were related to both maladaptive and adaptive perfectionism (Boone, et al., 2013). Although these results should be interpreted with caution, as they were found in eating disordered clients, they likely still shed light on the maladaptive schemas present in a variety of populations characterized by perfectionism, as twin studies have shown that many of the same genetic and environmental risk factors are present in both eating disorders and perfectionism (Egan, et al., 2011).

Development of Multidimensional Perfectionism Across the Lifespan

Development of multidimensional perfectionism in childhood. The first signs of perfectionism are usually exhibited in childhood and then progress throughout the lifespan; it is rare for formerly non-perfectionistic individuals to suddenly develop perfectionism in adulthood (Pryor 2004). The first signs of perfectionism can usually be spotted in very young children before they have even entered school, and have to do

with how they respond to competition and compliments. Young children who later go on to develop perfectionism tend to insist from a very early age that they must be the best at whatever they are doing, no matter if the competition is older, or has more practice or experience. In addition, children who later go on to develop maladaptive perfectionism also tend to be unable to gain satisfaction from other people's compliments of their work and performance; instead, they respond in a way that conveys that they feel that they could have still performed better or accomplished more than they did (Pyryt, 2004).

Once perfectionistic children enter kindergarten, the exhibition of perfectionistic thoughts and behaviors tends to become even more salient (Pyryt, 2004). From kindergarten onward, perfectionistic children, particularly maladaptively perfectionistic ones, tend to begin equating the evaluations they receive from teachers on their schoolwork with their own individual self-worth. The grade of A becomes not only a stamp of approval from the teacher of the child's work, but of the child as a person, and a poor grade represents a disconfirmation of not just the child's performance on the individual school assignment in question, but of the child's worth as a whole. Thus, every test, assignment, and project becomes yet another chance to risk hurting the self-concept of the maladaptively perfectionistic child. As a result, some maladaptively perfectionistic children may try to cope by procrastinating, which enables them to turn in work that only reflects a small portion of their ability. If they then receive a bad grade, they can say that this was because they did not put much effort into the assignment and was not because they tried and failed. In this way, they can rationalize their poor grades and thus protect their self-worth. However, such procrastination will likely impact their academic achievement negatively in the long-run (Pyryt, 2004).

Multidimensional perfectionism in adolescence. Kline and Short (1991) found in their research that perfectionism tended to increase as children matured and moved up from elementary school to high school. In addition, Schuler (2000) found that in their sample of gifted middle school boys and girls, approximately 87% demonstrated perfectionistic tendencies and most of the subjects had been perfectionists as long as they could remember; furthermore, they believed that their perfectionism was a part of who they were. The researchers also found that in their study they could differentiate groups of adaptively and maladaptively perfectionistic students from one another. The adaptively perfectionistic students tended to be able to accept when they made mistakes, believed that personal effort was an integral part of their perfectionism, and had the ability to engage in positive coping strategies regarding their perfectionistic tendencies. In addition, they tended to feel that they very much needed to have order and organization in their lives, enjoyed their parents' high expectations for them, and had positive role models in their lives who emphasized that doing one's personal best was what was most important. As a result of their perfectionism, these students also indicated that they reaped a number of benefits, including being more organized, working harder, being able to prioritize important activities in their lives, and having a higher level of achievement in school and sports (Schuler, 2000).

In comparison, the maladaptive perfectionists in the study had excessively high standards, were consistently anxious and worried about the possibility of making mistakes, and constantly needed approval from others in order to feel worthy (Schuler, 2000). Unfortunately, they were never able to obtain the level of approval that they felt they needed though, and instead were only able to perceive excessively high

expectations and criticism from important others; as a result, they tended to doubt their own judgments. The maladaptively perfectionistic students also lacked effective strategies for coping with their perfectionism and tended to come from home environments in which positive approval was conditional. They also lacked role models who could teach them how to appropriately deal with failure. As a result of their perfectionism, these students indicated that they suffered several negative outcomes, including not always being able to enjoy their lives, feeling time-constrained, out of control, and burned-out, and being over-critical of not only themselves, but other people as well (Schuler, 2000).

Multidimensional perfectionism in college students and adults. Research has also been conducted with students at the college level to determine if there are still discernable groups of adaptive and maladaptive perfectionists within this population, and if a relationship exists between maladaptive versus adaptive perfectionism and achievement motivation (Speirs-Neumeister, 2004a; Speirs-Neumeister, 2004b). Speirs-Neumeister (2004a) was able to successfully identify two types of perfectionists in her research with college students. The first group of students exhibited an adaptive self-oriented perfectionism, in which students worked for perfection in order to achieve mastery and performance-approach goals. Mastery goals involved mastering tasks or achieving competency in a particular area, while performance-approach goals were goals in which an individual strove to be at least as competent as his or her peers. The second unique type of perfectionism identified was maladaptive socially prescribed perfectionism. Students with this type of perfectionism worked for perfection in order to

avoid failure and set both performance-avoidance and performance-approach goals (Speirs-Neumeister, 2004a).

In regard to achievement motivation, Speirs-Neumeister's (2004b) findings indicated that for maladaptive perfectionists, the underlying motivation for engaging in achievement-oriented behaviors was a fear of failure. Although these maladaptively perfectionistic students set both performance-avoidance and performance-approach goals, the performance-approach goals were still related to a fear of failure. That is, these students believed that not trying was the same as failing and that the point of succeeding was to prove that they were not failing. Despite this, maladaptive perfectionists tended to be prone to procrastination on school work. In comparison, the underlying motivation for engaging in achievement-oriented behaviors for the adaptive perfectionists was a pure approach-oriented achievement motivation. These adaptively perfectionistic students set mastery and performance approach goals, which in turn lead to the development of a strong work ethic and increased motivation to seek out challenges (Speirs-Neumeister, 2004b).

Although a high level of adaptive perfectionism in college students is likely not a major cause for concern, additional research has shown that greater maladaptive perfectionism is worrisome; this is because it has been associated with an increase in negative psychological functioning, including higher levels of depressive symptomology, anxiety, stress, suicidal risk, and eating disturbances, as well as less optimal outcomes in the treatment of clinical depression (Chang, Watkins, & Banks, 2004). Furthermore, Rice and Dwello (2002) found that the maladaptively perfectionistic colleges students in

their sample had the poorest overall adjustment, as compared to adaptive perfectionists and nonperfectionists.

In addition to these more immediate negative outcomes of maladaptive perfectionism, it also appears there are more long-term negative outcomes of maladaptive perfectionism, even after students leave college. For example, Childs and Stoeber (2012) investigated the effects of perfectionism on stress and burnout in healthcare provision employees and school teachers over time and found that higher levels of maladaptive perfectionism at baseline were related to greater role stress and symptoms of burnout in employees six months later; such symptoms included increased exhaustion, cynicism, and inefficacy (Childs & Stoeber, 2012). In contrast, employees higher in adaptive perfectionism tended to have lower rates of burnout and higher levels of workplace engagement, suggesting that adaptive perfectionism may serve a protective function (Childs & Stoeber, 2012).

Finally, and perhaps most seriously, it appears that individuals who are maladaptively perfectionistic may even suffer reduced lifespans; Fry and Debats (2009) found that longitudinally, older adults with higher levels of perfectionism and neuroticism were more likely to have died after 6.5 years than individuals with lower levels of perfectionism and neuroticism (Fry & Debats, 2009). However, adaptive perfectionism may once again serve as a protective factor for the aging population. For example, Zhang, Zhang, and Meng (2010) found that in a sample of older Chinese adults, perfectionism served as a protective factor against the development of mild cognitive impairment. In addition, a study conducted by Karaminia, Soltani, and Bagherian-Sararoudi (2013) with a sample of elderly nursing home patients in Hamadan and

Malayer, Iran found that adaptive perfectionism facilitated positive mental health and, in fact, explained 10% of the variance in general mental health for their sample. They hypothesized that this could be related to adaptive perfectionism helping elderly people to reduce health-harming behaviors, increase positive emotions, the attainment of personal expectations in life, and social engagement, as well as facilitating the adoption of optimistic attitudes (Karaminia, et al., 2013).

Multidimensional Perfectionism and Differences in Executive Functioning

Unfortunately, neither the Dual Process Model of Perfectionism (Slade & Owen, 1998) nor the Cognitive Model of Clinical Perfectionism (Lo & Abbott, 2013) fully explain why clinical, or maladaptive, perfectionists are more likely to fall prey to such information processing biases and are thus subsequently more likely to suffer poor mental health outcomes. However, one explanation is that adaptive and maladaptive perfectionists exhibit differences in the ways in which they exert cognitive control, engage in various types of error processing and decision making, and regulate their affective processing and emotions. These types of processes fall under the neuropsychological domain of executive functioning, which includes such important functions as attentional control, inhibitory control (including response inhibition and interference control), working memory, cognitive flexibility, reasoning, problem-solving, and planning (Diamond, 2013). Thus, the cognitive and psychological problems that maladaptive perfectionists are subject to could be the direct result of deficits in executive functioning.

Cognitive control: Efficiency, accuracy, and response bias. A number of researchers have investigated the differential effects of adaptive versus maladaptive

perfectionism on cognitive control and the ability of perfectionists to successfully complete tasks related to efficiency, accuracy, and response bias. For example, Desnoyers and Arpin-Cribbie (2015) had perfectionists complete tasks of working memory (N-back task) and attention (d2 Test of Attention) and found that although neither self-oriented nor socially prescribed perfectionism predicted reaction time, socially prescribed perfectionism was a significant predictor of accuracy, with greater working memory task accuracy being associated with increased socially prescribed perfectionism. The authors thus concluded that although perfectionists may tend toward being more cautious in making decisions, their overall accuracy is generally unaffected (Desnoyers & Arpin-Cribbie, 2015).

However, Stoeber and Eysenck (2008) found that when they used a proofreading task that required perfectionists to find spelling, grammar, and format errors, perfectionism did affect overall performance, with greater Perfectionistic Standards being related to lower efficiency and more false alarms, and greater Discrepancy being related to fewer hits and a more conservative response bias. The authors thus concluded that perfectionism, particularly the Perfectionistic Standards facet, does impact perfectionists' efficiency. Furthermore, they noted that individuals higher in Perfectionistic Standards tended to find fault with things, even when everything was satisfactory, while those higher in Discrepancy acted in a more cautious, conservative manner, and resisted finding fault with things, even when they were unsatisfactory (Stoeber & Eysenck, 2008). Stoeber (2011) partially replicated these findings in a later study with a second proof-reading task and a larger sample. In this study, he again found that Perfectionistic Strivings was negatively correlated with efficiency, positively

correlated with incorrectly detecting errors (false alarms), and negatively correlated with response bias. Additionally, participants higher in Perfectionistic Strivings were again found to spend more time completing the proof-reading task than participants lower in Perfectionistic Strivings (Stoeber, 2011).

Further research has been done to investigate the specific role that time on task and time pressure play in perfectionists' performance. For example, Stoeber, Chesterman, and Tarn (2010) found that individuals higher in Perfectionistic Strivings were willing to spend more time on a task when that task had no time limit, that they performed better on said task, and that the amount of time spent on the task fully mediated the relationship between Perfectionistic Strivings and task performance. Furthermore, Perfectionistic Standards was negatively related to speed-versus-accuracy scores, with participants higher in Perfectionistic Strivings indicating they put more effort into being accurate, as opposed to completing tasks quickly. In comparison, participants low in Perfectionistic Strivings indicated that they put more effort into being fast, as opposed to being accurate. The results of this study therefore demonstrate that invested time represents a likely explanatory mechanism for why individuals high in Perfectionistic Strivings tend to perform better on self-paced tasks than individuals low in Perfectionistic Strivings (Stoeber, et al., 2010). However, it may be the case that decision-making capabilities start to be taxed when individuals high in Perfectionistic Strivings encounter time-constrained situations, even though their accuracy may not necessarily be affected (Desnoyers & Arpin-Cribbie, 2015).

In addition to research on the primarily adaptive facet of Perfectionistic Strivings, some research has also investigated the effects of the primarily maladaptive facet of

Evaluative Concerns on efficiency and accuracy. Ben-Artzi & Raveh (2016) conducted research to investigate true and false memory processes in adaptive and maladaptive perfectionists within the framework of a word list false memory paradigm. They found that while Perfectionistic Strivings was positively correlated with the ability to correctly identify presented words, Evaluative Concerns was related to greater false memories, with individuals higher in this facet of perfectionism incorrectly identifying a greater number of non-presented 'lures' as having been previously presented to them. In addition, individuals with higher levels of Evaluative Concerns had greater confidence that they had seen words that had not actually been presented to them than individuals lower in Evaluative Concerns. The authors ultimately concluded that the results of their study, as they relate to high Evaluative Concerns individuals' inability to discriminate between true and false memories, may indicate that such individuals have deficits in overall working memory capacity as the result of higher levels of worry, which may cause an inability to inhibit thoughts related to worries and thus allow them to shift to other topics (Ben-Artzi & Raveh, 2016).

Error processing and decision making. Beyond work on the ways in which perfectionism affects participants' abilities to successfully complete tasks involving efficiency, accuracy, and response bias, laboratory research has also been done on the error processing and decision making capabilities of adaptive and maladaptive perfectionists. For example, Brand and Alstotter-Gleich (2008) utilized a Game of Dice Task, which asks participants to try and predict the outcomes of dice rolls by selecting from combinations of high-probability/low payoff options and low-probability/high payoff options, to assess perfectionists' aversion or attraction to risky decisions. They found

that although decision-making under conditions of ambiguity was not significantly related to perfectionism, decision-making under risky conditions was. Specifically, it was found that individuals who were higher in the Concern over Mistakes facet of perfectionism were more likely to choose safe alternatives than individuals low in this facet, although this relationship was moderated by Personal Standards, with individuals low in Personal Standards and high in Concern over Mistakes exhibiting the best performance on the task. The authors concluded that since individuals high in Concern over Mistakes are more motivated to avoid making mistakes, they may act in a more careful and deliberate manner when making decisions in risky situations with explicit rules, which may allow them to better utilize deductive decision-making strategies and avoid errors and negative feedback in the long term. Thus, although Concern over Mistakes is generally considered to be a maladaptive form of perfectionism, it may demonstrate an advantage for perfectionistic individuals who find themselves needing to make decisions in non-ambiguous risky situations (Brand & Alstotter-Gleich, 2008).

Stahl, Acharki, Krsimon, Voller, and Gibbons (2015) have gone on to explore what happens when perfectionists do make processing errors, utilizing a flanker task and measurement of event-related potentials, specifically the error (related) negativity (Ne/ERN) and the error positivity (Pe); greater Ne/ERN amplitude is related to activation of an internal error-detection mechanism, while the Pe amplitude occurs after the Ne/ERN and shows an increase when a person becomes consciously aware of having made an error. The authors found that although there were no differences in general error rate, response speed, or post-error slowing related to perfectionism, participants higher in Personal Standards did perform better after they had previously made an

error, as compared to individuals low in Personal Standards. In addition, Evaluative Concerns was found to be negatively related to post-error accuracy, with individuals high in this facet of perfectionism performing less accurately after making an error. It was thus concluded that the perfectionism facet of Personal Standards might serve a protective role for perfectionists, by helping to prevent them from engaging in unhealthy avoidance strategies after making errors (Stahl, et al., 2015).

Schrijvers, De Bruijn, Destoop, Hulstijn, and Sabbe (2010) also investigated action monitoring in perfectionists utilizing Ne/ERN and Pe amplitudes. They found that the Doubts about Actions facet of perfectionism had a substantial effect on the Ne/ERN and that the Concern over Mistakes facet affected Pe amplitudes. Specifically, participants with greater Doubts about Actions had significantly larger Ne/ERN amplitudes than participants with lower levels of Doubts about Actions. In addition, participants with greater Concern over Mistakes had significantly larger Pe amplitudes. Such findings are in keeping with the affective-processing hypothesis, which posits that the Pe represents an individual's emotional error-assessment process. Thus, the higher Pe amplitudes seen after error commission in individuals with higher levels of maladaptive perfectionism may represent affective awareness of having made a mistake and the related processing of such an event as negative (Schrijvers, et al., 2010). Tops, Koole, and Wijers (2013) also reported that they were later able to replicate these findings utilizing a flanker task in which correct and incorrect responses were accompanied by images of approving or disapproving faces; this served to make the commission of mistakes more salient.

Given the suggestion that relative stimulus visibility might impact the post-error processing of perfectionists, Drizinsky, Zulch, Gibbons, and Stahl (2016) investigated this phenomenon by combining a Simon task, a masking task, and an error-awareness paradigm in an effort to create an experimental setup in which both response uncertainty and error awareness could be varied as a result of varying the visibility of the target stimulus. One major finding from this study was that regardless of the visibility of the target stimulus, individuals higher in Perfectionistic Strivings were more likely to classify their own errors as having been correct responses. The authors hypothesized that this could either be because individuals with high levels of Perfectionistic Striving also have high levels of self-esteem, or because they are unwilling to admit to a less than perfect performance (Drizinsky, et al., 2016).

A second finding from this study was that participants who were high in Evaluative Concerns were more aware of the errors they made in the medium stimulus visibility condition, but less aware of errors made in the high stimulus visibility condition; however, high Evaluative Concerns participants did have better post-error accuracy in the high stimulus visibility condition (Drizinsky, et al., 2016). Although these results appear counterintuitive at first, the authors of the study thought that such a pattern of behavior might have occurred because participants in the high visibility condition had a longer amount of time to develop error awareness, and thus might have had an increased amount of time to engage in worrying, which took attention away from task response-processing and resulted in poorer error awareness (Drizinsky, et al., 2016).

Overall, the results from this study were in keeping with the error-processing avoidance hypothesis; however, this was only true in the high stimulus-visibility

condition, which evoked a low level of response uncertainty, and not in the medium stimulus-visibility condition, which evoked a high level of response uncertainty (Drizinsky, et al., 2016). Thus, individuals who are more adaptively perfectionistic appear to be less bothered by making mistakes and are thus better able to recover when they make them, as opposed to individuals who are more maladaptively perfectionistic and tend to have their performance impaired by worry and avoidant behavior, which results in a reduced ability to accurately process, and subsequently respond to, errors.

Affective processing and emotion regulation. In addition to research on the cognitive biases maladaptive perfectionists are susceptible to as a result of deficits in executive functioning, work has also been done to investigate the ways in which such deficits impact perfectionists' abilities to effectively regulate their affective processes and emotions. This is particularly important given that increased maladaptive perfectionism has been shown to be related to increased psychological distress (Aldea & Rice, 2006). In seeking to explore this relationship further, Aldea and Rice (2006) found that emotional dysregulation fully mediated the relationship between perfectionism and psychological distress, with positive effects being found between maladaptive perfectionism and psychological distress, and inverse effects being found between adaptive perfectionism and distress. That is, greater maladaptive perfectionism was related to greater psychological distress because of the presence of greater emotional dysregulation, while greater adaptive perfectionism was related to decreased psychological distress because of the absence of emotional dysregulation (Aldea & Rice, 2006). Perrone-McGovern, Simon-Dack, Beduna, Williams, and Esche (2015)

also found similar results in their research, with adaptive perfectionism being related to the presence of higher levels of emotion regulation. However, they did not find any relationship between maladaptive perfectionism and level of emotion regulation (Perrone-McGovern, et al., 2015).

These types of results have not only been found with survey-type research; deficits in emotion regulation have also been related to physiological markers of stress in the body, with Richardson, et al. (2014) demonstrating that maladaptive perfectionism is associated with a lower cortisol response in the body when an individual is presented with a stressful task. This finding is consistent with the theory that maladaptive perfectionism leads to chronic stress in the body, which results in a blunted pattern of stress reactivity. The authors concluded that the higher levels of physiological stress seen in the maladaptive perfectionists were due to their increased use of the maladaptive coping mechanism of suppression, as opposed to the adaptive perfectionists in the study, who favored the use of reappraisal, which was conceptualized as being healthier (Richardson, et al., 2014).

Rudolph, Flett, and Hewitt (2007) furthered the research on the specific deficits in cognitive emotion regulation that are present in perfectionists. They found that the facet of Self-Oriented Perfectionism was only associated with increased self-blame, while Socially Prescribed Perfectionism was associated with increased catastrophizing, self-blame and rumination, as well as lower levels of positive reappraisal and being able to put things in perspective. The authors therefore concluded that one of the main reasons perfectionism, particularly maladaptive perfectionism, might be related to increased distress and psychopathology is because perfectionists have deficits in cognitive

emotion regulation in which they tend to over-rely on negative cognitive coping responses and lack positive cognitive emotion coping responses (Rudolph, et al., 2007). Furthermore, even when few negative life events are actually occurring, perfectionists tend to artificially magnify those errors and limitations that do exist (Macedo, Marques, & Pereira, 2014).

Despite perfectionists' knowledge that they are maladaptive, these types of negative cognitive emotion coping responses may be maintained because of metacognitive factors, that is, because perfectionists have beliefs about the benefits of certain patterns of belief (Macedo, et al., 2014). Perfectionists who engage in maladaptive emotion regulation processes such as rumination and self-blame may believe that these processes are valuable for helping them to prepare for future dangers and challenging situations they might encounter. They therefore continue to engage in them, despite the fact that they result in short-term, and potentially long-term, distress and negative outcomes. The presence of these types of metacognitive beliefs in maladaptive perfectionists, and the negative cognitive processes that accompany them, may therefore ultimately help to explain why maladaptive perfectionism is so pervasive across a broad variety of psychopathological diagnoses (Macedo, et al., 2014).

Multidimensional perfectionism and performance on standardized neuropsychological assessment measures of executive functioning. As can be seen, there have been a variety of studies that have investigated specific facets of executive functioning in perfectionists using laboratory tasks. However, few studies have attempted to directly assess executive functioning using standardized neuropsychological assessment instruments in individuals with perfectionism

uncomplicated by a comorbid mental health concern, a necessary step to take if perfectionism-related executive functioning deficits are to be regularly researched, assessed, and treated in a clinical setting. Of the few studies that have taken this crucial step however, the results support the idea that maladaptive perfectionism is characterized by deficits in executive functioning. For example, Slade, et al.'s (2009) administered a comprehensive battery of neuropsychological tests to both adaptive and maladaptive perfectionists, as assessed by the Positive and Negative Perfectionism Scale (PANPS); this battery included sensory-perceptual tests, which assessed for appropriate functioning on both the left and right sides of the body, tests of the motor functioning of each hand, the WRAT-III Academic Achievement tests, the Wechsler Adult Intelligence Scale-3rd edition, the revised Wechsler Memory Scale, the Stroop Color-Word Test, the Trail Making Test, and the Category Test (Slade, et al., 2009).

Overall, results indicated that three of the four tests used to assesses motor functioning were positively correlated with adaptive perfectionism (Slade, et al., 2009). However, no significant differences were found between adaptive and maladaptive perfectionists on measures of sensory-perceptual functioning; this is important because it suggests that perfectionists do not differ in their ability to perform adequately on “passive” tasks that do not require either putting forth positive effort or making a trade-off decision between accuracy and speed. Additional results indicated that reading and mathematics achievement were positively correlated with adaptive perfectionism, while mathematics achievement was negatively correlated with maladaptive perfectionism. Verbal IQ and Full Scale IQ were also positively associated with adaptive perfectionism,

while Performance IQ and Full Scale IQ were negatively associated with maladaptive perfectionism (Slade, et al., 2009).

The study's findings in regard to executive functioning abilities specifically are perhaps the most interesting for the current research. Slade, et al. (2009) found that performance on tasks of working memory was positively associated with adaptive perfectionism; they hypothesized that this was because adaptive perfectionists were willing to work harder to succeed on such tests, which is an efficacious strategy given the nature of working memory tasks. Furthermore, they found that performance on tasks of attention and executive functioning was negatively related to maladaptive perfectionism; they hypothesized that this was because the maladaptive perfectionists' excessively rigid approach to test taking, which was characterized by a strategy of trying to avoid making errors at all costs, negatively impacted their ability to pay attention and engage in planning. This rigidity likely then impacted their ability to adequately perform on other tasks. More specifically, if maladaptive perfectionists had an impaired ability to pay attention at the beginning of a set of tasks, and then their abilities to plan and execute a course of action were also subsequently decreased later on, this likely would wind up affecting the entire range of tasks being tested. Overall, the authors thus concluded that while adaptive perfectionism is likely to be beneficial for performance on tasks involving accuracy alone, as well as tasks that require both speed and accuracy, maladaptive perfectionism is likely to cause more specific impairments in only those tasks that involve having to make a decision regarding a trade-off between speed and accuracy (Slade, et al., 2009).

Although the results of Slade, et al.'s (2009) research are intriguing, there are two major flaws with their study as it relates to understanding the relationship of executive functioning deficits to multidimensional perfectionism in the general population. The first, and greatest, problem with this study is the authors' choice to use the Positive and Negative Perfectionism Scale (PANPS) to assess multidimensional perfectionism, as this measure has been demonstrated to be an inadequate measure of positive and negative perfectionism (Egan, Piek, Dyck, & Kane, 2011). This is due to several issues, included the poor factor structure of the measure, as well as its lack of convergent validity. Specifically, the Positive Perfectionism subscale of the PANPS is an invalid measure of adaptive perfectionism, as it has significant correlations with the Concern over Mistakes dimension of the Frost Multidimensional Perfectionism Scale, as well as being moderately correlated with depressive symptomology. As the validity of this measure is particularly poor in clinical samples (Egan, et al., 2011), it was likely not the best choice of measure for Slade, et al.'s (2009) study, whose sample was comprised of patients who had been referred for routine neuropsychological assessment.

In terms of understanding the relationship of executive functioning deficits to multidimensional perfectionism in the general population, the fact that the sample in Slade, et al.'s (2009) study was a clinical one is the second greatest problem with their research, as patients presenting for neuropsychological assessment may have a variety of reasons for having executive functioning deficits. Furthermore, the authors of the study did not report that they controlled for such variables as patient diagnosis or level

of symptom severity, raising the possibility that the results of the study were influenced by extraneous, confounding variables.

Affrunti, Gramszlo, and Woodruff-Borden (2016) also sought to answer the question of whether or not maladaptive perfectionism is the result of impaired executive functioning processes, particularly within the domain of cognitive shifting. However, they studied the phenomenon in children and utilized self-report measures of executive functioning (the Behavior Rating Inventory of Executive Function—Parent Form and the Child and Adolescent Perfectionism Scale), rather than performance measures. Overall, they found that although deficits in cognitive shifting did not independently predict increases in perfectionism, the interaction of fearful temperament and deficits in cognitive shifting did predict increases in the Socially Prescribed Perfectionism and Self-Oriented Perfectionism—Critical subscales of perfectionism. Although the effect sizes were relatively small, the authors concluded that they were of similar magnitude to other known predictors of perfectionism, such as parenting and social stressors. Therefore, interactions between fearful temperament and executive functioning deficits could be useful in predicting increased maladaptive perfectionism in children, as children who have difficulty with cognitive set shifting may be more likely to perseverate on their feelings of distress when they do not meet standards, either their own or those of other people (Affrunti, et al., 2016).

Overall, it can thus be seen that while interesting preliminary research has been conducted in order to try and investigate the relationship between multidimensional perfectionism and executive functioning deficits in children and clinical populations, no research has specifically attempted to answer the question of how executive functioning

deficits relate to multidimensional perfectionism in the general population of healthy adults. Therefore, studying this phenomenon in college-age young adults would be optimal, as these individuals are at the age when executive functioning has been shown to peak; executive functioning increases rapidly between the ages of 15-19, peaks between the ages of 20-29, and slowly diminishes thereafter (De Luca, et al., 2003). Furthermore, the relationship between multidimensional perfectionism and executive functioning deficits is important to study in college students because both maladaptive perfectionism and deficits in executive functioning can negatively impact their academic and social outcomes (Kennedy, 2017; Rice & Dwello, 2002), resulting in potentially deleterious consequences in terms of their future success. Finally, none of the research that has been conducted thus far on the relationship between multidimensional perfectionism and executive functioning deficits has utilized both a reliable and valid measure of multidimensional perfectionism and objective neuropsychological assessment measures together. Therefore, such a study still needs to be conducted if an accurate understanding of how executive functioning deficits relate to multidimensional perfectionism in cognitively intact adults is to be gained.

Multidimensional Perfectionism as a Transdiagnostic Process

A transdiagnostic process is defined as a trait or characteristic that not only occurs across multiple disorders, but is also a risk factor or maintaining mechanism for those disorders (Egan, et al., 2011). Based off of this definition, maladaptive perfectionism meets the standard for being considered a transdiagnostic process across a number of psychopathological disorders, including eating disorders, anxiety disorders, obsessive-compulsive disorder, obsessive-compulsive personality disorder, and

depression, as it not only serves as both a risk and maintaining factor for these disorders, but has also been related to the co-occurrence of such pathology (Egan, et al., 2011). Furthermore, as with maladaptive perfectionism, many of these disorders are characterized by deficits in executive functioning, affective processing, and emotion regulation, which suggests a possible shared biobehavioral mechanism for such comorbidity. Finding such an underlying mechanism, whether it be genetic, environmental, or some combination of the two, would be highly useful, as it could provide a specific, focused treatment target for more precise interventions that address a variety of disorders with a single approach (Egan, et al., 2011). While current treatments for both maladaptive perfectionism and executive functioning deficits primarily involve the use of cognitive-behavioral therapy to help individuals learn to cope with the symptoms of these problems, and therefore behave in more adaptive ways, continued research on maladaptive perfectionism and executive functioning deficits, and the relationship between them, will ideally one day lead to an intervention targeted at treating, or even preventing, the development and expression of the biobehavioral mechanisms underlying both of these processes, whether they be genetic or brain-based correlates, or factors that are more environmental in nature.

Multidimensional perfectionism and executive dysfunction in eating disorders. Eating disorders are a particularly good example of the way in which maladaptive perfectionism can be seen to be a transdiagnostic process. First, it is known that maladaptive perfectionism increases and maintains eating disorder pathology, with higher levels of maladaptive perfectionism seen in clients suffering from both anorexia nervosa (AN) and bulimia nervosa (BN), as compared to healthy controls

(Egan, et al., 2011). In addition, retrospective reports of increased maladaptive perfectionism in childhood are related to the future development of both AN and BN. Furthermore, maladaptive perfectionism has been demonstrated to be a prospective predictor for the development of BN in women, and even once patients with AN have recovered to a normal body weight they continue to show elevated levels of maladaptive perfectionism as compared to controls. Finally, twin studies have shown that many of the same genetic and environmental risk factors are present in both eating disorders and perfectionism (Egan, et al., 2011). One study even found that three of the genes they investigated, which are known to be associated with AN in women, were also associated with perfectionism (Bachner-Melman, et al., 2007). It thus appears that individuals who are genetically predisposed to develop perfectionism may also be predisposed to develop eating disorders via the same genetic mechanism.

Individuals with eating disorders have also been shown to exhibit deficits in cognitive functioning similar to those seen in maladaptive perfectionists, particularly in the areas of executive functioning, focused attention, information processing speed, and memory; such deficits are present even once nutritional state is controlled for (Kemps, Tiggemann, Wade, Ben-Tovim, & Breyer, 2006; Tchanturia, et al., 2004). With these clients, the main system that is malfunctioning appears to be the *inhibitory control-emotional regulation-executive function* circuit, which results in core deficits in three main neurocognitive constructs: decision making, response inhibition, and cognitive flexibility (Fagunodo, et al., 2012). Manifestations of difficulties with cognitive flexibility are particularly common in the AN population, and likely represent an underlying problem with set-shifting (Roberts, Tchanturia, Stahl, Southgate, & Treasure, 2007).

Such difficulties are thought to be partially genetic, as research has shown that unaffected mothers of daughters with AN also have similarly impaired cognitive styles, with deficits in set-shifting and global processing abilities (Lang, Treasure, & Tchanturia, 2015).

Multidimensional perfectionism in anxiety disorders, depressive disorders, and obsessive-compulsive disorders. Maladaptive perfectionism is also a key factor in several types of anxiety disorders; a core component of maladaptive perfectionism, evaluative concerns, has been consistently demonstrated to be positively related to general trait anxiety, and individuals in clinical samples with both panic disorder and social anxiety have been found to have significantly elevated levels of maladaptive perfectionism (Burgess & DiBartolo, 2016; Egan, et al., 2011). Patients with social anxiety disorder in particular have been shown to have the highest levels of maladaptive perfectionism, when compared to individuals with panic and obsessive-compulsive disorder (Burgess & DiBartolo, 2016). Furthermore, clients who do not respond well to CBT for social anxiety have been found to have significantly higher levels of perfectionism at the start of treatment than individuals who respond well to interventions, suggesting that unresolved perfectionism may negatively impact treatment success (Egan, et al., 2011). Interestingly, the presence of specific phobia does not appear to be related to either adaptive or maladaptive perfectionism (Egan, et al., 2011).

Levels of maladaptive perfectionism are also higher in clients with depression than in healthy controls and perfectionism has been found to be predictive of an increase in symptoms of depression over a four-month period of time (Egan, et al.,

2011). Furthermore, perfectionism is a risk factor for mood swings in individuals with bipolar disorder and in prospective and retrospective studies, higher levels of maladaptive perfectionism have been shown to be strongly predictive of suicidal ideation and behavior. Finally, although perfectionism has generally been found to be a trait that is stable over time, slight declines in facets of maladaptive perfectionism have been found to co-occur with the weakening or remission of active major depressive disorder episodes over the span of a year; this suggests that although perfectionism is a personality trait, the degree to which it is expressed it is somewhat dependent on affective state (Cox & Enns, 2003).

In regard to obsessive-compulsive disorder (OCD), perfectionism is one the six key cognitive factors inherent to this particular pathology and research has shown that patients with OCD score significantly higher on measures of maladaptive perfectionism than individuals without OCD (Egan, et al., 2011). Several studies have also found that maladaptive perfectionism interferes with the ability of OCD patients to engage in the exposure and response prevention tasks that are a critical piece of the therapy interventions recommended for the treatment of OCD, as well as predicting overall poorer responding to group and individual treatment for OCD in general (Chik, Whittal, & O'Neill, 2008; Frost & DiBartolo, 2002). Furthermore, Kyrios et al. (2007) found in their research that even after controlling for OCD patients' pre-morbid level of symptomology, the perfectionism subscale of the Obsessive Beliefs Questionnaire was the only subscale that significantly predicted treatment outcome, with higher scores predicting poorer outcomes. Taken as a whole, these findings are important because they suggest that maladaptive perfectionism is a key maintaining factor in anxious,

depressive, and obsessive-compulsive pathology (Egan, et al., 2011). They become even more powerful when one considers that they hold true not just in adults, but in pediatric samples as well, as studies have found that maladaptive perfectionism is related to the development of anxiety, depressive, and obsessive-compulsive disorders in children (Affrunti & Woodruff-Borden, 2014).

Executive functioning deficits in anxiety disorders. Research has demonstrated that individuals with a variety of anxiety disorders are subject to deficits in cognitive functioning. For example, Airaksinen, Larsson, and Forsell (2005) found that individuals suffering from social phobia had deficits in fluency, as measured by their inability to generate as many words on the FAS portion of the Controlled Oral Word Association Test (COWAT) as members of the control group. Such individuals have also been found to suffer deficits in attention and executive functioning, as measured by their performance on Parts A and B of the Trail Making Test (Cohen et al., 1996). Persons with panic disorder have been found to have similar impairments in executive functioning as well, as indicated by the relatively greater time it takes them to complete Part B of the Trail Making Test as compared to healthy controls; they have also been found to have deficits in divided, but not selective attention (Airaksinen, et al., 2005; Lautenbacher, Sernal, & Krieg, 2002).

Further attention and executive functioning deficits have also been noted in those individuals suffering from post-traumatic stress disorder (PTSD); for example, Stein, Kennedy, and Twamley (2002) found that trauma-exposed individuals demonstrated worse performance on the Paced Auditory Serial Addition Task (PASAT), which measures attention, as well as on the Stroop Color-Word Interference Test (SCWIT)

and Part B of the Trail Making Test, which both measure executive functioning. Jenkins, Langlais, Delis, and Cohen (2000) also found that individuals with PTSD performed more poorly than members of a control group on tasks involving auditory and visual attention, such as Digit Span (Total and Backward), the PASAT, the sequential learning portion on the Continuous Performance Task, the Digit Symbol Task, and Part B of the Trail Making Test. Finally, although not as well studied, some research has shown that older individuals suffering from generalized anxiety disorder (GAD) also suffer deficits in a number of cognitive domains, including information processing speed and executive functions, including inhibition (Beaudreau & O'Hara, 2009; Bierman, Comijs, Jonker, & Beekman, 2005; Hogan, 2003; Paterniti, Dufouil, Bisseurbe, & Alperovitch, 1999).

Executive functioning deficits in depressive disorders. Executive dysfunction deficits in individuals suffering from depression are those perhaps best supported by the research literature, particularly in the subdomains of attention and short-term/working memory (Castaneda, Tuulio-Henriksson, Marttunen, Suvisaari, & Lonnqvist, 2008). For example, Egeland et al. (2003) found that individuals with major depressive disorder (MDD) performed more poorly than members of a control group on the Stroop Color-Word Interference Test (SCWIT), which measures executive functions, as well as on Digit Span and the Continuous Performance Test, which measures attention. Hill, Keshavan, Thase, and Sweeney (2004) found similar results, in that individuals in their study with MDD performed more poorly than a control group on tests of attention such as the Cancellation and Digit Span subtests of the WAIS, the Digit Symbol Test, and Part A of the Trail Making Test. Their participants with major depressive disorder with accompanying psychotic features also performed more poorly than controls on several

tests of executive functioning, including the COWAT, the SCWIT, Part B of the Trail Making Test, and the Wisconsin Card Sorting Test (WCST) (Hill et al., 2004). In addition, Stordal et al. (2004) discovered that individuals with MDD performed more poorly on the tests of executive functioning they administered, including the COWAT, Digit Span (Backward), the PASAT, the SCWIT, and the WCST (failure to maintain set) (Stordal et al., 2004). Finally, support for the presence of executive functioning deficits in major depressive disorder comes from the more recent work of Micco et al. (2009), who found that even in children, major depression could be used to predict significantly poorer performance on a variety of measures of executive functioning, including the Wechsler Intelligence Scale for Children-3rd edition (WISCs-III) Freedom from Distractibility Index, which measures working memory, as well as on the Processing Speed Index and Symbol Search subtest specifically, both which measure processing speed. They also found that depression in children predicted poorer performance on the Perseverative Errors aspect of the WCST, which assesses for set-shifting ability (Micco, et al., 2009).

Another finding of interest, in relation to the relationship between depression and executive functioning deficits, is that research has shown that even with the remission of symptoms of major depressive disorder, problems with executive functions, verbal learning, and memory continue to exist (Smith, Muir, & Blackwood, 2006). This suggests that these deficits may actually represent trait vulnerability markers for the development of MDD, in juxtaposition to problems with short-term and working memory, which may simply represent secondary symptoms of depression (Smith, et al., 2006).

Thus, such deficits may represent a possible target for interventions that have the goal of preventing the initial onset of depression in vulnerable populations.

Executive functioning deficits in obsessive-compulsive disorders.

Individuals with OCD has been shown to consistently demonstrate deficits in visuospatial memory, executive functioning, verbal memory, verbal fluency, and processing speed (Shin, Lee, Kim, & Kwon, 2014). Interestingly, students with OCD traits have been shown to demonstrate impaired performance on the recall trials of the Rey-Osterrieth Complex Figure Test; however, such deficits are thought to be the result of the use of inefficient organizational strategies during the copy trial, rather than due to problems with memory, since there are no substantial differences in scores on short-delay and long-delay trials (Aycicegi-Dinn, Dinn, & Caldwell-Harris, 2009; Kashyap, Kumar, Kandavel, & Reddy, 2013). Thus, the primary cognitive deficit present in OCD does appear to be in executive functioning, with poor performance in other domains seeming to be largely attributable to the inability of clients with OCD symptoms to generate and implement appropriate organizational strategies for incoming information during the encoding phase (Kashyap, et al., 2013; Olley, Malhi, & Sachdey, 2007).

Aims and Hypotheses

As multidimensional perfectionism is a transdiagnostic process that contributes to both the development and maintenance of a variety of psychopathologies, it is important to be able to assess for its presence and form in a reliable and valid fashion. However, as the state of the field currently exists, multidimensional perfectionism is typically only assessed via self-report measures. This is unfortunate, as cognitive research on multidimensional perfectionism suggests that there are objectively measurable ways in

which it might be assessed. Still, most of the experimental laboratory tests used in the research literature are too time-consuming and potentially expensive to be widely used in clinical practice; they are also typically lacking in published normative data. However, neuropsychological assessment measures that can assess for executive functioning deficits are widely available, typically do not require the use of expensive laboratory equipment, and have well-researched, published normative data. Unfortunately, there remains a dearth of information on whether or not these assessment measures can reliably detect executive functioning deficits in perfectionists. Therefore, it remains to explore whether or not these standardized neuropsychological measures can detect executive functioning deficits in perfectionistic individuals, as well as to discern whether or not such assessment measures demonstrate adequate discriminant validity between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. Finally, it still remains to be seen whether or not such objective executive functioning measures demonstrate concurrent validity with the self-report measures of perfectionism that are currently in widespread use.

Aim One: Determine if there are differences in performance on neuropsychological assessment measures of executive functioning between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists.

Hypothesis One: Adaptive perfectionists will perform better on executive functioning tasks involving attention, fluency, planning and decision making, working memory, and processing speed than maladaptive perfectionists or nonperfectionists.

Hypothesis Two: Maladaptive perfectionists will perform more poorly on executive functioning tasks involving attention, fluency, planning and decision making, working memory, and processing speed than adaptive perfectionists or nonperfectionists.

Hypothesis Three: Maladaptive perfectionists will self-report significantly greater deficits in executive functioning than adaptive perfectionists.

Aim Two: Determine if there are differences in symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating disorder pathology between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists.

Hypothesis Four: Maladaptive perfectionists will endorse significantly higher symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating disorder pathology than adaptive perfectionists and nonperfectionists.

Hypothesis Five: Adaptive perfectionists will endorse significantly lower symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating disorder pathology than maladaptive perfectionists and nonperfectionists.

CHAPTER III: METHODS

Participants

Participants were 2,157 undergraduate students at East Carolina University enrolled in the ECU Psychology Department Experimentrak subject pool for their introductory Psychology courses. Additionally, participants needed to be at least 18 years of age and not have used any alcohol or illicit substances within the past 24 hours. As compensation for their participation, participants earned research credit for their Introductory Psychology course.

Psychosocial Measures and Questionnaires

Demographic and psychiatric history questionnaire. Participants were asked to provide basic demographic information, as well as asked about substance use history that was pertinent to determining if they met study inclusion criteria. Finally, they were asked questions regarding any diagnoses of mental health concerns. At the end of the online portion of the study, participants were also asked whether they perceived themselves as being a perfectionist, and if so, do they believe this had a positive or negative affect on their ability to work and engage in daily activities (See Appendix A)

Revised Almost Perfect Scale (APS-R). The Almost Perfect Scale Revised (APS-R) is a 23 item self-report measure of perfectionism with three subscales, Standards, Discrepancy, and Order, which discriminate between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists (Slaney, et al., 2001). The Standards subscale measures whether or not an individual sets high standards for themselves, the Discrepancy subscale indicates whether or not an individual is meeting the standards they have set for themselves, and the Order subscale measures how

much order and organization an individual feels they need in their life. Each item is ranked on a seven-point Likert scale, from 1 = Strongly Disagree to 7=Strongly Agree, for a total possible score of 49 points on the High Standards subscale, 84 points on the Discrepancy subscale, and 28 points on the Order subscale. Scores of less than 42 points on the High Standards subscale indicate that an individual is a non-perfectionist and scores greater than or equal to 42 points on the subscale indicate that an individual is a perfectionist (Rice & Ashby, 2007). Furthermore, scores of less than 42 points on the Discrepancy subscale indicate that an individual is an adaptive perfectionist, while scores greater than or equal to 42 points indicate that an individual is a maladaptive perfectionist. Scores on the Order subscale are irrelevant for classification (Rice & Ashby, 2007).

The APS-R is the revised version of the original Almost Perfect Scale (APS), which was published in 1992 and, among other issues, was not thought to measure maladaptive perfectionism adequately (Slaney, et al., 2001). Exploratory and confirmatory factor analyses were used to arrive at the three dimensions comprising the APS-R, and structure coefficients were adequate, ranging from 0.42 to 0.88. Additionally, reliability was tested and also found to be acceptable, with Cronbach's alphas ranging from 0.82 to 0.92 for the subscale scores. Finally, construct validity was investigated by comparing the APS-R with the MPS-H and the MPS-F (Frost, et al., 1990; Hewitt & Flett, 1991). Results indicated that the High Standards subscale, which measures adaptive perfectionism, showed 0.64 and 0.55 correlations with the Self-Oriented Perfectionism subscale of the MPS-H in the two tested samples. Additionally, the APS-R Discrepancy subscale showed 0.31 and 0.23 correlations with the Self-

Oriented Perfectionism subscale of the MPS-H and 0.43 and 0.45 correlations with the Socially Prescribed Perfectionism subscale (Slaney, et al., 2001).

Further exploration indicated that the High Standards subscale of the APS-R had a .64 correlation with the Personal Standards subscale of the MPS-F (Slaney, et al., 2001). Additionally, the Discrepancy subscale of the APS-R had a 0.55 correlation with the Concern Over Mistakes subscale of the MPS-F and a 0.62 correlation with the Doubts About Actions subscale. Overall, these results indicate that the APS-R correlates adequately with other commonly utilized measures of perfectionism, although there was some discrepancy. This was expected to be the case since the MPS-H and MPS-F measure different conceptualizations of perfectionism than does the APS-R (Slaney, et al., 2001). Additional research has also indicated that the APS-R is a culturally valid measure of adaptive and maladaptive perfectionism in African American college students specifically (Mobley, Slaney, & Rice, 2005). (See Appendix B)

Mini-International Personality Item Pool—Five Factor Model (Mini-IPIP). The Mini-International Personality Item Pool-Five Factor Model (Mini-IPIP) is a 20-item short form of the 50-item International Personality Item Pool-Five Factor Model assessment measure (Goldberg, 1992; Donnellan, Oswald, Baird, & Lucas 2006). It is a self-report measure of Big Five personality traits with five scales that assess five domains of personality: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Intellect/Imagination (Donnellan, et al., 2006). Each domain is assessed by four items, two which are scored in a positive direction and two which are reverse-scored, and each item is ranked on a five-point Likert scale from 1 = Very Inaccurate to 5 = Very Accurate. Each of the scales have been shown to demonstrate acceptable internal

consistency, with Cronbach's alphas of at least .60, if not significantly above. The Mini-IPIP scales have also been shown to cover the Big Five facets of personality in a manner similar to other, broader Big Five measures, as well as having test-retest correlations similar to those of the measure it was derived from (the 50-item International Personality Item Pool-Five Factor Model) over time-spans of a few weeks to several months. Finally, the Mini-IPIP scales have also been shown to have similar convergent, discriminant, and criterion-related validities as other Big Five measures (Donnellan, et al., 2006) (See Appendix C).

Patient Health Questionnaire (PHQ-9). The Patient Health Questionnaire (PHQ-9) is a 9 item self-report measure of common symptoms of depression, including reduced appetite, trouble concentrating, feeling down, and fatigue (Kroenke & Spitzer, 2002). It allows for participants to indicate how often during the past two weeks they have experienced the listed symptoms of depression, from 0 = Not at all, to 3 = Nearly every day. Total scores can range from 0 to 27 and a cut score of 10 indicates that a participant has clinically meaningful symptoms of depression. The PHQ-9 has high internal consistency, with alpha coefficients ranging from 0.86-0.89. It has also demonstrated satisfactory criteria validity, as determined by comparing the measure's diagnostic capabilities to those of a mental health professional (Kroenke & Spitzer, 2002) (See Appendix D).

Overall Anxiety Severity and Impairment Scale (OASIS). The Overall Anxiety Severity and Impairment Scale (OASIS) is a 5 item self-report measure that assesses the severity and impairment associated with any anxiety disorder (Norman, Cissell, Means-Christensen, & Stein, 2006). It asks participants to rate on a scale from 0 (little to

none) to 4 (extremely or all of the time) how often they felt anxious over the past week, how intense or severe their anxiety was, how often they engaged in anxiety-related avoidance behaviors, how much their anxiety interfered with their ability to engage in work or school related activities, and how much their anxiety interfered with their social life. Total scores range from 0 to 20 and a cut score of eight is considered optimal for discriminating between those individuals with and without an anxiety disorder (Norman, et al., 2011).

In research with college students, the OASIS has been found to have high internal consistency, with a Cronbach's alpha for the five items of 0.80, as well as excellent test-retest reliability (Cronbach's alpha = 0.82) (Norman, et al., 2006). This measure has also demonstrated good convergent and discriminant validity, as it correlates positively with the Beck Depression Inventory ($r = 0.51$) and Spielberger Trait Anxiety Questionnaire ($r = 0.62$), and negatively with the Connor-Davidson Resilience Scales ($r = -0.59$) (Norman, et al., 2006) (See Appendix E).

Eating Attitudes Test (EAT-26). The Eating Attitudes Test (EAT-26) is a 26 item self-report measure of symptoms and concerns that characterize eating disorder pathology (Garner, Olmstead, Bohr, & Garfinkel, 1982). It asks participants to rate on a six-point Likert scale (from 0 = Never to 3 = Always) how often they experience a number of symptoms related to Dieting, Bulimia and Food Preoccupation, and Oral Control. Total scores range from 0 to 78 and scores above 20 indicate that a high level of concern around dieting, body weight, or problematic eating behaviors is present. In addition to the 26 main questions, the EAT-26 also asks participants to provide their

height and weight, so that BMI can be calculated, and well as having them indicate how often they engage in specific behaviors related to eating pathology (Garner, et al. 1982).

The EAT-26 is a shortened version of the original EAT-40 and the two are highly correlated ($r = 0.98$) (Garner, et al., 1982). Overall reliability coefficients for the EAT-26 are good and range from 0.83 in a non-clinical sample to 0.90 in an anorexic sample. The EAT-26 also has good convergent validity with formal diagnostic interviews based off DSM-IV eating disorder criteria, with the EAT-26 correctly diagnosing 90% of individuals diagnosed as eating disordered via clinical interview (Mintz & O'Halloran, 2000) (See Appendix F).

Obsessive-Compulsive Inventory-Revised (OCI-R). The Obsessive-Compulsive Inventory-Revised (OCI-R) is an 18 item self-report measure of symptoms related to obsessions and compulsions (Foa, et al., 2002). It asks participants to rank how much they agree with statements related to washing, obsessing, hoarding, ordering, checking, and neutralizing symptoms of Obsessive-Compulsive Disorder (OCD) on a 5-point Likert scale ranging from 0 = Not at all to 4 = Extremely. The OCI-R has good internal consistency, with a Cronbach's alpha of .90 for the full scale. It also has moderate to high test-retest reliability and satisfactory convergent and discriminant validity with the original Obsessive Compulsive Inventory, as well as with other measures, both observer- and self-report, of obsessive-compulsive symptomology (Foa, et al., 2002 (See Appendix G).

Positive and Negative Affect Schedule. The PANAS is a 20 item self-report questionnaire that gauges an individual's levels of positive and negative affect at various points in time, ranging from the current moment to within the past month; the

current study will utilize the momentary assessment version (Watson, Clark, & Tellegen, 1988). Ten of the items on the PANAS assess positive emotional states; these comprise the Positive Affectivity subscale. The other ten items assess negative emotional states and make up the Negative Affectivity subscale. Participants are asked to rate each emotional state on how strongly they are currently experiencing it, from 1=Very slightly or not at all, to 5=Extremely (Watson, et al., 1988).

Research into the reliability of the PANAS has indicated that it has adequate internal reliability, with alpha coefficients ranging from 0.84 to 0.90, depending upon the time period assessed (i.e., in the moment versus in the past week) (Watson, et al., 1998). In addition, research has indicated that the PANAS also has acceptable divergent, convergent, and concurrent validity; scores on the Positive Affectivity subscale have been shown to be negatively correlated with scores on the Beck Depression Inventory, the State Anxiety Scale of the State-Trait Anxiety Inventory, and the Hopkins Symptom Checklist, and scores on the Negative Affectivity subscale have been shown to be positively correlated with these measures (Watson, et al., 1998) (See Appendix H).

Historical Interview. Participants were administered a semi-structured interview regarding a number of relevant psychosocial factors, including whether or not there were any complications with their mother's pregnancy or their birth, if they had any developmental problems or congenital abnormalities, and whether or not they had any history of difficulties in school. They were also asked if they had ever suffered from any head injuries that were accompanied by loss of consciousness, if they had any past or present history of mental health concerns (including Attention Deficit Hyperactivity

Disorder), if they were currently on any psychotropic medications, and if they were currently using any alcohol or illicit drugs. Finally, they were questioned as to whether or not they were currently experiencing any cognitive symptoms, such as problems with memory, reasoning, language, attention/concentration, visuospatial functioning, motor control, or impulse regulation.

Neuropsychological Assessment Measures

Wechsler Abbreviated Scale of Intelligence-2nd Edition (WASI-II). The Wechsler Abbreviated Scale of Intelligence-2nd edition (WASI-II) is an abbreviated test of general intelligence created to assess both general and specific cognitive abilities (Wechsler, 1999). It is comprised of four subtests; the Vocabulary and Similarities subtests form the Verbal Scale, and the Block Design and Matrix Reasoning subtests from the Performance Scale. All four subtest together yield a Full Scale IQ (FSIQ) (Wechsler, 1999). The WASI-II subtests have moderate to high levels of internal consistency (.90 and above for composite scores), as well as adequate test-retest reliability (0.90-0.96 for adult composite scores) and high interrater reliability (Johnson, 2014). They also demonstrate strong convergent and discriminant validity with other Wechsler tests, such as the Wechsler Adult Intelligence Scale-4th edition (WAIS-IV) (Johnson, 2014).

Wechsler Test of Adult Reading (WTAR). The Wechsler Test of Adult Reading (WTAR) is used to estimate premorbid intellectual functioning and consists of a list of 50 phonetically irregular words that participants are asked to pronounce aloud (Mathias, Bowden, & Barrett-Woodbridge, 2007). The WTAR allows for premorbid IQ to be estimated based off of reading performance, demographic information (including age,

gender, ethnicity, and education), or by combining the two (ideal). It has satisfactory convergent validity with the Wechsler Adult Intelligence Scale-3rd edition (WAIS-III), with correlations ranging from 0.75 for verbal IQ to 0.73 for full-scale IQ (Wechsler, 2001). Scores on the WTAR are typically stable over time and are reliable indicators of premorbid functioning, except in the most severe cases of traumatic brain injury (Lezak, Howieson, Bigler, & Tranel, 2012a).

Wechsler Adult Intelligence Scales-4th Edition (WAIS-IV) subtests. The Wechsler Adult Intelligence Scale-4th Edition (WAIS-IV) is designed to assess a participant's overall intellectual ability and has good convergent validity with other measures of intellectual functioning; for example, it has a correlation of 0.88 with the Stanford-Binet IV (Wechsler, 2008). The overall measure consists of 15 subscales, which are divided up into four indexes: Verbal Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed. The Working Memory Index measures attention, concentration, mental control, and reasoning, while the Processing Speed Index measures the ability to quickly and correctly scan, sequence, and discriminate simple visual information. The following four subtests, which comprise the Working Memory and Processing Speed Indexes, will be utilized in this study:

Digit Span. The Digit Span subtest consists of three separate tasks, Digit Span Forward, Digit Span Backward, and Digit Span Sequencing. Digit Span Forward involves asking participants to repeat back increasingly longer strings of numbers in the same order as the examiner read them, while Digit Span Backward requires participants to repeat them backwards. Digit Span Sequencing

requires participants to recall increasingly longer strings of number in ascending numerical order. This subtest is used to assess working memory and has excellent internal consistency, with a split-half reliability coefficient of 0.92 in the 18-19-year-old normative sample and 0.91 in the 20-24 year-old normative sample.

Arithmetic. The Arithmetic subtest requires participants to solve a series of mental arithmetic problems within a specified time limit. This subtest is used to assess working memory and has good internal consistency, with a split-half reliability coefficient of 0.88 in the 18-19-year-old normative sample and 0.84 in the 20-24-year-old normative sample.

Symbol Search. The Symbol Search subtest requires participants to look within a group of symbols to see if one of them matches a target symbol; this must be done within a specified time limit. This subtest is used to assess processing speed and has good internal consistency, with a test-retest reliability coefficient of 0.81 in both the 18-19-year-old and 20-24-year old normative samples.

Coding. The Coding subtest requires participants to use a key to copy symbols paired with numbers; this must be done within a specified time limit. This test is used to assess processing speed and has good internal consistency, with a test-retest reliability coefficient of 0.85 in both the 18-19-year old and 20-24-year old normative samples.

Delis-Kaplan Executive Function System (D-KEFS) subtests. The Delis-Kaplan Executive Function System (D-KEFS) is a series of nine independent tests that

measure executive functioning impairments, even when they are mild (Delis, Kaplan, & Kramer, 2001; Lezak, Howieson, Bigler, & Tranel, 2012b). All of the tests except one, the Word Context Test, are variants of the most common neuropsychological assessment tools currently in use for measuring executive functioning. The principle scores for each of the subtests have acceptable test-retest reliability (0.43-0.73). For the purposes of the current research, only the following six tests will be used:

Trail Making Test. This test requires participants to create a trail with their pencil by connecting numbers, letter, and then alternating between numbers and letters (Delis, et al., 2001). These tests are used to assess attention and the alpha coefficients indicate that internal consistency is adequate for the Combined Number and Letter Sequencing Composite (0.70-0.79), but low for Conditions 1-4 (≤ 0.59) (Strauss, Sherman, & Spreen, 2006a).

Verbal Fluency Test. This test requires participants to generate words by letter, by category, and then by alternating between two categories, all within a specified amount of time. These tests are used to assess fluency and alpha coefficients indicate that internal consistency is high for Condition 1-Letter Fluency Total Correct (0.80-0.89), but marginal for Condition 2-Category Fluency and Condition 3-Category Switching Total Switching (0.60-0.69), and low for Category Switching Total Correct (≤ 0.59).

Design Fluency Test. This test requires participants to create unique designs by using exactly four straight lines to make connections

among filled or empty dots. The task starts out by having participants build designs from only empty or filled dots, but then becomes a switching task in which they must alternate between empty and filled dots. This test is used to assess fluency.

Color-Word Interference Test. This test is a modified Stroop task comprised of four different conditions. The first condition requires participants to name colors, the second requires them to read color words, the third requires them to look at color names that are printed in a different color ink and then name the color of the ink instead of reading the word, and the fourth requires them to switch between reading the ink color or reading the color word name. This test is used to assess attention and the alpha coefficient indicates that internal consistency is adequate for the Combined Color Naming + Word Reading Composite (0.70-0.79).

Tower Test. This test consists of five disks that vary in size from small to large and a board with three vertical pegs; it requires participants to move the disks from a predetermined start peg to a specified end peg in the fewest moves possible. In addition, the participant must only move one disk at a time and they must never place a larger disk on top of a smaller disk. This test is used to assess for planning and decision making and the alpha coefficient indicates that internal consistency is marginal for Total Achievement (0.60-0.69).

Sorting Test. This test requires participants to take a set of cards and repeatedly sort and describe the cards based on attributes of shape, color, writing, or word meaning. The second portion requires the participant to describe examiner created sorts. These tests are used to assess planning and decision making and the alpha coefficients indicate that internal consistency is adequate for Condition 1-Free Sorting Confirmed, Condition 2-Free Sorting Description, and Condition 3-Sorting Recognition Total. The Sorting Test of the D-KEFS has also been shown to have a moderate to high correlation (0.31-0.59) with the Wisconsin Card Sorting Test (Delis, et al., 2001; Strauss, et al., 2006a).

Behavior Rating Inventory of Executive Functioning-Adult (BRIEF-A). The Behavior Rating Inventory of Executive Functioning-Adult version (BRIEF-A) is a 75 item self-report measure of executive functioning (Roth, Isquith, & Gioia, 2005). It has nine clinical scales, which include Inhibit, Shift, Emotional Control, Self-Monitor, Initiate, Working Memory, Plan/Organize, Task Monitor, and Organization of Materials. The first four scales together make up the Behavioral Regulation Index (BRI) and the other five scales together make up the Metacognitive Index (MI). Finally, a summation of all nine scales provides an overall summary score called the Global Executive Composite (GEC). The BRIEF-A also has three built-in validity scales (Roth, et al., 2005).

The nine individual clinical scales of the BRIEF-A demonstrate adequate to excellent reliability, with Cronbach's alphas ranging from 0.73 (Inhibit) to 0.90 (Emotional Control); the three composite indexes also all demonstrate excellent

reliability, with Cronbach's alphas ranging from 0.93 to 0.96 (Roth, et al., 2005). The BRIEF-A has also shown good predictive and discriminant validity by accurately differentiating between students with and without formal diagnoses of ADHD, along with good convergent validity with the Connors Adult ADHD Rating Scales-Self Report: Long Version (CAARS-S:L) (Hauser, Lukomski, & Samar, 2013).

Hopkins Verbal Learning Test-Revised (HVLTR). The Hopkins Verbal Learning Test-Revised (HVLTR) is a test of an individual's memory ability to acquire, retain, and retrieve orally presented words (Keith, 2005). It consists of three acquisition trials of 12 verbally presented words (4 from each of three different semantic categories), a free word-recall trial, and a word-recognition trial. Though the HVLTR has weak reliability data supporting it, it has excellent validity (Keith, 2005).

Rey Complex Figure Test (RCFT) Copy Trial. The Rey Complex Figure Test (RCFT) Copy Trial is a test of visuoconstructional ability in which a participant is presented with a line-drawing of a multipart geometric figure and asked to copy it onto a second sheet of paper (Cohen, 2001). Precise, empirically-derived scoring criteria are used to score the drawings. The RCFT has strong reliability evidence supporting its use, including an average interrater reliability coefficient of .94, and good to excellent convergent and discriminant validities with other related and unrelated neuropsychological measures (Cohen, 2001).

21-Item Test. The 21-Item Test is ostensibly a list-learning test whose actual purpose is as a screen for suboptimal effort; it can identify exaggerated or feigned memory impairment (Iverson, Franzen, & McCracken, 1991). In this task, a participant is read 21 nouns (7 rhyming word pairs, 7 semantically related word pairs, and 7

semantically unrelated word pairs) and asked to freely recall as many as possible. Participants are then subsequently asked to complete a two-alternative forced-choice recognition task with the target words (Iverson, et al., 1991). This measure has internal reliability ranging from marginal to good (0.65-0.81) in individuals feigning head injury (Strauss, Sherman, & Spreen, 2006b). A cutoff of 9 is recommended for identifying feigned symptomatology (Strauss, et al., 2006b).

Procedures

After signing up for the study, participants completed the first portion of it online. This section of the study began with the informed consent document, a demographic and psychiatric history questionnaire, the Almost Perfect Scale Revised (APS-R), the Mini-International Personality Item Pool-Five Factor Model (Mini-IPIP), the Patient Health Questionnaire (PHQ-9), the Overall Anxiety Severity and Impairment Scale (OASIS), the Eating Attitudes Test (EAT-26), and the Obsessive-Compulsive Inventory-Revised (OCI-R) (Donnellan, et al., 2006; Foa, et al., 2002; Garner, et al., 1982; Kroenke & Spitzer, 2002; Norman, et al., 2006; Slaney, et al., 2001; Wu, Watson, & Clark, 2007).

The second portion of the study was conducted face-to-face in the Psychological and Assessment Specialty Services (PASS) Clinic, located in the Rawl building at East Carolina University. It began with another informed consent process, during which participants had any questions they might have had about the study answered. Next, a brief interview was conducted with each participant in order to gain an understanding of their basic psychosocial history, including any history of mental health concerns, psychotropic drug use, or use of illicit substances. Then, each participant was

administered a Positive and Negative Affect Schedule (PANAS) and then a number of measures of neurocognitive functioning, including the Wechsler Abbreviated Scales of Intelligence-2nd edition (WASI-II), Wechsler Test of Adult Reading (WTAR), the Digit Span, Arithmetic, Symbol Search, and Coding subtests from the Wechsler Adult Intelligence Scales-4th Edition (WAIS-IV), the Trail Making, Verbal Fluency, Design Fluency, Color-Word Interference, Tower, and Sorting subtests from the Delis-Kaplan Executive Function System (DKEFS), the Behavior Rating Inventory of Executive Functioning-Adult version (BRIEF-A), the Hopkins Verbal Learning Test-Revised (HVLTR), the Rey Complex Figure Test (RCFT) Copy Trial, and the 21-item test (Iverson, et al., 1991; Keith, 2005; Cohen, 2001; Roth, et al., 2005; Watson, et al., 1988; Wechsler, 1999; Wechsler, 2001; Wechsler, 2008). Finally, each participant was administered a second PANAS (Watson, et al., 1988).

At the completion of the in-person assessment portion of the study, participants were debriefed about the research and provided with a referral for further services if they endorsed distress. They were also offered the opportunity to return to the PASS Clinic to receive feedback on the results of the measures they completed in-person. Participants who indicated they were interested had a brief report written for them, which outlined their normative strengths and weaknesses, and were contacted upon its completion to schedule an in-person feedback session with a study clinician. No clinical diagnoses were provided during these feedback sessions and if at the end participants had further questions, they were referred to the PASS Clinic's psychoeducational assessment service for follow-up.

Statistical Analyses

The first, second, and third hypotheses, that adaptive perfectionists would perform better on executive functioning tasks involving attention, fluency, planning and decision making, working memory, and processing speed than maladaptive perfectionists or nonperfectionists, that maladaptive perfectionists would perform more poorly on these measures than adaptive perfectionists and nonperfectionists, and that maladaptive perfectionists would self-report significantly greater deficits in executive functioning than adaptive perfectionists, were tested with a one-way multivariate analysis of variance (one-way MANOVA) test. The independent variable was the type of perfectionist, with three levels of perfectionist: nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. The first dependent variable for the MANOVA was participants' scores on the Attention Index, which were calculated by taking $(z\text{-Trail Making} + z\text{-Color-Word Interference})/2$. The second dependent variable was participants' scores on the Fluency Index, which were calculated by taking $(z\text{-Verbal Fluency} + z\text{-Design Fluency})/2$. The third dependent variable was participants' scores on the Planning and Decision Making Index, which were calculated by taking $(z\text{-Tower Test} + z\text{-Sorting Test})/2$. The fourth dependent variable was participants' scores on the Working Memory Index, which were calculated by taking $(z\text{-Digit Span} + z\text{-Arithmetic})/2$. The fifth dependent variable was participants' scores on the Processing Speed Index, which were calculated by taking $(z\text{-Coding} + z\text{-Symbol Search})/2$. Finally, the sixth dependent variable for the MANOVA was participants' Global Executive Composite scores on the BRIEF-A. When the overall results were significant for the MANOVA, follow-up analyses in the form of Tukey's HSD were conducted. A follow-up sensitivity

analysis was also performed, utilizing APS-R subscale scores as continuous variables in a regression analysis. The following variables were also controlled for statistically: age, history of head injury, past or present mental health concerns, current psychotropic drug use, current use of alcohol or illicit substances, currently experienced cognitive symptoms, scores on the PHQ-9, OASIS, EAT-26, and OCI-R.

An a priori power analysis conducted with G*Power indicated that in order for a medium effect size to be found, with 80% power, at the .05 level of significance, 147 participants were required. This indicated that 49 nonperfectionists, 49 adaptive perfectionists, and 49 maladaptive perfectionists were required in order to have equal sample sizes for all three levels of the independent variable.

The fourth and fifth hypotheses, that maladaptive perfectionists would endorse significantly higher symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating disorder pathology than adaptive perfectionists and nonperfectionists, and that adaptive perfectionists would endorse significantly lower levels of these types of pathology than maladaptive perfectionists and nonperfectionists, were tested using a one-way multivariate analysis of variance (one-way MANOVA) test. The independent variable was again the type of perfectionist, with three levels of perfectionist: nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. The dependent variables for the MANOVA were scores on the PHQ-9, OASIS, OCI-R, and EAT-26. When the overall results were significant for the MANOVA, follow-up analyses in the form of Tukey's HSD were conducted.

CHAPTER IV: RESULTS

Statistical analyses were conducted using the SPSS 24.0 statistical software package. Online and in-person survey and neuropsychological data for participants who took part in the in-lab portion of the study were inspected for missing or aberrant values. The normality of the data distribution was also assessed and two outliers from the eating disorder symptomology data were removed in order to reduce skewness. Furthermore, a square root transformation was also performed on the depression and eating disorder symptomology data because the data were positively skewed more than one standard deviation above the mean (Wuensch, 2016; Wuensch, 2017).

There were 2,157 participants who originally took part in the online portion of the study (See Figure 1). Of the total number of original participants who took part in the online portion of the study, 101 self-selected into the in-lab portion of the research by signing up for the study via the online subject pool management system; they therefore also had their neuropsychological assessment and in-lab survey data included in the analyses. Nine of these in-lab participants were excluded from the final analysis due to failure to pass built in validity measures. These consisted of four online survey questions with obviously correct answers (“I am so picky that I will only eat barbecued giraffe”) or where the answer was provided in the question (“Please select strongly disagree”). There were also six built-in validity measures for the in-lab neuropsychological assessment measures. Both online and laboratory data were considered to be of questionable validity if one validity measure was incorrect, and completely invalid if more than one validity measure was incorrect. Participants were excluded from the final analysis if either their online or in-lab data were completely

invalid (six participants for online data), or if both sets of data were questionably valid (three participants). Three additional participants were excluded from the final analysis due to incomplete data. Data from the remaining 89 participants (40 women, 48 men, 1 individual who preferred not to specify their biological sex) were included in the final analyses of perfectionism classification, neuropsychological functioning, and psychopathology symptomatology (See Figure 1).

The mean age of the participants in this in-lab sample was 18.74 ($SD = 1.33$) and 48 participants (53.9%) identified themselves as Caucasian (See Table 1). Three Pearson chi-square tests were performed to determine if there were statistically significant differences in biological sex, gender, or race between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. No association was found between perfectionism category and biological sex [$X^2(2, N = 88) = 5.61, p = 0.06$], gender [$X^2(2, N = 88) = 3.95, p = 0.14$], or race [$X^2(2, N = 89) = 14.39, p = 0.28$] (See Table 1).

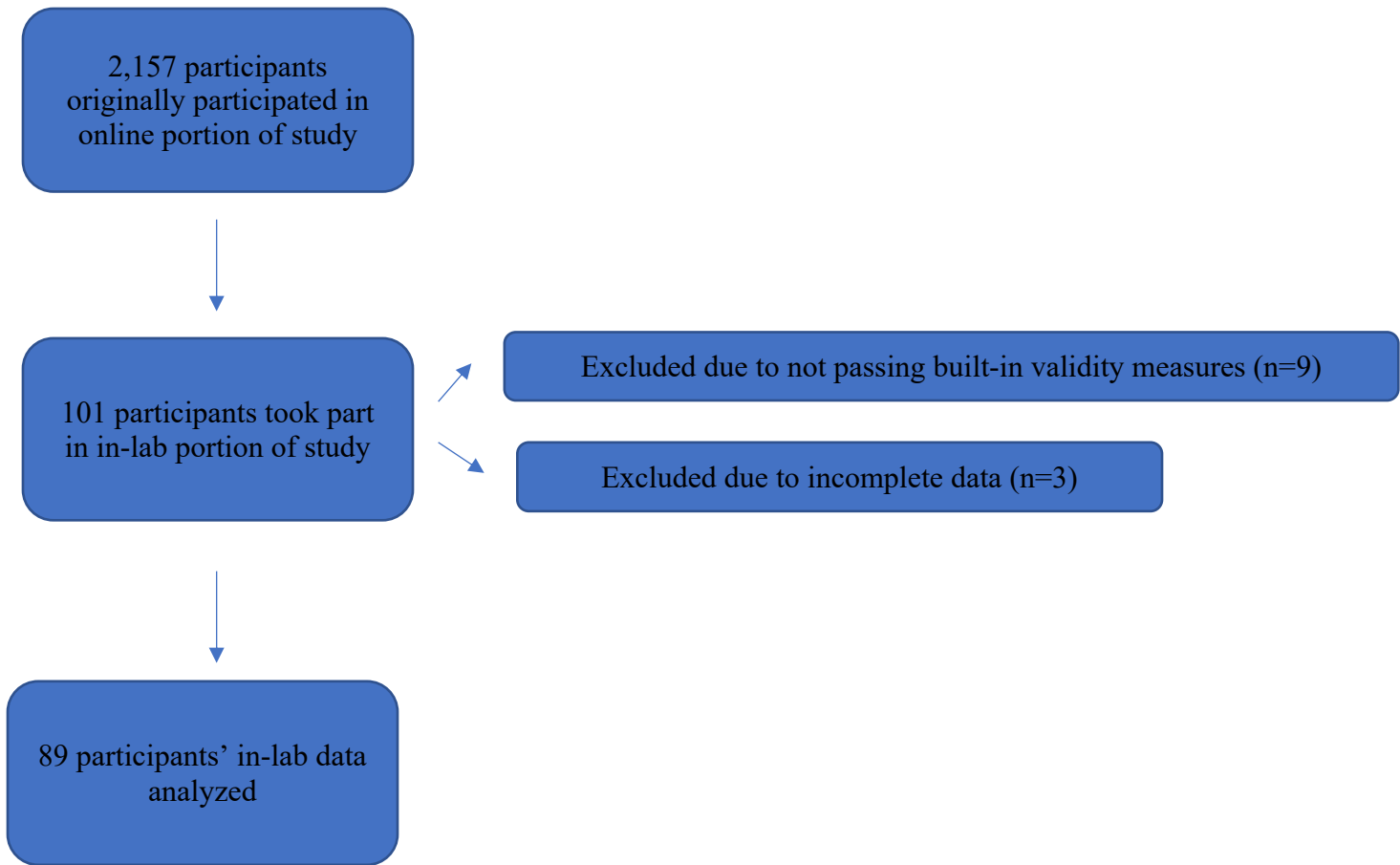


Figure 1. Participant Recruitment and Retention Across Online and In-Lab Study Portions

Table 1

Demographics for Lab Participants by Perfectionism Classification

	<u>Nonperfecti</u> <u>onists</u> (n = 32)	<u>Adaptive</u> <u>Perfectionists</u> (n = 17)	<u>Maladaptive</u> <u>Perfectionists</u> (n = 40)	<u>Total</u> (n = 89)
<i>Biological Sex</i>				
Male	22 (68.8%)	10 (58.8%)	16 (40.0%)	48 (52.2%)
Female	10 (31.2%)	7 (41.2%)	23 (57.5.3%)	40 (43.5%)
No Answer	0 (0.0%)	0 (0.0%)	1 (2.5%)	1 (1.1%)
<i>Gender</i>				
Male	22 (68.8%)	10 (58.8%)	19 (47.5%)	51 (57.3%)
Female	9 (28.1%)	7 (41.2%)	21 (52.5%)	37 (41.6%)
No Answer	1 (3.1%)	0 (0.0%)	0 (0.0%)	1 (1.1%)
<i>Race</i>				
Caucasian	18 (56.3%)	10 (58.8%)	20 (50.0%)	48 (53.9%)
African American	6 (18.8%)	3 (17.6%)	13 (32.5%)	22 (24.7%)
White Hispanic	3 (9.4%)	0 (0.0%)	0 (0.0%)	3 (3.4%)
Black Hispanic	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Native American	0 (0.0%)	1 (5.9%)	0 (0.0%)	1 (1.1%)
Asian/Pacific Islander	2 (6.3%)	1 (5.9%)	3 (7.5%)	6 (6.7%)
Multiracial	1 (3.1%)	2 (11.8%)	3 (7.5%)	6 (6.7%)
Other	2 (6.3%)	0 (0.0%)	1 (2.5%)	3 (3.4%)
No Answer	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
<i>Age</i>				
Mean (SD; range- range)	18.66 (1.04; 18.0-23.0)	19.06 (2.36; 18.0-28.0)	18.65 (0.92; 18.0-21.0)	18.74 (1.33; 18.0-28.0)

Aim One

Study Hypotheses. The first aim of the current research was to determine if there were differences in performance on objective and subjective neuropsychological assessment measures of executive functioning between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. It was first hypothesized that adaptive perfectionists would perform better on objective neuropsychological executive functioning tasks involving attention, fluency, planning and decision making, working memory, and processing speed than maladaptive perfectionists or nonperfectionists (***hypothesis one***). Second, it was hypothesized that maladaptive perfectionists would perform more poorly on these same measures of executive functioning compared to adaptive perfectionists or nonperfectionists (***hypothesis two***). Finally, it was hypothesized that maladaptive perfectionists would self-report significantly greater deficits in executive functioning than adaptive perfectionists (***hypothesis three***).

To test these hypotheses, a one-way multivariate analysis of covariance (MANCOVA) test was conducted to compare scores on measures of attention, fluency, planning and decision making, working memory, processing speed, and self-reported symptoms of executive dysfunction between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. The following variables were also controlled for statistically: age, history of head injury, past or present mental health concerns, current psychotropic drug use, currently experienced cognitive symptoms, and scores on measures of depression, anxiety, eating pathology, and obsessive-compulsive disorder. Results indicated that there were no statistically significant differences between the

perfectionism groups on the combined dependent variables after controlling for the listed covariates, $F(12, 132) = 0.94$, $p = 0.509$, Wilks' $\Lambda = 0.85$, partial $\eta^2 = 0.08$.

To be thorough, the same test was then repeated, this time without the addition of the covariates into the model. A one-way multivariate analysis of variance (MANOVA) test was conducted to compare scores on measures of attention, fluency, planning and decision making, working memory, processing speed, and self-reported symptoms of executive dysfunction between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. Results indicated that there were still no statistically significant differences between the perfectionism groups on the combined dependent variables, $F(16, 152) = 1.54$, $p = 0.093$, Wilks' $\Lambda = 0.74$, partial $\eta^2 = 0.14$.

Next, separate tests were run for the objective and subjective measures of executive functioning. A one-way multivariate analysis of variance (MANOVA) test was first conducted to compare scores on objective measures of attention, fluency, planning and decision making, working memory, and processing speed between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. Results indicated that there were no statistically significant differences between the perfectionism groups on the combined dependent variables, $F(10, 158) = 0.35$, $p = 0.965$, Wilks' $\Lambda = 0.96$, partial $\eta^2 = 0.22$.

After that, a one-way multivariate analysis of variance (MANOVA) test was conducted to compare scores on a subjective, multidimensional self-report measure of executive dysfunction. Results indicated that there were statistically significant differences between the perfectionism groups on the combined dependent variables, $F(6, 166) = 3.51$, $p = 0.003$, Wilks' $\Lambda = 0.79$, partial $\eta^2 = 0.11$. More specifically,

perfectionism classification was found to be significantly related to z-scores on the Metacognition Index of the BRIEF-A ($F(2, 88) = 6.41, p = 0.003$), as well as the Global Executive Composite ($F(2, 88) = 6.57, p = 0.002$). Post-hoc analyses using Tukey's HSD indicated that adaptive perfectionists ($M = -0.10, SD = 0.84$) had significantly lower z-scores on the Metacognition Index of the BRIEF-A than nonperfectionists ($M = 0.89, SD = 0.91$) ($HSD(2, 85) = 0.99, p = 0.002$), thus suggesting that adaptive perfectionists self-report significantly fewer symptoms of executive dysfunction than nonperfectionists for tasks that require the use of metacognition (See Figure 2). Furthermore, adaptive perfectionists ($M = -0.16, SD = 0.69$) had significantly lower z-scores on the Global Executive Composite of the BRIEF-A than maladaptive perfectionists ($M = 0.51, SD = 0.95$) ($HSD(2, 85) = -0.68, p = 0.023$) and nonperfectionists ($M = 0.78, SD = 0.85$) ($HSD(2, 85) = -0.95, p = 0.001$) (See Figure 3). However, when this same analysis was repeated taking covariates into account (i.e., age, history of head injury, past or present mental health concerns, current psychotropic drug use, currently experienced cognitive symptoms, and scores on measures of depression, anxiety, eating pathology, and obsessive-compulsive disorder), perfectionism category only remained significantly related to z-scores on the Metacognition Index ($F(2, 73) = 3.44, p = 0.037$), not the Global Executive Composite ($F(2, 73) = 2.97, p = 0.058$).

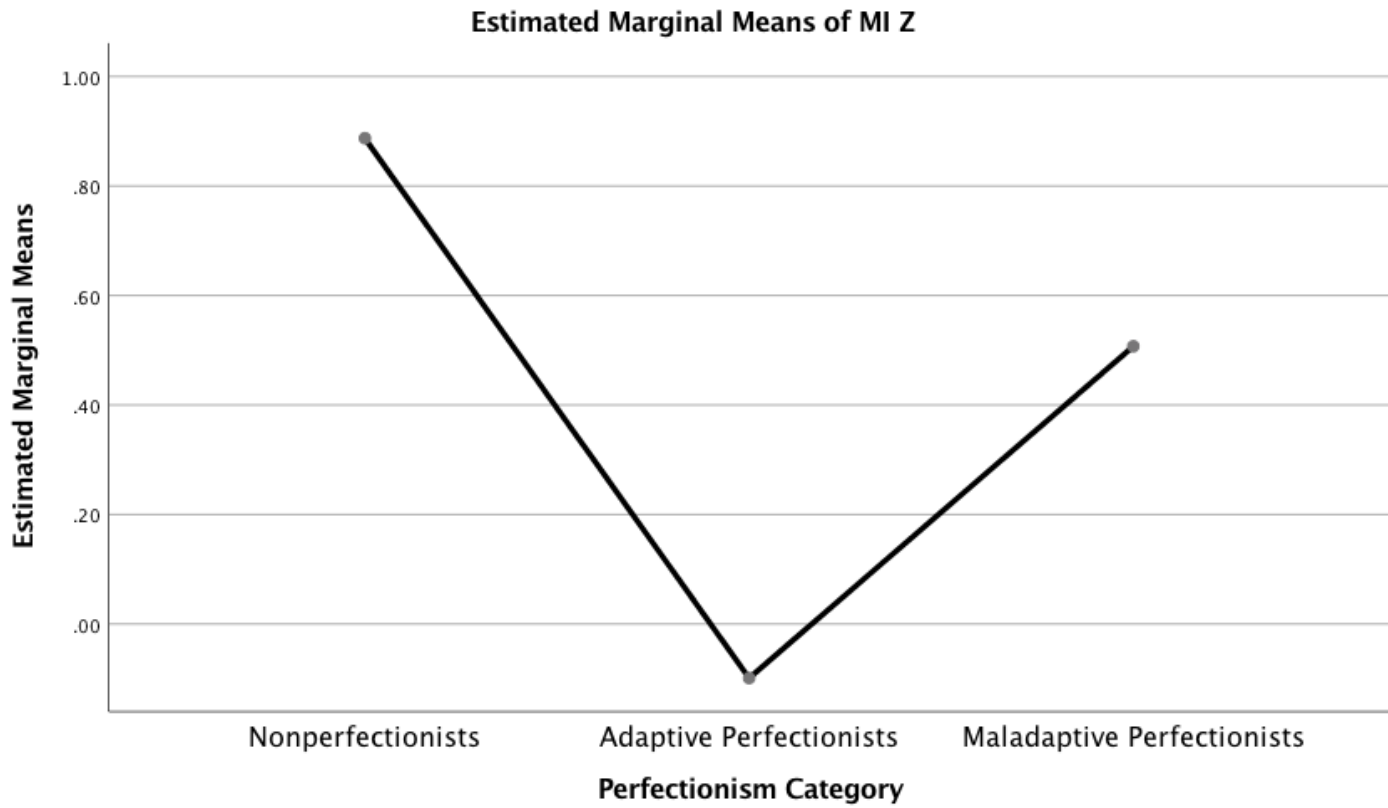


Figure 2. Mean Metacognition Index Z-Scores by Perfectionism Category;

Nonperfectionists $n = 31$, Adaptive Perfectionists $n = 16$, Maladaptive Perfectionists $n =$

36

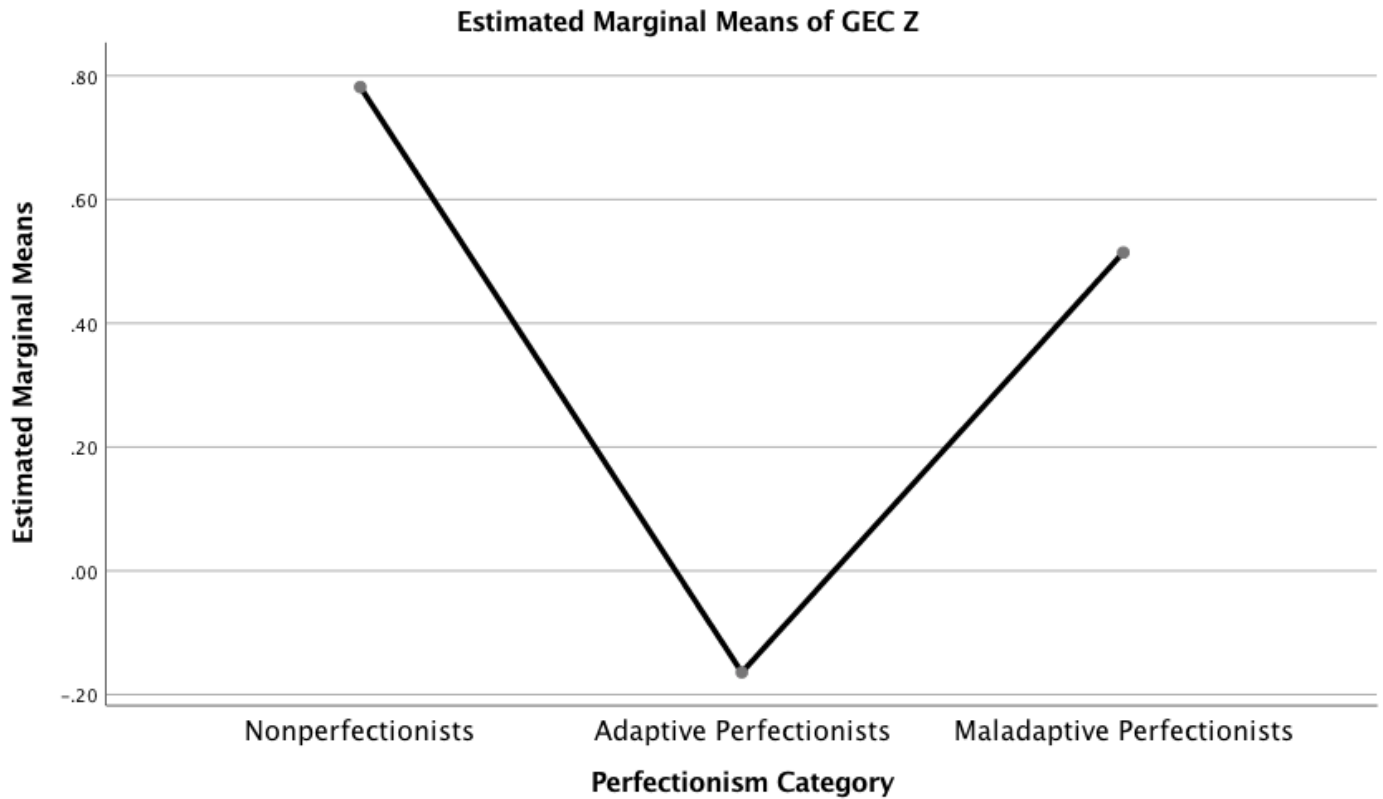


Figure 3. Mean Global Executive Composite Index Z-Scores by Perfectionism Category; Nonperfectionists $n = 31$, Adaptive Perfectionists $n = 16$, Maladaptive Perfectionists $n = 36$

Since the Metacognition Index is made up of five subscales, further analyses were conducted in order to determine if scores on specific Metacognition Index subscales differed by perfectionism classification. A one-way multivariate analysis of variance (MANOVA) test was conducted to compare scores on the Metacognition Index subscales of Initiate, Working Memory, Plan/Organize, Task Monitor, and Organization of Materials by perfectionism classification. Results indicated that there were statistically significant differences between the perfectionism groups on the combined dependent variables, $F(10, 162) = 1.90$, $p = 0.048$, Wilks' $\Lambda = 0.80$, partial $\eta^2 = 0.11$. More

specifically, perfectionism classification was found to be significantly related to scores on the Initiate ($F(2, 85) = 5.91, p = 0.004$), Plan/Organize ($F(2, 85) = 3.12, p = 0.049$), Task Monitor ($F(2, 85) = 3.30, p = 0.042$), and Organization of Materials subscales of the Metacognition Index of the BRIEF-A ($F(2, 85) = 6.40, p = 0.003$). Post-hoc analyses using Tukey's HSD indicated that adaptive perfectionists ($M = 11.47, SD = 2.04$) had significantly lower scores on the Initiate subscale than nonperfectionists ($M = 14.71, SD = 3.19$) ($HSD(2, 85) = 3.24, p = 0.003$) (See Figure 4). In addition, adaptive perfectionists ($M = 13.94, SD = 2.30$) had significantly lower scores on the Plan/Organize subscale than nonperfectionists ($M = 16.45, SD = 3.63$) ($HSD(2, 85) = 2.51, p = 0.042$) (See Figure 5). Furthermore, adaptive perfectionists ($M = 9.76, SD = 2.28$) had significantly lower scores on the Task Monitor subscale than nonperfectionists ($M = 11.48, SD = 2.11$) ($HSD(2, 85) = 1.72, p = 0.032$) ($HSD(2, 85) = 3.30, p = 0.042$) (See Figure 6). Finally, nonperfectionists ($M = 14.06, SD = 3.87$) had significantly higher scores on the Organization of Materials subscale than both maladaptive perfectionists ($M = 11.92, SD = 3.88$) ($HSD(2, 85) = 2.14, p = 0.039$) and adaptive perfectionists ($M = 10.35, SD = 3.08$) ($HSD(2, 85) = 3.71, p = 0.003$) (See Figure 7).

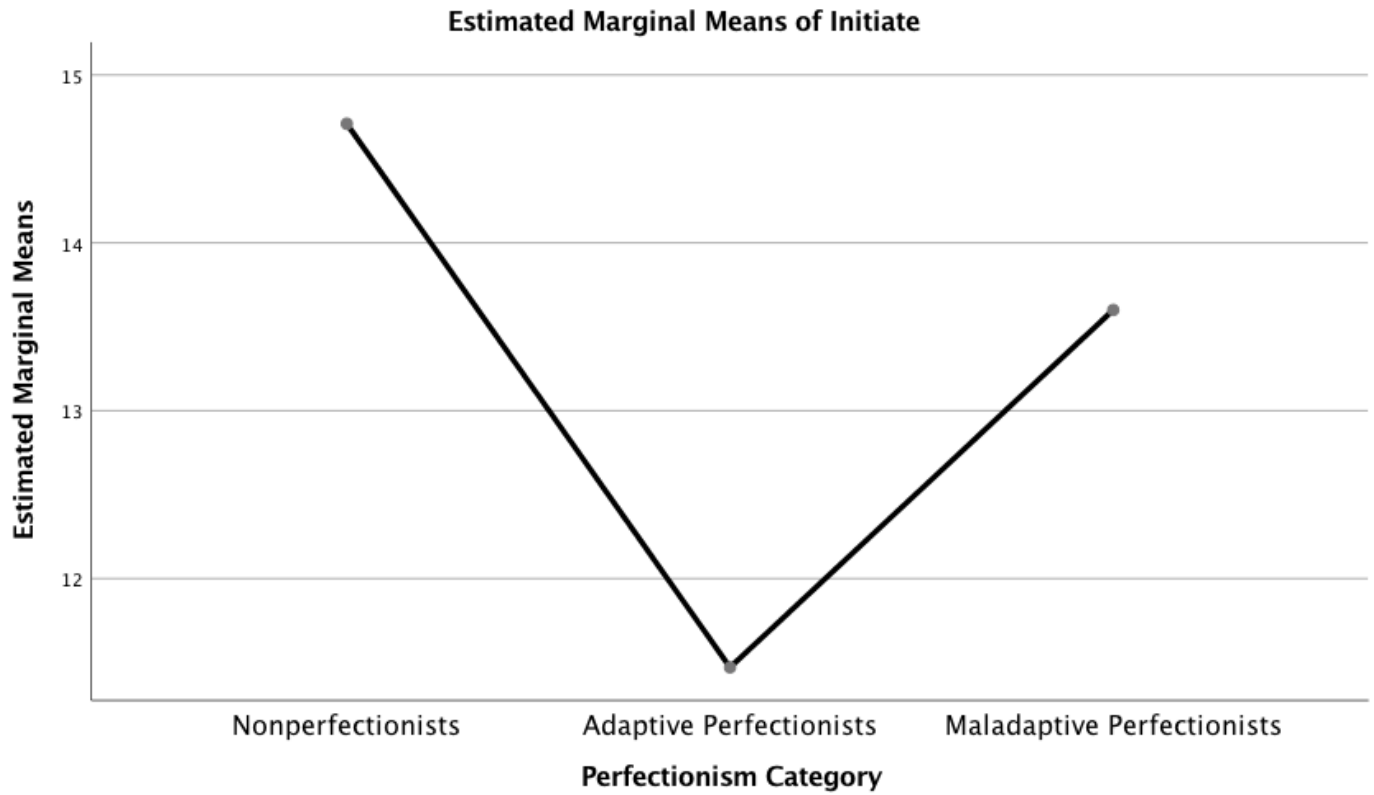


Figure 4. Mean Initiate Subscale Scores by Perfectionism Category; Nonperfectionists $n = 31$, Adaptive Perfectionists $n = 16$, Maladaptive Perfectionists $n = 36$

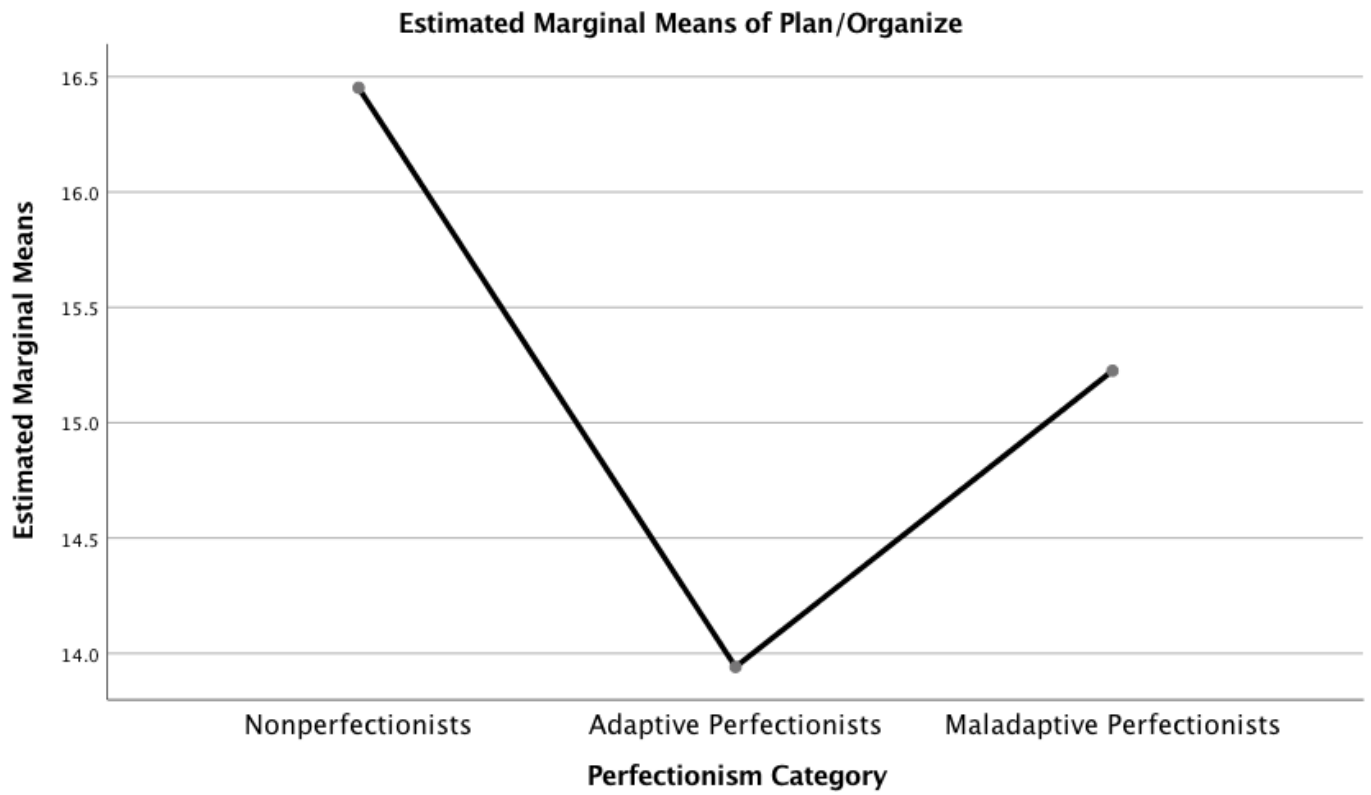


Figure 5. Mean Plan/Organize Subscale Scores by Perfectionism Category;

Nonperfectionists $n = 31$, Adaptive Perfectionists $n = 16$, Maladaptive Perfectionists $n =$

36

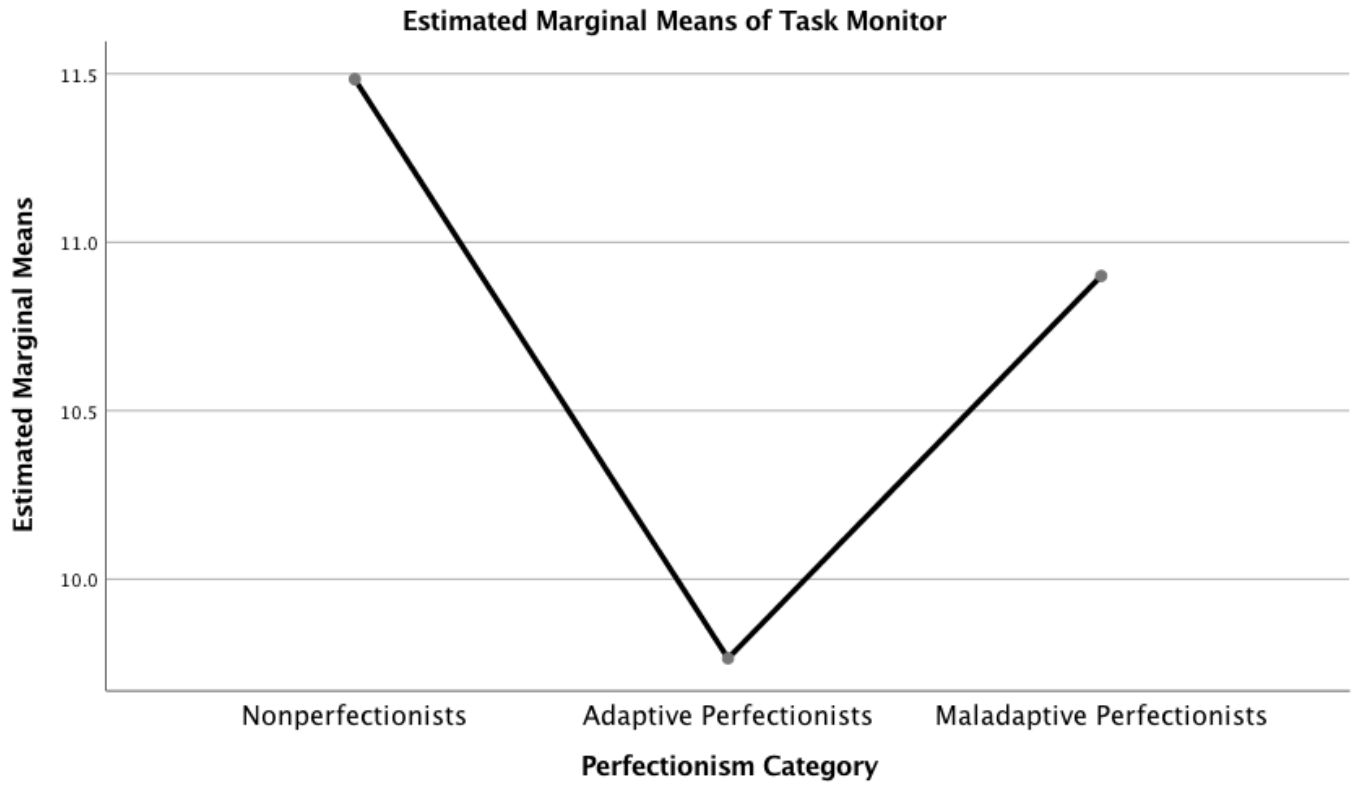


Figure 6. Mean Task Monitor Subscale Scores by Perfectionism Category;
Nonperfectionists $n = 31$, Adaptive Perfectionists $n = 16$, Maladaptive Perfectionists $n = 36$

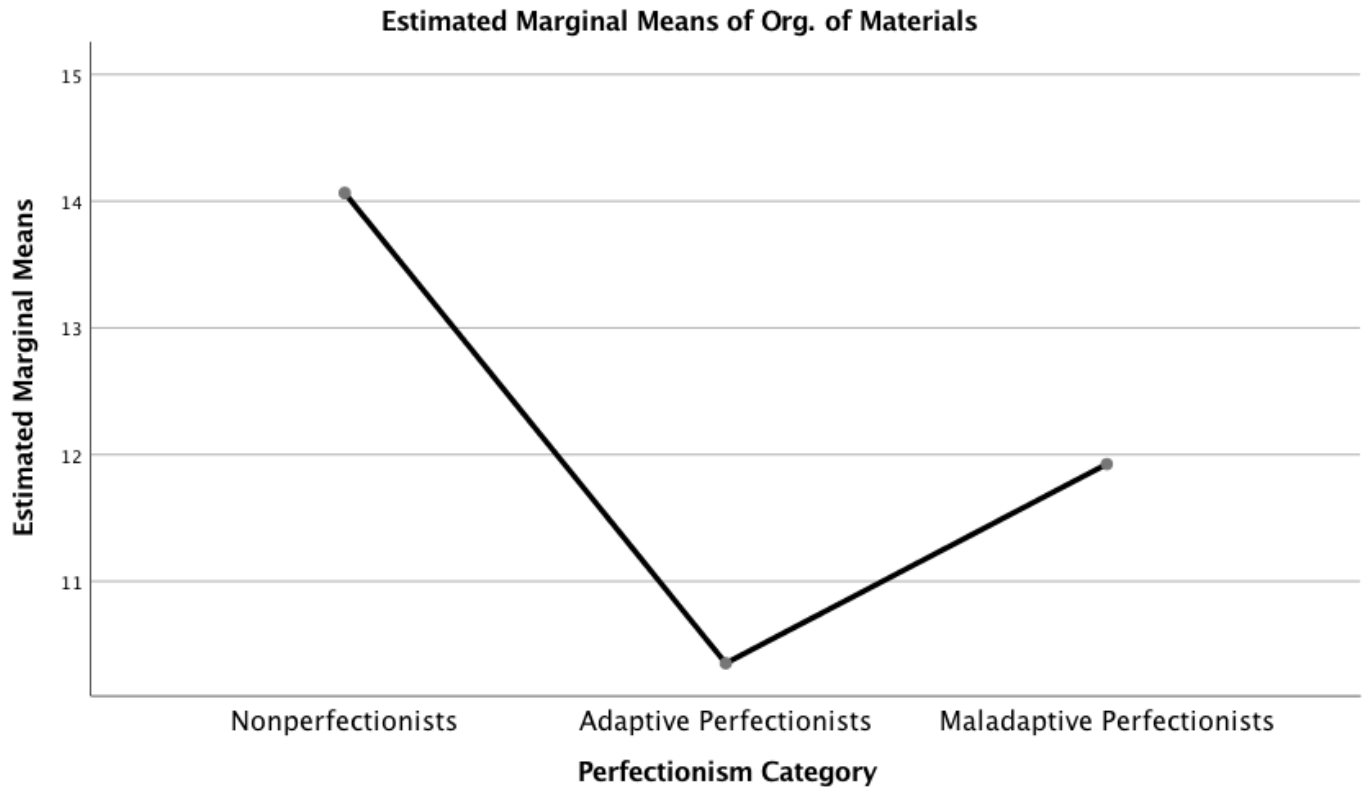
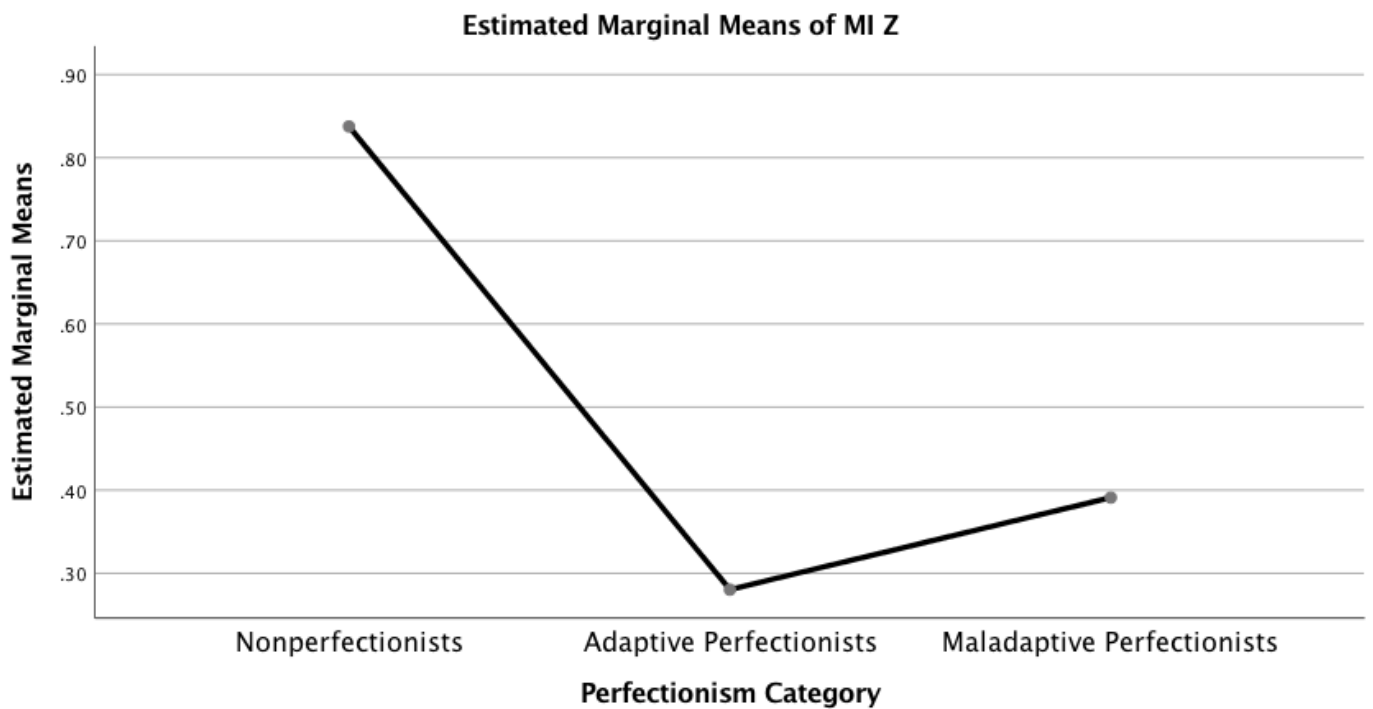


Figure 7. Mean Organization of Materials Subscale Scores by Perfectionism Category; Nonperfectionists $n = 31$, Adaptive Perfectionists $n = 16$, Maladaptive Perfectionists $n = 36$

Finally, the previous MANOVA investigating the relations between perfectionism classification and specific Metacognition Index subscales was repeated, this time with the following covariates statistically controlled for: age, history of head injury, past or present mental health concerns, current psychotropic drug use, currently experienced cognitive symptoms, and scores on measures of depression, anxiety, eating pathology, and obsessive-compulsive disorder. Results indicated that there were still statistically significant differences between the perfectionism groups on the combined dependent variables, $F(6, 142) = 2.87, p = 0.011, \text{Wilks' } \Lambda = 0.80, \text{partial } \eta^2 = 0.11$. Post-hoc

analyses using Tukey’s HSD indicated that even after controlling for the covariates, there remained statistically significant differences among the perfectionism groups for scores on the Metacognition Index of the BRIEF-A, $F(2, 73) = 3.44, p = 0.037$ (See Figure 8). Thus, it appears that adaptive perfectionists self-report the fewest number of symptoms of executive dysfunction, in particular, symptoms of executive dysfunction related to the ability to engage in tasks that require the use of metacognition, while nonperfectionists report the greatest number of symptoms of dysfunction. Therefore, the **first, second, and third** hypotheses were not supported.



Covariates appearing in the model are evaluated at the following values: Age = 18.73, History of Head Injury? = 1.59, MI Present? = 1.32, Current Psychotropic Use? = 1.13, Current Cognitive Symptoms? = 1.74, PHQTotal = 6.22, OASISTotal = 4.51, EATTTotal = 8.80, OCDTotal = 13.47

Figure 8. Mean Metacognition Index Z-Scores by Perfectionism Category, with Covariates Considered; Nonperfectionists $n = 31$, Adaptive Perfectionists $n = 16$, Maladaptive Perfectionists $n = 36$

Covariates. In addition to the statistically significant differences between the perfectionism groups for self-reported symptoms of executive dysfunction, there were statistically significant differences for a number of the covariates. First, results indicated that there were statistically significant differences by age for the combined dependent variables $F(6, 66) = 2.86, p = 0.015, \text{Wilks' } \Lambda = 0.79, \text{partial } \eta^2 = 0.21$. More specifically, age was found to be significantly related to scores on tasks of attention ($F(1, 71) = 13.26, p = 0.001$), fluency ($F(1, 71) = 4.08, p = 0.047$), working memory ($F(1, 71) = 7.87, p = 0.006$), and processing speed ($F(1, 71) = 4.65, p = 0.034$). Follow-up tests in the form of Pearson correlations were performed and indicated that there were significant negative associations between age and scores on measures of attention ($r(87) = -0.33, p = 0.002$), fluency ($r(85) = -0.23, p = 0.030$), and working memory ($r(87) = -0.24, p = 0.021$). Thus, as age increased, scores on objective neuropsychological assessment measures of attention, fluency, and working memory decreased.

In addition, results also indicated that there were statistically significant differences for depression scores for the combined dependent variables, $F(6, 66) = 3.84, p = 0.002, \text{Wilks' } \Lambda = 0.74, \text{partial } \eta^2 = 0.26$. More specifically, total scores on the PHQ-9, a self-report measure of depressive symptoms, were found to be significantly related to scores on the Global Executive Composite of the BRIEF-A, $F(1, 71) = 20.35, p = <0.00$. A follow-up test in the form of a Pearson correlation was performed and indicated that there was a significant positive association between depression scores and Global Executive Composite z-scores, $r(86) = 0.62, p = <0.001$. Thus, as self-reported symptoms of depression increased, so too did self-reported symptoms of executive dysfunction.

Exploratory Analyses. To further the exploration of Aim One, a variety of additional analyses were next conducted in order to determine if relations existed between multidimensional perfectionism, the personality factors of conscientiousness and neuroticism, and executive functioning. First, multiple regression analyses were used to assess whether the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, or the interaction of these variables predicted scores on objective measures of executive functioning, including: 1) scores on the Attention Index; 2) scores on the Fluency Index; 3) scores on the Planning and Decision-Making Index; 4) scores on the Working Memory Index; and 5) scores on the Processing Speed Index. The results of the first regression indicated that the predictors did not explain a statistically significant portion of the variance in scores on the Attention Index, $R^2 = .06$, $F(10, 76) = 0.49$, $p = 0.889$. The results of the second regression indicated that the predictors did not explain a statistically significant portion of the variance in scores on the Fluency Index, $R^2 = .10$, $F(10, 74) = 0.83$, $p = 0.601$. The results of the third regression indicated that the predictors did not explain a statistically significant portion of the variance in scores on the Planning and Decision Making Index, $R^2 = .06$, $F(10, 75) = 0.51$, $p = 0.878$. The results of the fourth regression indicated that the predictors did not explain a statistically significant portion of the variance in scores on the Working Memory Index, $R^2 = .18$, $F(10, 76) = 1.63$, $p = 0.115$. Finally, the results of the fifth regression indicated that the predictors did not explain a statistically significant portion of the variance in scores on the Processing Speed Index, $R^2 = .09$, $F(10, 76) = 0.71$, $p = 0.716$. Thus, the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, nor the

interaction of these variables were found to significantly predict scores on objective neuropsychological measures of executive functioning.

The next multiple regression analysis was used to assess whether the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, or the interaction of these variables predicted scores on a subjective self-report measure of executive dysfunction, the Global Executive Composite (GEC) of the BRIEF-A. The results of the regression indicated that ten predictors explained 62% of the variance, $R^2 = .62$, $F(10, 75) = 12.24$, $p = <0.001$. It was found that Conscientiousness ($\beta = -0.61$, $p = <0.001$) and Neuroticism ($\beta = 0.26$, $p = 0.003$) significantly predicted GEC scores. Specifically, as Conscientiousness increased, GEC scores decreased, and as Neuroticism increased, so too did GEC scores. That is, as Conscientiousness increased, self-reported symptoms of executive dysfunction decreased, and as Neuroticism increased, so too did self-reported symptoms of executive dysfunction. In addition, the interaction between the APS-R Standards subscale and the mini-IPIP Conscientiousness subscale significantly predicted GEC scores ($\beta = 0.23$, $p = 0.012$). When this interaction was probed by testing the conditional effects of Standards at three levels of Conscientiousness, low, moderate, and high, it was found that Standards was significantly related to GEC scores when Conscientiousness was low ($R^2 = 0.190$), but not when Conscientiousness was moderate ($R^2 = 0.003$) or high ($R^2 = 0.004$). That is, for those participants low in Conscientiousness, an increase in Standards predicted a significant decrease in GEC scores; thus, for participants low in Conscientiousness, higher Standards predicted

fewer reported symptoms of executive dysfunction. A scatterplot summarizes the results (Figure 9).

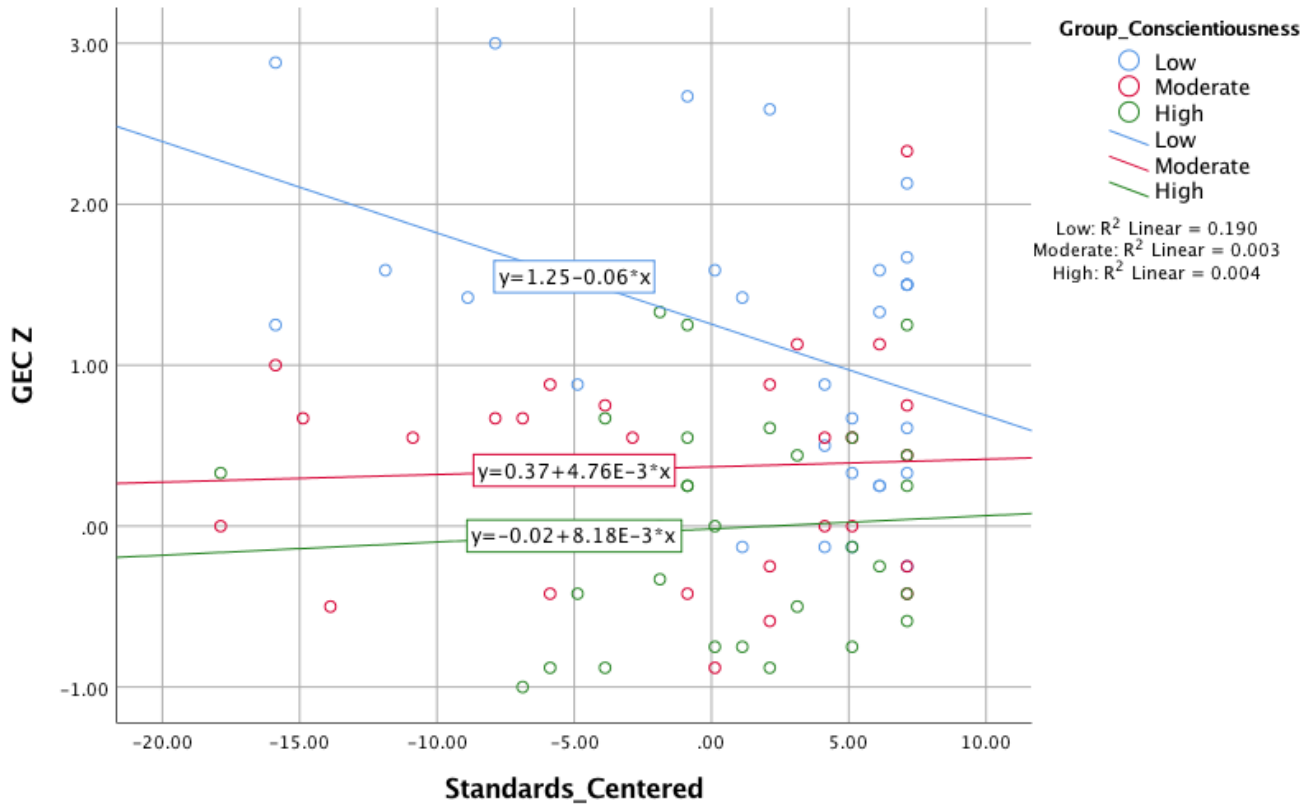


Figure 9. Global Executive Composite Scores by Standards for Three Levels of Conscientiousness (All Participants); Low Conscientiousness $n = 30$, Moderate Conscientiousness $n = 29$, High Conscientiousness $n = 30$

Overall, when considering the value of the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, and the interactions of these variables for predicting self-reported symptoms of executive dysfunction among nonperfectionists, adaptive perfectionists, and maladaptive perfectionists, it first becomes apparent that by itself, the personality trait of Conscientiousness has predictive value only for nonperfectionists and maladaptive

perfectionists, not for adaptive perfectionists. Second, by itself, the personality trait of Neuroticism only has predictive utility for nonperfectionists, not for adaptive or maladaptive perfectionists.

Aim Two

Study Hypotheses. The second aim of the current research was to determine if there were differences in self-reported symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating disorder pathology between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. It was first hypothesized that maladaptive perfectionists would endorse significantly higher symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating pathology than adaptive perfectionists and nonperfectionists (*hypothesis four*). Furthermore, it was hypothesized that adaptive perfectionists would endorse significantly lower levels of these symptoms than maladaptive perfectionists and nonperfectionists (*hypothesis five*).

To test these hypotheses, a one-way multivariate analysis of variance (one-way MANOVA) test was conducted to compare scores on the PHQ-9, OASIS, EAT-26, and OCI-R between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. Results indicated that there were statistically significant differences between the perfectionism groups on the combined dependent variables, $F(8, 160) = 2.27, p = 0.025, \text{Wilks' } \Lambda = 0.81, \text{partial } \eta^2 = 0.10$. Post-hoc analyses using Tukey's HSD indicated that adaptive perfectionists ($M = 2.82, SD = 1.20$) had significantly lower PHQ-9 depression scores than both nonperfectionists ($M = 6.63, SD = 0.88$) and maladaptive perfectionists ($M = 7.38, SD = 0.81$) ($HSD(2, 83) = 5.12, p = 0.008$) (See

Figure 10). Furthermore, adaptive perfectionists ($M = 2.82$, $SD = 0.86$) had significantly lower OASIS anxiety scores than maladaptive perfectionists ($M = 5.60$, $SD = 0.58$) ($HSD(2, 83) = 3.82$, $p = 0.026$) (See Figure 11). In addition to these findings, post-hoc analyses indicated that maladaptive perfectionists ($M = 11.86$, $SD = 11.21$) had significantly higher EAT-26 eating disorder pathology scores than both nonperfectionists ($M = 6.69$, $SD = 7.0$) and adaptive perfectionists ($M = 5.59$, $SD = 6.75$) ($HSD(2, 83) = 4.08$, $p = 0.020$) (See Figure 12). However, there were no significant differences between perfectionism groups for OCI-R obsessive compulsive disorder scores ($HSD(2, 83) = 2.85$, $p = 0.064$). Thus, **hypothesis four** was fully supported for self-reported symptoms of eating disorder pathology, partially supported for self-reported symptoms of depression and anxiety, and not supported for self-reported symptoms of obsessive-compulsive disorder. In addition, **hypothesis five** was fully supported for self-reported symptoms of depression, partially supported for self-reported symptoms of anxiety and eating disorder pathology, and not supported for self-reported obsessive-compulsive disorder symptomology.

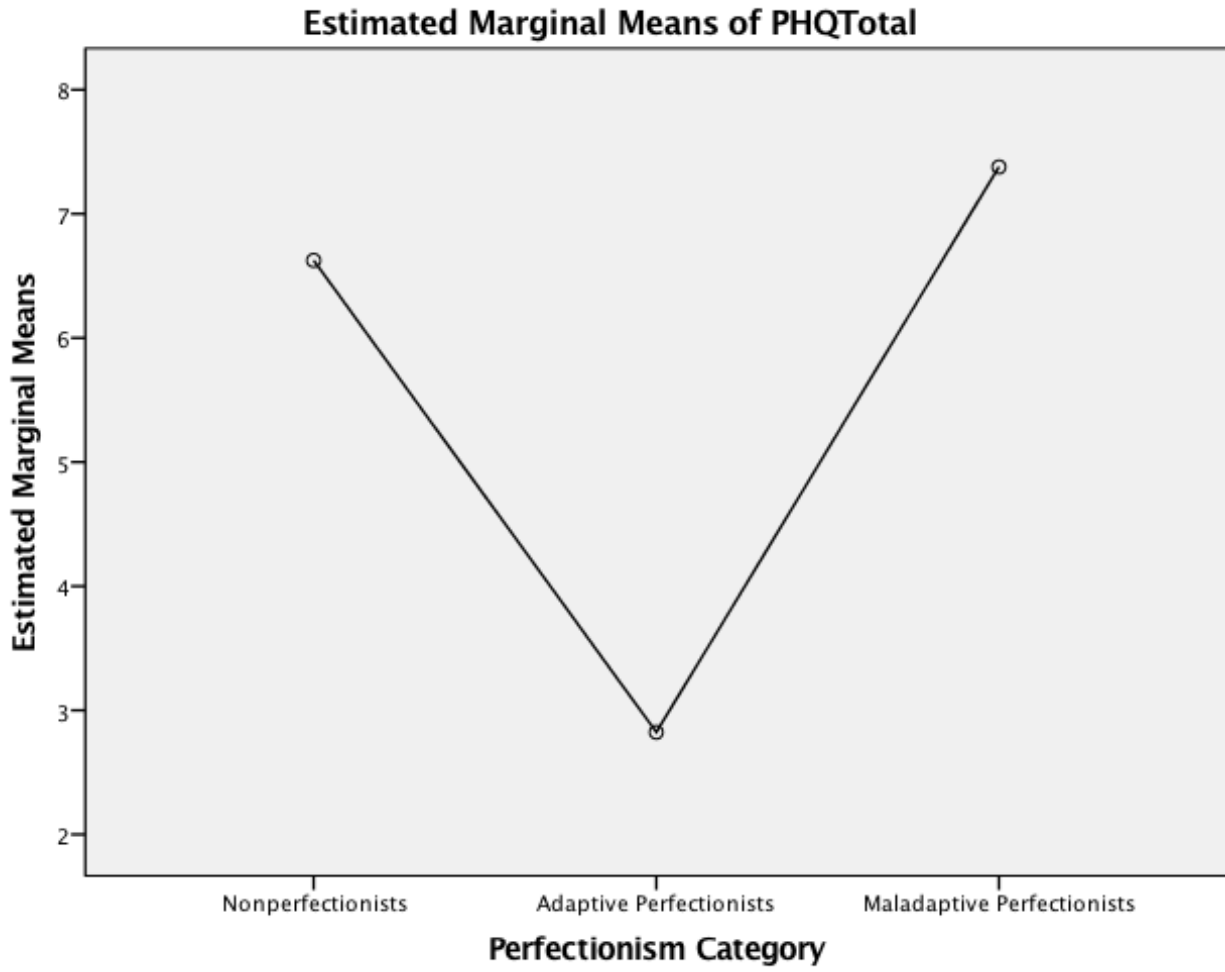


Figure 10. Mean PHQ Total Scores by Perfectionism Category; Nonperfectionists $n = 32$, Adaptive Perfectionists $n = 17$, Maladaptive Perfectionists $n = 37$

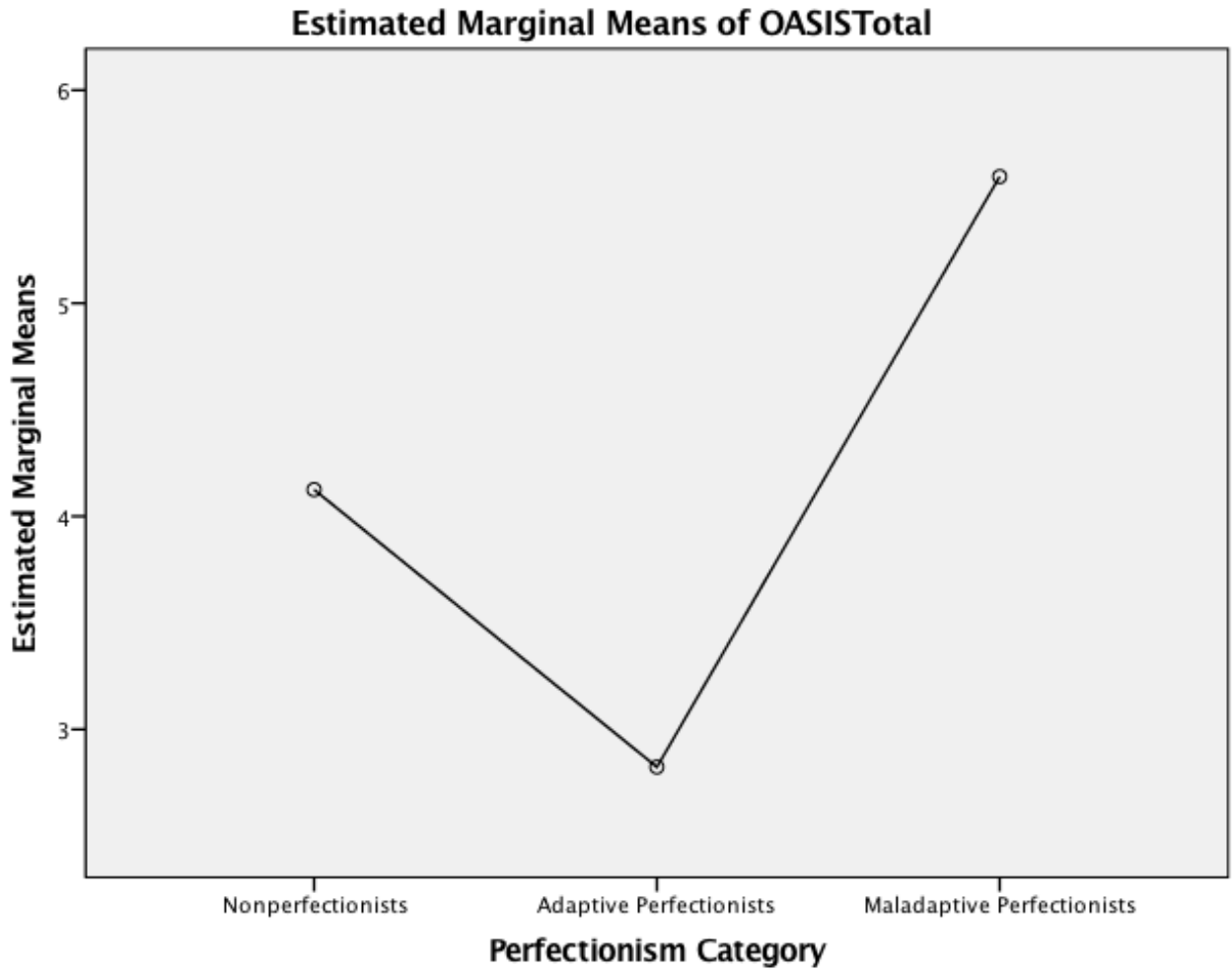


Figure 11. Mean OASIS Total Scores by Perfectionism Category; Nonperfectionists $n = 32$, Adaptive Perfectionists $n = 17$, Maladaptive Perfectionists $n = 37$

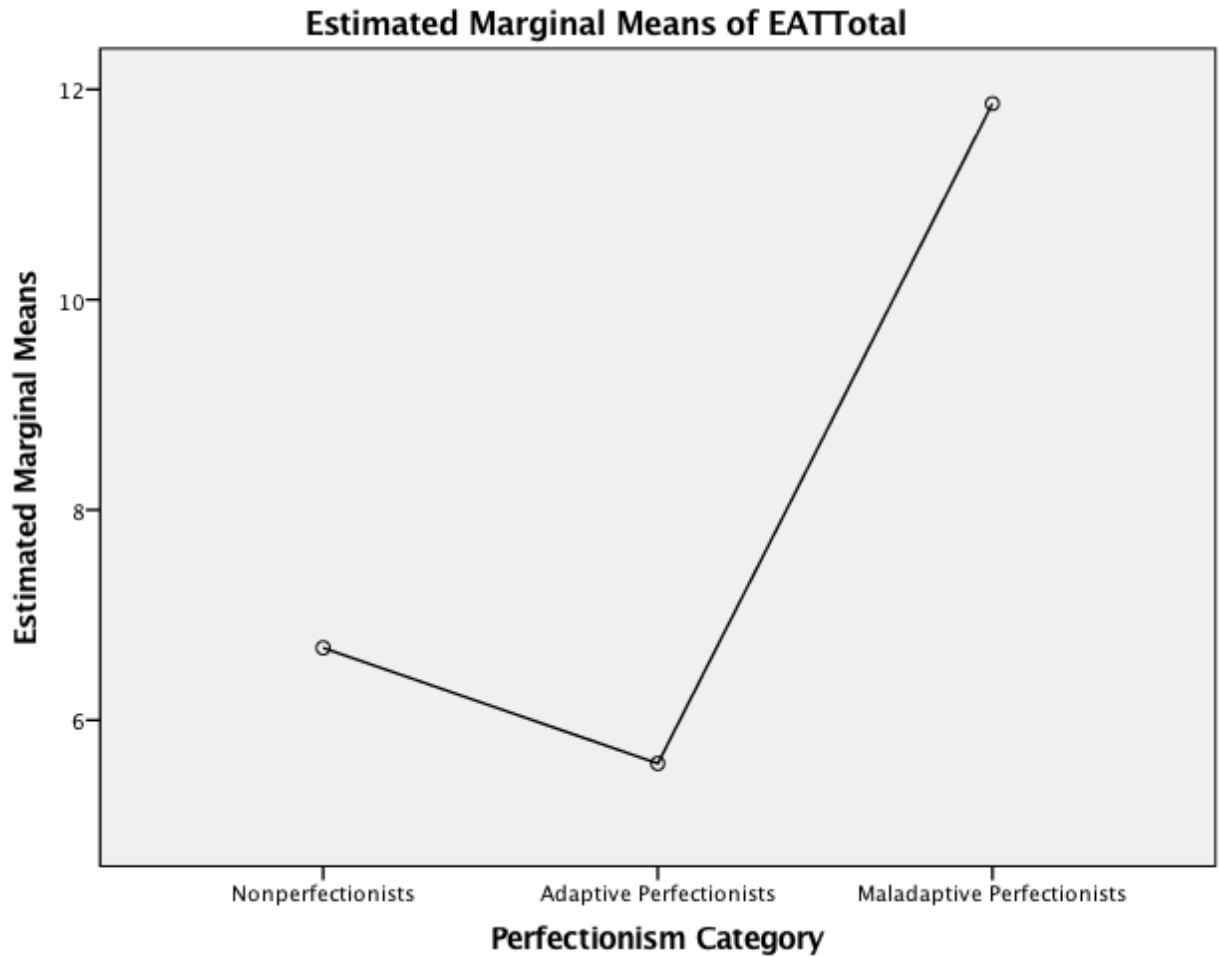


Figure 12. Mean EAT-26 Total Scores by Perfectionism Category; Nonperfectionists $n = 32$, Adaptive Perfectionists $n = 17$, Maladaptive Perfectionists $n = 37$

Exploratory Analyses. Interestingly, the previously seen significant results for the effects of perfectionism classification on self-reported symptoms of psychopathology disappeared when scores on a measure of personality were controlled for. When the initial one-way MANOVA test was repeated with scores on the mini-IPIP dimensions used as covariates, results indicated that there remained no statistically significant differences between the perfectionism groups on the combined dependent variables

$F(8, 150) = 0.48, p = 0.868, \text{Wilks' } \Lambda = 0.95, \text{partial } \eta^2 = 0.03$. Instead, scores for the mini-IPIP domains of Conscientiousness ($F(4, 75) = 5.84, p = <0.001, \text{Wilks' } \Lambda = 0.76, \text{partial } \eta^2 = 0.24$) and Neuroticism ($F(4, 75) = 12.01, p = <0.001, \text{Wilks' } \Lambda = 0.61, \text{partial } \eta^2 = 0.39$) accounted for the statistically significant portion of the variance. More specifically, Conscientiousness was found to be significantly related to self-reported symptoms of depression, $F(1, 78) = 11.43, p = 0.001$. A Pearson correlation indicated that there was a significant negative association between Conscientiousness scores and self-reported symptoms of depression on the PHQ-9, $r(87) = -0.46, p = <0.001$. That is, as Conscientiousness increased, self-reported symptoms of depression decreased.

The personality trait of Neuroticism was also found to be significantly related to self-reported symptoms of depression ($F(1, 78) = 35.71, p = <0.001$), as well as to self-reported symptoms of anxiety ($F(1, 78) = 23.76, p = <0.001$), eating pathology ($F(1, 78) = 9.28, p = 0.003$), and obsessive-compulsive disorder ($F(1, 78) = 24.23, p = <0.001$). Pearson correlations indicated that there were significant positive associations between Neuroticism scores and scores on self-report measures of depression ($r(87) = 0.62, p = <0.001$), anxiety ($r(87) = 0.59, p = <0.001$), eating pathology ($r(87) = 0.33, p = 0.001$), and obsessive-compulsive disorder ($r(87) = 0.54, p = <0.001$). That is, as neuroticism increased, so too did self-reported symptoms of depression, anxiety, eating pathology, and obsessive-compulsive disorder.

Depression. Since previous analyses conducted as part of Aim One demonstrated the existence of interaction effects between the APS-R subscales and the mini-IPIP subscales of Conscientiousness and Neuroticism for self-reported symptoms

of executive dysfunction, multiple regression analyses were next conducted to determine if such interaction effects also existed for scores on self-report measures of psychopathology, including depression, anxiety, eating pathology, and obsessive-compulsive disorder. The first group of multiple regression analyses was used to assess whether the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, or the interactions of these variables predicted scores on the PHQ-9, a self-report measure of depression symptoms. The results of the regression indicated that ten predictors explained 62.6% of the variance, $R^2 = .63$, $F(10, 76) = 12.70$, $p = <0.001$. It was found that Conscientiousness ($\beta = -0.41$, $p = <0.001$) significantly negatively predicted PHQ-9 depression scores and Neuroticism ($\beta = 0.43$, $p = <0.001$) significantly positively predicted these scores. In addition, a number of interaction effects were found. First, the interaction between the mini-IPIP subscales of Conscientiousness and Neuroticism significantly predicted PHQ-9 depression scores ($\beta = -0.28$, $p = 0.002$). When this interaction was probed by testing the conditional effects of Conscientiousness at three levels of Neuroticism, low, moderate, and high, it was found that Conscientiousness was significantly related to PHQ-9 depression scores when Neuroticism was high ($R^2 = 0.462$) or low ($R^2 = 0.107$), but not when Neuroticism was moderate ($R^2 = 0.043$). Specifically, for those participants high and low in Neuroticism, an increase in Conscientiousness predicted a significant decrease in PHQ-9 depression scores. A scatterplot summarizes the results (See Figure 13).

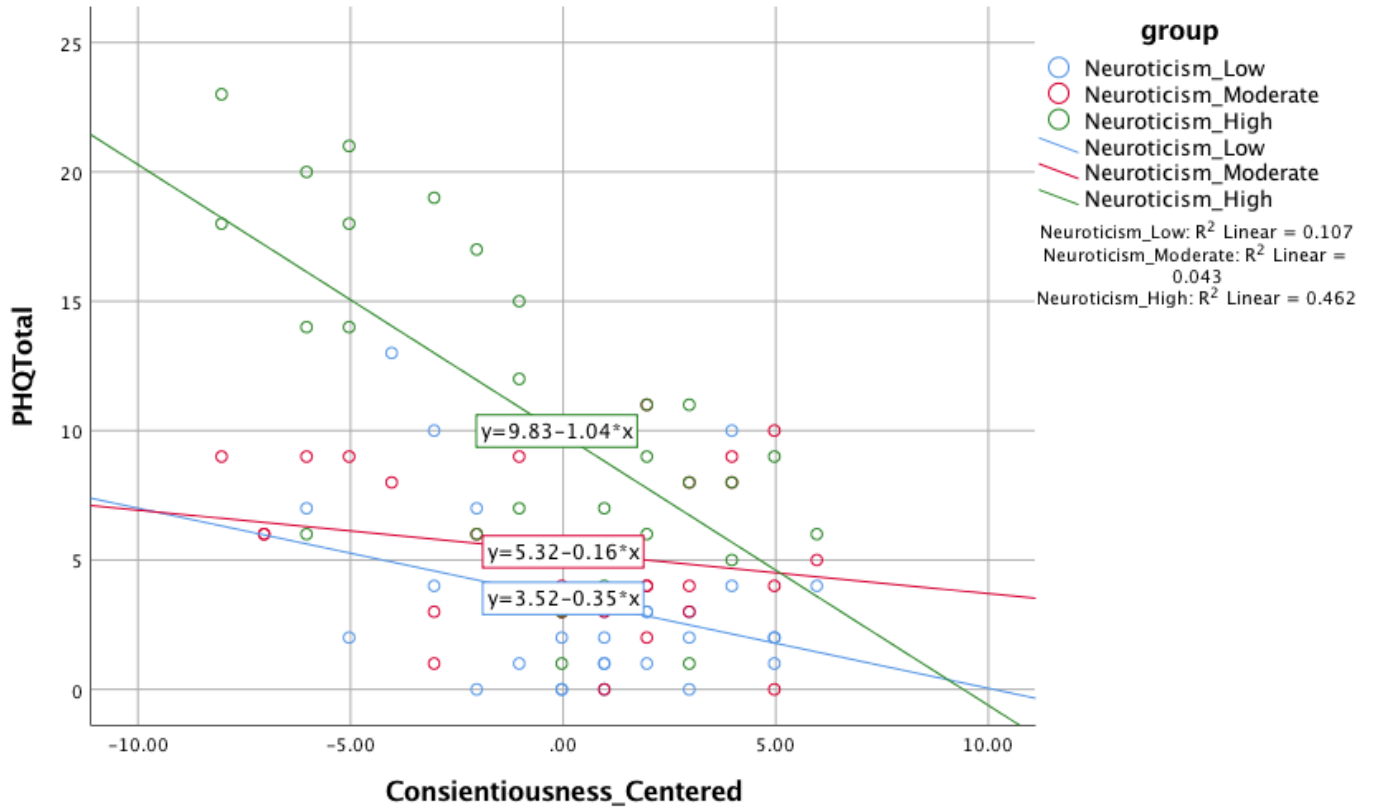


Figure 13. PHQ-9 Scores by Conscientiousness for Three Levels of Neuroticism (All Participants); Low Neuroticism $n = 30$, Moderate Neuroticism $n = 29$, High Neuroticism $n = 30$

Second, the interaction between the APS-R Standards subscale and the mini-IPIP Conscientiousness subscale significantly predicted PHQ-9 depression scores ($\beta = 0.20, p = 0.021$). When this interaction was probed by testing the conditional effects of Standards at three levels of Conscientiousness, low, moderate, and high, it was found that Standards was significantly related to PHQ-9 depression scores when Conscientiousness was high ($R^2 = 0.153$), but not when Conscientiousness was low ($R^2 = 0.041$) or moderate ($R^2 = 0.005$). Specifically, for those participants high in

Conscientiousness, an increase in Standards predicted a significant increase in PHQ-9 depression scores. A scatterplot summarizes the results (See Figure 14).

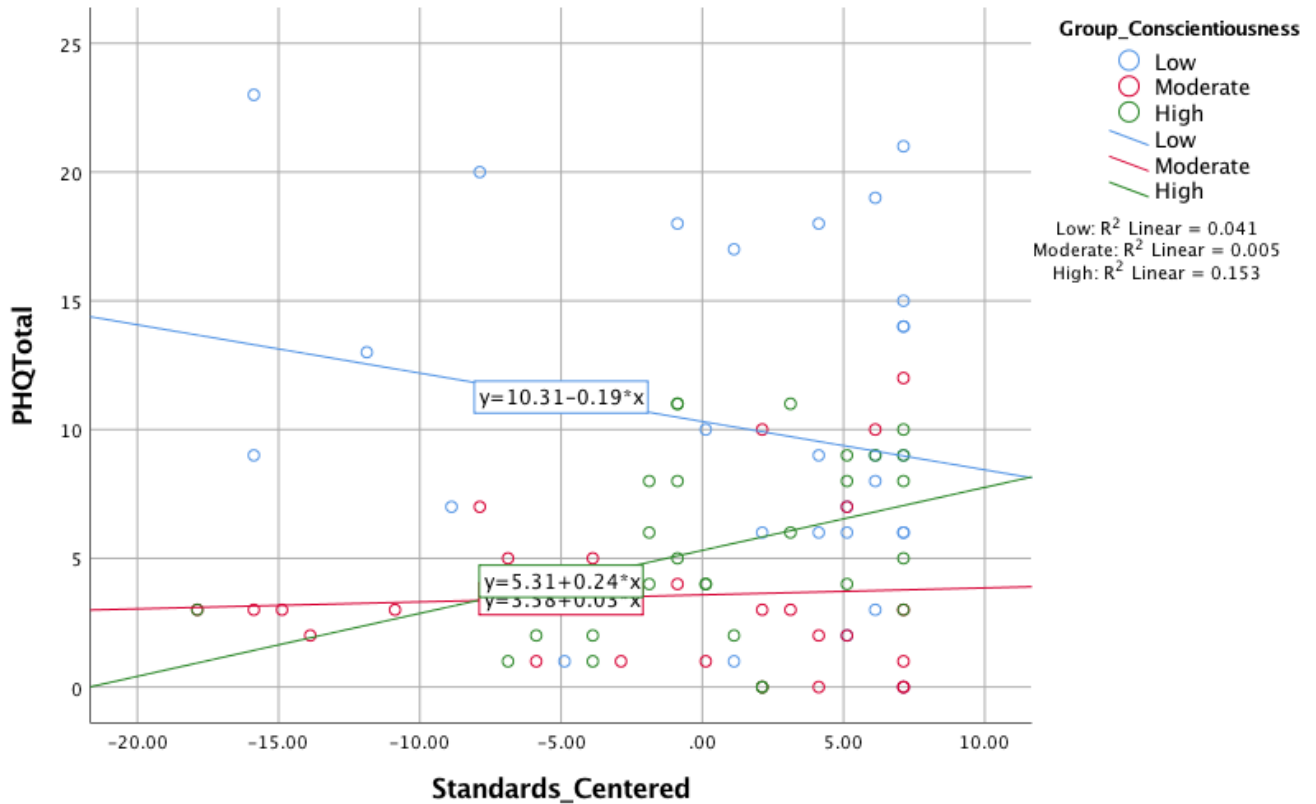


Figure 14. PHQ-9 Scores by Standards for Three Levels of Conscientiousness (All Participants); Low Conscientiousness $n = 30$, Moderate Conscientiousness $n = 29$, High Conscientiousness $n = 30$

Finally, the interaction between the APS-R Standards subscale and the mini-IPIP Neuroticism subscale significantly predicted PHQ-9 depression scores ($\beta = 0.24$, $p = 0.012$). When this interaction was probed by testing the conditional effects of Standards at three levels of Neuroticism, low, moderate, and high, it was found that Standards was significantly related to PHQ-9 depression scores when Neuroticism was low ($R^2 = 0.101$), but not when Neuroticism was moderate ($R^2 = 0.065$) or high ($R^2 = 0.013$).

Specifically, for those participants low in Neuroticism, an increase in Standards predicted a significant decrease in PHQ-9 depression scores. A scatterplot summarizes the result (See Figure 15).

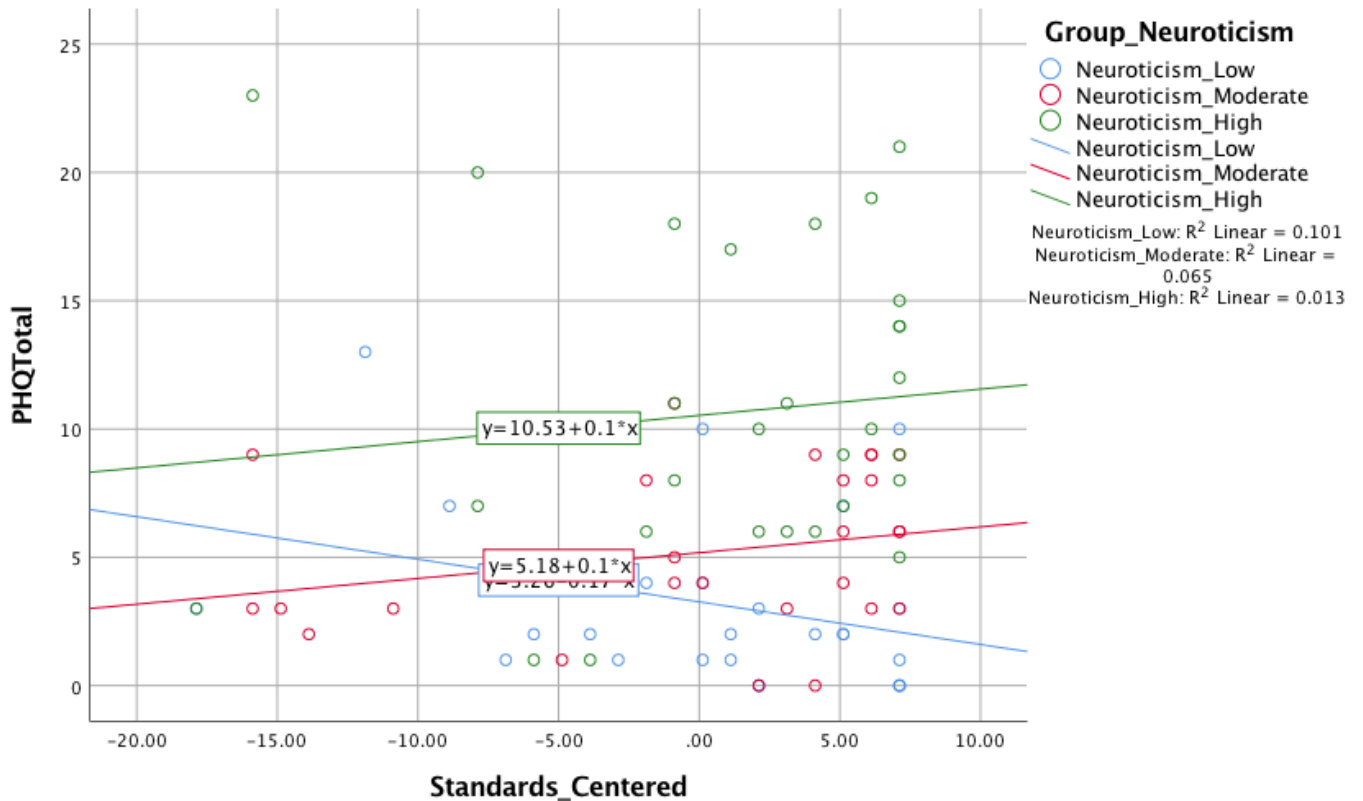


Figure 15. PHQ-9 Scores by Standards for Three Levels of Neuroticism (All Participants); Low Neuroticism $n = 30$, Moderate Neuroticism $n = 29$, High Neuroticism $n = 30$

Overall, when considering the value of the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, and the interactions of these variables for predicting self-reported symptoms of depression among nonperfectionists, adaptive perfectionists, and maladaptive perfectionists, it first becomes apparent that by itself, the personality trait of Conscientiousness has predictive value only for maladaptive perfectionists, not for adaptive perfectionists or

nonperfectionists. Furthermore, by itself, the personality trait of Neuroticism only has predictive utility for nonperfectionists and maladaptive perfectionists, not for adaptive perfectionists.

Anxiety. The second group of multiple regression analyses was used to assess whether the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, or the interactions of these variables predicted scores on the OASIS, a self-report measure of anxiety symptoms. The results of the regression indicated that ten predictors explained 43.7% of the variance, $R^2 = .44$, $F(10, 76) = 5.90$, $p = <0.001$. It was found that Neuroticism ($\beta = 0.52$, $p = <0.001$) significantly positively predicted OASIS anxiety scores for the overall sample. However, no interaction effects were found.

Eating Disorder Pathology. The third group of multiple regression analyses was used to assess whether the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, or the interactions of these variables predicted scores on the EAT-26, a self-report measure of eating disorder pathology. The results of the regression indicated that the predictors did not explain a statistically significant portion of the variance in EAT-26 eating pathology scores for the total sample ($R^2 = .18$, $F(10, 76) = 1.70$, $p = 0.097$).

Obsessive-Compulsive Pathology. The fourth group of multiple regression analyses was used to assess whether the APS-R subscales of Standards and Discrepancy, the mini-IPIP subscales of Conscientiousness and Neuroticism, or the interactions of these variables predicted scores on the OCI-R, a self-report measure of symptoms of obsessive-compulsive pathology. The results of the regression indicated

that ten predictors explained 38.1% of the variance, $R^2 = .38$, $F(10, 73) = 4.50$, $p = <0.001$. It was found that Neuroticism ($\beta = 0.49$, $p = <0.001$) significantly positively predicted OCI-R obsessive-compulsive pathology scores for the overall sample. Thus, as Neuroticism increased, so too did self-reported symptoms of obsessive-compulsive pathology. However, no significant interaction effects were found.

Relationship between Perfectionism and Personality. Due to the interaction effects that were found in this study between the APS-R subscales of Standards and Discrepancy and the mini-IPIP subscales of Conscientiousness and Neuroticism, and because previous researchers have found that variations in the Big Five factors of Conscientiousness and Neuroticism are strongly related to variations in the multidimensional perfectionism facets of Standards and Discrepancy the final step in this study was to investigate the direct relations between APS-R subscale scores and scores on the mini-IPIP subscales of Conscientiousness and Neuroticism (Rice, Ashby, & Slaney, 2007). Multiple regression analyses were used to assess whether the mini-IPIP subscales of Conscientiousness and Neuroticism predicted scores on the APS-R subscales of Standards and Discrepancy. The results of the first regression indicated that for the total study sample, the predictors did not explain a statistically significant portion of the variance in APS-R Standards subscale scores, $R^2 = .002$, $F(2, 84) = 0.78$, $p = 0.925$. The results of the second regression indicated that the predictors also did not explain a statistically significant portion of the variance in APS-R Discrepancy subscale scores, $R^2 = .04$, $F(2, 84) = 1.85$, $p = 0.164$.

Therefore, overall, the mini-IPIP subscales of Conscientiousness and Neuroticism do not hold significant predictive value for scores on the APS-R subscales

of Standards and Discrepancy for the total study sample. It can thus be concluded that the interaction effects found in this study between the APS-R subscales of Standards and Discrepancy and the mini-IPIP subscales of Conscientiousness and Neuroticism are not simply a reflection of the relations between perfectionism subscales and personality traits.

Interestingly though, there were significant differences in Big Five personality traits by perfectionism classification. A one-way multivariate analysis of variance (MANOVA) test was conducted to compare scores on the mini-IPIP subscales of Extraversion, Agreeableness, Conscientiousness, Neuroticism and Intellect/Imagination between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists. Results indicated that there were statistically significant differences between the perfectionism groups on the combined dependent variables, $F(10, 164) = 6.84, p < 0.001$, Wilks' $\Lambda = 0.50$, partial $\eta^2 = 0.29$. More specifically, perfectionism classification was found to be significantly related to scores on all five of the mini-IPIP subscales: Extraversion ($F(2, 86) = 5.37, p = 0.006$), Agreeableness ($F(2, 86) = 9.36, p < 0.001$), Conscientiousness ($F(2, 86) = 13.43, p < 0.001$), Neuroticism ($F(2, 86) = 8.58, p < 0.001$), and Intellect/Imagination ($F(2, 86) = 4.16, p = 0.019$). Post-hoc analyses using Tukey's HSD indicated that adaptive perfectionists ($M = 15.35, SD = 1.03$) had significantly higher Extraversion subscale scores on the mini-IPIP than maladaptive perfectionists ($M = 11.83, SD = 0.67$) ($HSD(2, 86) = 3.53, p = 0.014$) or nonperfectionists ($M = 11.41, SD = 0.75$) ($HSD(2, 86) = 3.95, p = 0.007$) (See Figure 16). In addition, nonperfectionists ($M = 12.97, SD = 0.54$) had significantly lower Agreeableness subscale scores than maladaptive perfectionists ($M = 15.23, SD = 0.48$) ($HSD(2, 86) =$

2.26, $p = 0.007$) or adaptive perfectionists ($M = 16.71$, $SD = 0.74$)($HSD(2, 86) = 3.74$, $p = <0.001$) (See Figure 17). Furthermore, adaptive perfectionists ($M = 16.88$, $SD = 0.79$) had significantly higher Conscientiousness subscale scores than maladaptive perfectionists ($M = 14.50$, $SD = 0.52$)($HSD(2, 86) = 2.38$, $p = 0.036$) or nonperfectionists ($M = 11.94$, $SD = 0.58$)($HSD(2, 86) = 4.94$, $p = <0.001$). Maladaptive perfectionists ($M = 14.50$, $SD = 0.58$) also had significantly higher Conscientiousness subscale scores than nonperfectionists ($M = 11.94$, $SD = 0.58$)($HSD(2, 86) = 2.56$, $p = 0.004$) (See Figure 18). In addition, maladaptive perfectionists ($M = 12.63$, $SD = 0.48$) had significantly higher Neuroticism subscale scores than nonperfectionists ($M = 10.03$, $SD = 0.54$)($HSD(2, 86) = 2.59$, $p = 0.001$) or adaptive perfectionists ($M = 9.82$, $SD = 0.73$)($HSD(2, 86) = 2.80$, $p = 0.005$) (See Figure 19). Finally, adaptive perfectionists ($M = 16.35$, $SD = 0.66$) had significantly higher Intellect/Imagination subscale scores on the mini-IPIP than maladaptive perfectionists ($M = 14.08$, $SD = 0.43$)($HSD(2, 86) = 2.28$, $p = 0.014$) (See Figure 20). Thus, it should be noted that there are significant differences between nonperfectionists, maladaptive perfectionists, and adaptive perfectionists for all five of the Big Five personality traits, despite only Conscientiousness and Neuroticism being of utmost interest in the current study.

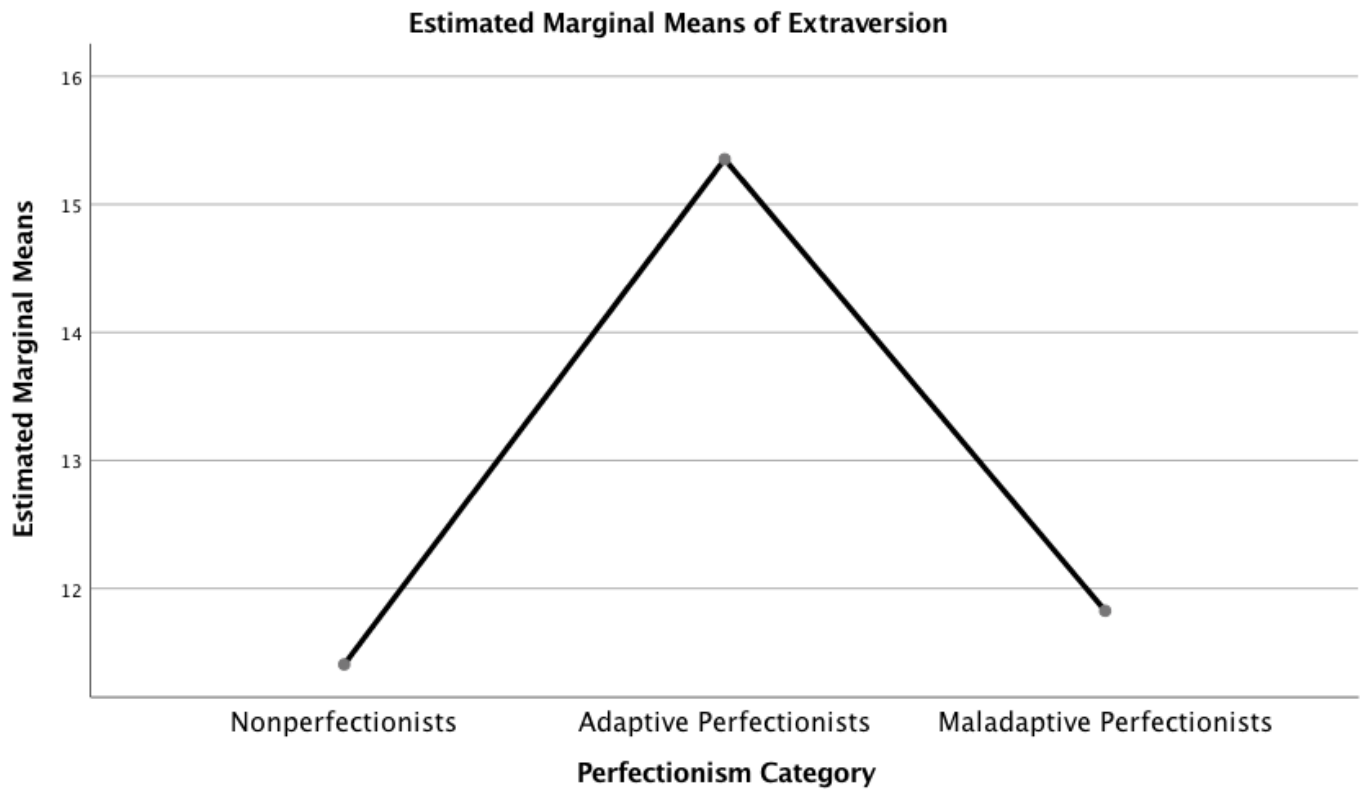


Figure 16. Mean Extraversion Subscale Scores by Perfectionism Category;
Nonperfectionists $n = 32$, Adaptive Perfectionists $n = 17$, Maladaptive Perfectionists $n =$

37

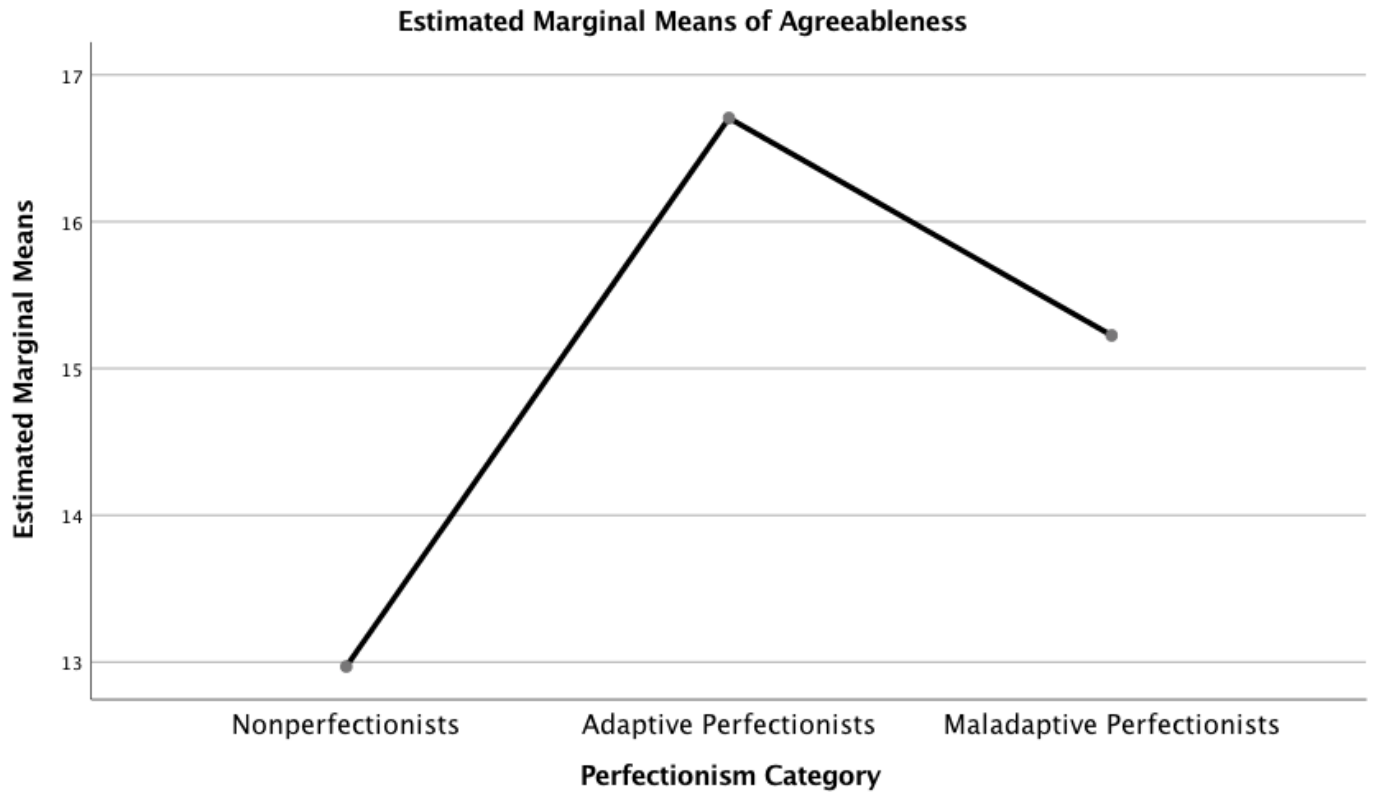


Figure 17. Mean Agreeableness Subscale Scores by Perfectionism Category; Nonperfectionists $n = 32$, Adaptive Perfectionists $n = 17$, Maladaptive Perfectionists $n =$

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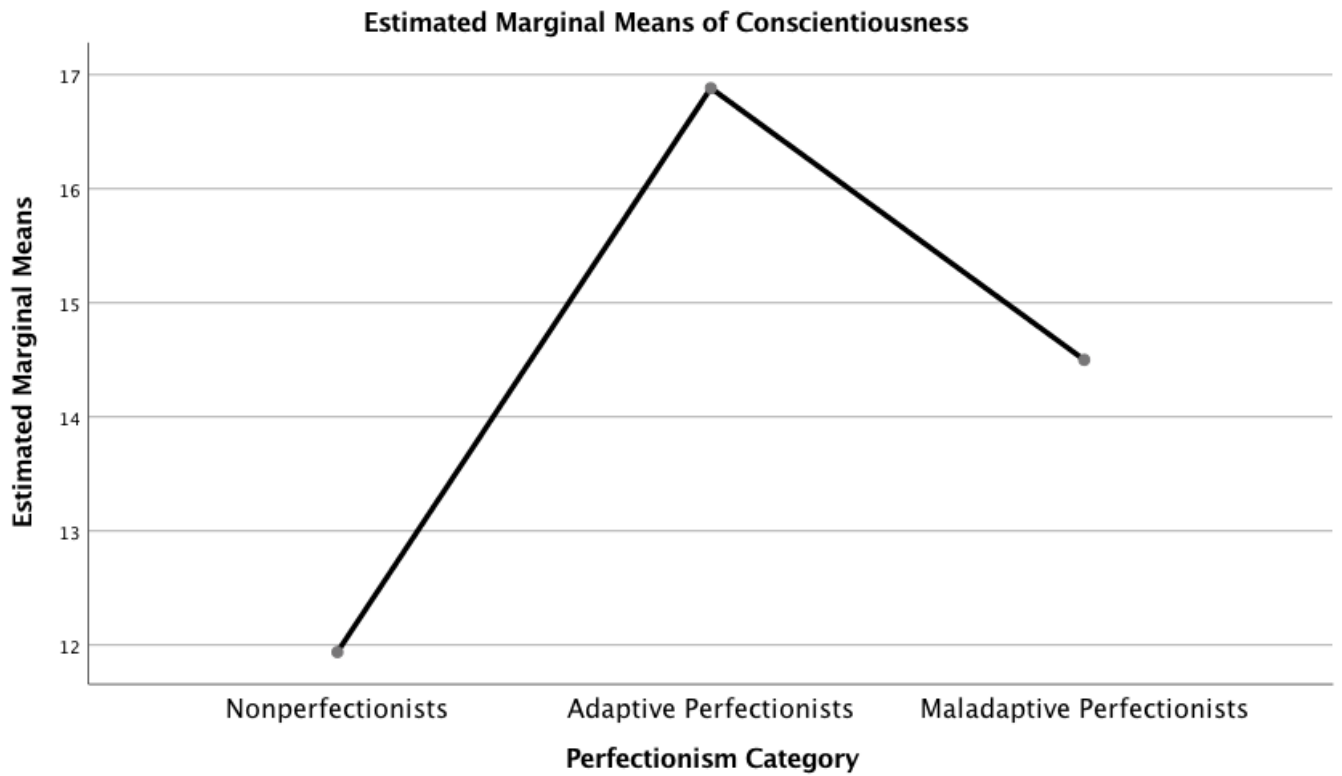


Figure 18. Mean Conscientiousness Subscale Scores by Perfectionism Category; Nonperfectionists $n = 32$, Adaptive Perfectionists $n = 17$, Maladaptive Perfectionists $n = 37$

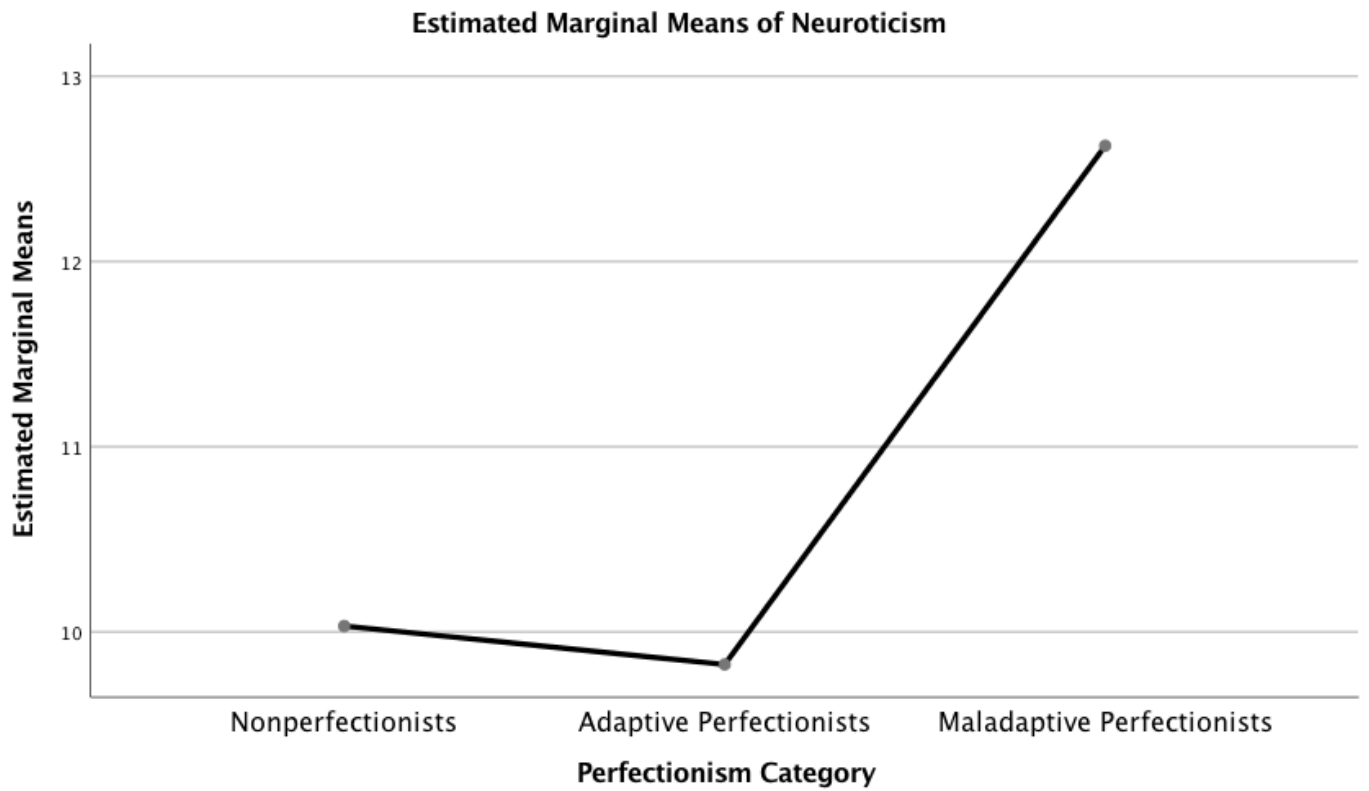


Figure 19. Mean Neuroticism Subscale Scores by Perfectionism Category; Nonperfectionists $n = 32$, Adaptive Perfectionists $n = 17$, Maladaptive Perfectionists $n =$

37

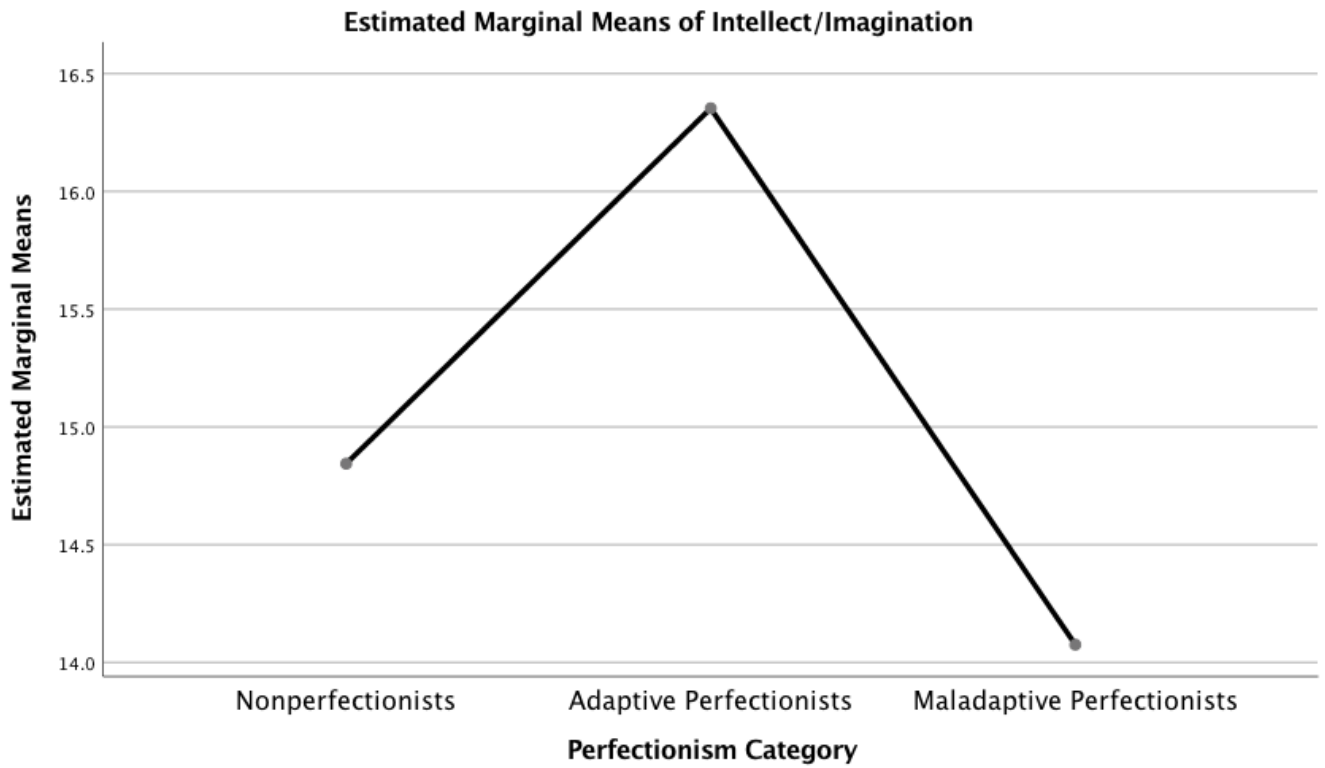


Figure 20. Mean Intellect/Imagination Subscale Scores by Perfectionism Category; Nonperfectionists $n = 32$, Adaptive Perfectionists $n = 17$, Maladaptive Perfectionists $n = 37$

CHAPTER V: CONCLUSION

Discussion

The purpose of this study was two-fold: 1) to investigate the differences in performance on neuropsychological assessment measures of executive functioning between nonperfectionists, adaptive perfectionists, and maladaptive perfectionists and 2) to explore the relation between multidimensional perfectionism and symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating pathology.

Summary of Results and Relevant Implications

Differential relation of executive functioning by perfection classification.

Hypotheses one and two. The first and second hypotheses, that adaptive perfectionists would perform better than maladaptive perfectionists and nonperfectionists on objective neuropsychological executive functioning tasks involving attention, fluency, planning and decision making, working memory, and processing speed, and that maladaptive perfectionists would perform more poorly compared to adaptive perfectionists and nonperfectionists on these same objective measures of executive functioning, were not supported. Specifically, scores on objective neuropsychological assessment measures of attention, fluency, planning and decision making, working memory, and processing speed were unrelated to perfectionism classification. This was true regardless of whether or not the covariates of age, history of head injury, past or present mental health concerns, current psychotropic drug use, currently experienced cognitive symptoms, and scores on measures of depression, anxiety, eating pathology, and obsessive-compulsive disorder were controlled for.

There are a number of possible explanations for the finding in the current research that there were no significant differences on objective neuropsychological assessment measures of executive functioning between nonperfectionists, maladaptive perfectionists, and adaptive perfectionists. One possible explanation for these null findings could be that a Type II error was committed. The current study was underpowered, due to low sample size. A post-hoc power analysis conducted with G*Power indicated that the present sample only achieved 58% power for a large effect at the .05 level of significance. Future studies would therefore benefit from an increase in sample size.

A second explanation for the current findings may be that multidimensional perfectionism, as it is currently understood and conceptualized, is simply not related to objective deficits in executive functioning in the non-clinical adult population. It is notable that only one other study was found in the review of the relevant literature that utilized objective neuropsychological assessment measures to study executive functioning in multidimensionally perfectionistic adults (Slade, et al., 2009). While the results of that research did indicate that a relation existed between multidimensional perfectionism and executive functioning in adults, as discussed in the introduction, the study had several severe methodological problems, including the use of an inadequate measure of multidimensional perfectionism; the researchers also utilized a convenience sample of patients from a neuropsychological practice without controlling for possible third factor variables, such as patient diagnosis or level of symptom severity. Therefore, while it is possible that no other research has been completed on the topic of executive functioning differences in multidimensional perfectionists, it is also plausible that the

dearth of published research is the result of the file-drawer effect, and that null results from studies in this area of research are the rule, rather than the exception.

Finally, it may be the case that while differences in executive functioning do exist between nonperfectionists, maladaptive perfectionists, and adaptive perfectionists, the objective neuropsychological measures of executive functioning used in the current study were simply not sensitive enough to pick these differences up. This suggestion is supported by the fact that a variety of studies utilizing laboratory task paradigms to measure executive functioning among multidimensional perfectionists have found significant differences between groups (Brand & Alstotter-Gleich, 2008; Desnoyers & Arpin-Cribbie, 2015; Drizinsky, et al., 2016; Richardson, et al., 2014; Schrijvers, et al., 2010; Stahl, et al., 2015; Tops, et al., 2013), even though the current research, which was conducted in a clinical setting, did not. Thus, it may be the case that in order to see existing differences between perfectionism groups in a clinical setting, a neuropsychological methodology that has greater sensitivity to smaller differences in executive functioning is required.

Hypothesis three. The third hypothesis, that maladaptive perfectionists would self-report significantly greater deficits in executive functioning than adaptive perfectionists, was also not supported. Specifically, there were no significant differences between adaptive and maladaptive perfectionists on the Behavioral Regulation Index, Metacognition Index, or Global Executive Composite of the BRIEF-A (a self-report measure of executive functioning) once the covariates of age, history of head injury, past or present mental health concerns, current psychotropic drug use, currently

experienced cognitive symptoms, and scores on measures of depression, anxiety, eating pathology, and obsessive-compulsive disorder were controlled for.

Executive functioning and the BRIEF-A. There were other interesting findings related to self-reported symptoms of executive dysfunction among nonperfectionists and adaptive perfectionists though, which may help to explain the null third hypothesis. First, adaptive perfectionists had significantly lower scores on the Metacognition Index of the BRIEF-A than nonperfectionists, specifically on the Initiate, Plan/Organize, Task Monitor, and Organization of Materials subscales. This indicates that adaptive perfectionists self-reported significantly fewer symptoms of executive dysfunction than nonperfectionists, but only for tasks that required the use of metacognition.

Metacognition is the awareness a person has of their own mental processes as they occur, and its presence allows for the ability to consciously regulate one's own cognitions and the results of actions based off of those cognitions (Beran, Brandl, Perner, & Proust, 2012).

It thus appears that adaptive perfectionists in this study self-reported having significantly less difficulty than nonperfectionists with metacognitive tasks that require them to: 1) start activities and self-sufficiently come up with ideas and ways to solve problems on their own, 2) plan for the future, set goals, and engage in goal-oriented behavior, 3) maintain order in their work and personal spaces, and 4) reliably assess the effects of their work and social performances (Gioia, Isquith, Guy, & Kenworthy, 2000). Since metacognition is critical for learning in general, and for success in school in particular, such an advantage may help to explain the known relationship between adaptive perfectionism and greater academic achievement (Hacker, Dunlosky, &

Graesser, 2009; Stoeber & Otto 2006).

These findings related to subjective reports of executive functioning differences are also noteworthy given the earlier finding that scores on objective neuropsychological assessment measures of attention, fluency, planning and decision making, working memory, and processing speed were unrelated to perfectionism classification. It is unexpected that participants who did not evidence objective differences in executive functioning nevertheless self-reported having such differences. However, these results can perhaps be at least partially explained by focusing in on the indices and subscales of the BRIEF-A where differences in symptoms of executive functioning were self-reported, versus the indices and subscales where differences were not reported. Differences in executive functioning were not reported for the Working Memory subscale of the Metacognition Index, nor for any of the scales of the Behavioral Regulation Index, which includes the subscales of Inhibit, Shift, and Emotional Control. Except for the subscale of Emotional Control, these scales appear to mirror those executive functions that were assessed via objective neuropsychological testing in the current study. Therefore, it is consistent that participants did not self-report differences on these subscales, since they did not exhibit differences on the objective assessment measures that mirror them.

In comparison, the subscales of the Metacognition Index for which adaptive perfectionists reported fewer symptoms of dysfunction than nonperfectionists (i.e., the Initiate, Plan/Organize, Task Monitor, and Organization of Materials subscales) do not mirror as closely those executive functions probed during the objective neuropsychological assessment portion of the study; metacognitive skills are more

complex than those routinely measured with a standard neuropsychological battery (Koren, Seidman, Goldsmith, & Harvey; 2006; Quiles, Verdoux, & Prouteau, 2014). This hypothesis, that the discrepancy observed in the current study between scores on objective and subjective measures of executive functioning is the result of metacognition not being objectively assessed, is given some credence by the finding that overall sample scores on the Behavioral Regulation Index were significantly correlated with overall sample scores on the Fluency Index ($r(86) = 0.24, p = 0.024$) (one of the objective indices of executive functioning in the study), while overall sample scores on the Metacognition Index were not significantly correlated with any of the objective indices of executive functioning.

However, it is notable that scores on the Behavioral Regulation Index were still only related to one of the five indices used in this study to objectively assess executive functioning. Such a result calls into question the convergent validity of the BRIEF-A, but this is not the first time such a problem has been noted. For example, Buchanan (2016) found in his research with a nonclinical sample that neither of the self-report measures of executive functioning studied were significantly correlated with objective, performance-based measures of executive functioning. Instead, similarly to the current study, scores on such self-report measures were only correlated with Big Five personality traits. Buchanan (2016) concluded that in nonclinical samples, self-report measures of executive functioning may simply not be reliable proxies for scores on objective tests of executive dysfunction. In addition, Nordvall, Jonsson, and Neely (2016) found related results in their work with adolescents with psychosocial and substance abuse problems who were interned in treatment facilities or residential

homes; self-reported symptoms of executive dysfunction on the BRIEF were only weakly correlated with scores on objective, performance-based tests of executive functioning. These authors concluded that self-report measures of executive functioning might simply assess different aspects of executive functioning than objectives measure, although they note that these functions are not necessarily less important (Nordvall, et al., 2016).

Hypothesis four. The fourth hypothesis, that maladaptive perfectionists would endorse significantly greater symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating pathology than adaptive perfectionists and nonperfectionists was partially supported. Specifically, hypothesis four was fully supported for self-reported symptoms of eating disorder pathology, partially supported for self-reported symptoms of depression and anxiety, and not supported for self-reported symptoms of obsessive-compulsive pathology. Maladaptive perfectionists did endorse greater symptom levels of eating disorder pathology than both adaptive perfectionists and nonperfectionists. Maladaptive perfectionists also endorsed greater symptom levels of depression and anxiety than adaptive perfectionists, but not greater symptom levels than nonperfectionists. Finally, maladaptive perfectionists did not report significantly greater symptom levels of obsessive-compulsive pathology than any other perfectionism group.

Hypothesis five. The fifth hypothesis, that adaptive perfectionists would endorse significantly lower symptom levels of depression, anxiety, obsessive-compulsive disorder, and eating pathology than maladaptive perfectionists and nonperfectionists, was partially supported. Specifically, hypothesis five was fully supported for self-

reported symptoms of depression, partially supported for self-reported symptoms of anxiety and eating pathology, and not supported for self-reported symptoms of obsessive-compulsive pathology. Adaptive perfectionists did endorse lower symptom levels of depression than maladaptive perfectionists and nonperfectionists. Adaptive perfectionists also endorsed lower symptom levels of anxiety and eating pathology than maladaptive perfectionists. However, adaptive perfectionists did not report significantly lower symptom levels of obsessive-compulsive pathology than any other perfectionism group.

Despite hypotheses four and five both being partially supported, the significant effects of perfectionism classification on self-reported symptoms of depression, anxiety, and eating pathology disappeared entirely when scores on the mini-IPIP, a measure of Big Five personality traits, were controlled for. Instead, scores for the personality traits of Conscientiousness and Neuroticism accounted for the statistically significant portion of the variance in psychopathology scores.

Overall, the results of Aim Two demonstrate how complicated it is to predict which groups of clients will be at an increased or decreased risk for psychopathology. The initial results for hypotheses four and five were misleading because they made it appear as though perfectionism classification was a relatively straightforward predictor of psychopathology symptoms; however, this finding was deceptive because its significance disappeared entirely when personality factors were controlled for.

Limitations and Future Directions

There are several limitations in regard to the design of the current study that should be addressed in future research on multidimensional perfectionism and

executive functioning, if greater knowledge is to be gained about the relations between these factors. In addition, the results of this study revealed unhypothesized relations between multidimensional perfectionism and Big Five personality traits; therefore, these factors should not be ignored in future research.

Limitations due to the present sample. There were four main limitations in regard to the sample of individuals who participated in this study. First, the sample size in this study was smaller than would have been ideal. This resulted in the study being underpowered, as suggested by a post-hoc power analysis, which indicated that there was only a 58% chance of finding a large effect size at the .05 level of significance. Therefore, a future direction for this research would be to repeat it with a new, appropriately sized sample.

A second limitation in terms of the sample in this study was that the sample was not evenly divided among nonperfectionists ($n = 32$), adaptive perfectionists ($n = 17$), and maladaptive perfectionists ($n = 40$). If this study were to be repeated, it could be beneficial to hand select participants from those who have completed the online portion of the study so that a more even distribution is achieved across perfectionism classifications, rather than allowing anyone who wants to sign up to participate. However, it should be noted that the sample obtained in the present study was fairly consistent, in terms of multidimensional perfectionism demographics, with previous samples used in perfectionism research at East Carolina University. In a previous study of multidimensional perfectionism at ECU (Corson, 2016), it was found that 71% of the population was perfectionistic and 38% percent was maladaptively perfectionistic. In

comparison, 64% of the participants in the present sample were classified as perfectionistic, with 45% being maladaptively perfectionistic.

A third limitation of this study was that the sample consisted solely of college students at East Carolina University and had a limited age range ($M = 18.74$, $SD = 1.33$, Range = 18.0-28.0). Such a restricted age range means that the results of this study cannot necessarily be generalized to people outside of this narrow, young adult age group. Specifically, as frontal brain areas that are important for executive functioning are thought to not completely mature until an individual is in their mid-20's, the results of this research may therefore be difficult to generalize to adults with fully mature cognitive capacities (Johnson, Blum, & Giedd, 2009). The effects of perfectionism are important to understand in the college population itself, as a result of the fact that previous research has demonstrated that maladaptively perfectionistic college students have the poorest overall adjustment, as compared to adaptively perfectionistic or non-perfectionistic students (Rice & Dellwo, 2002). In addition, understanding perfectionism in this current sample of college students may be important, given the high rates of maladaptive perfectionism within the East Carolina University student body; compared to the findings of research conducted by Grzegorek, Slaney, Franze, and Rice (2004), who found that 57% of their college student sample was perfectionistic, with 26% being maladaptive perfectionists, research with ECU students has indicated that 71% of students are perfectionistic, with a full 38% being maladaptively perfectionistic (Corson, 2016). Nevertheless, were this study to be repeated, it could be beneficial to include participants in the middle and older adult age groups as well, in order to increase the external validity of the study results. It would also be interesting to study a young adult

sample longitudinally, to see if study results change over time. However, despite the truncated age range in this study, there was still enough variability in age to suggest that internal validity of the research paradigm was preserved. As would be expected when using normative age data to scale each participant's raw data, there were significant negative associations between age and scores on measures of attention, fluency, and working memory.

Finally, a fourth limitation of this study was that although a non-clinical sample was utilized, individuals with potentially confounding mental health concerns, such as anxiety and depression, were likely still members of the ECU community who participated in the study, simply as a result of the base rates of mental health concerns on college campuses (Garlow, et al., 2008). Although participants were asked if they had any past or present history of mental health concerns to that this could be controlled for statistically, it is possible that participants may not have disclosed their mental health diagnoses or may still have had undiagnosed mental health concerns that could have impacted their executive functioning (Biringier, et al., 2005).

Limitations due to the present methodology. The use of the Behavior Rating Inventory of Executive Function-Adult version (BRIEF-A) is one possible methodological limitation of this study. Results suggested that for the study sample, the BRIEF-A was a better measure of personality factors than it was a measure of executive functioning deficits. Other researchers have also concluded that in nonclinical samples, self-report measures of executive functioning may simply not be reliable proxies for scores on objective tests of executive dysfunction; rather, they appear to be better measures of personality (Buchanan, 2016).

A second methodological limitation of this study, which likely contributed significantly to the limited sample size, was that the research protocol was too burdensome on participants. The clinical portion of the research required each participant to complete two to three hours of intensive neuropsychological assessment, which not only resulted in difficulty recruiting participants, but appeared to result in fatigue for those who did take part in the study. Although fatigue was not directly measured in this study, the Positive and Negative Affect Schedule was administered both prior to and after testing. Results of this measure indicated that there was a significant decrease in participants' positive affect from pre-test to post-test ($r(87) = 0.74, p = <0.001$), as well as a significant increase in negative affect ($r(87) = 0.53, p = <0.001$). There were also qualitative observations by the researchers administering the study protocols that participants frequently complained of being tired and repeatedly requested to know how much longer testing would take.

Such a pattern of diminishing positive affect, combined with increasing negative affect, may have resulted in reduced effort on the part of participants as testing progressed. This did appear to be the case, based on researcher observations. Therefore, if this study were to be repeated, it would likely be beneficial to eliminate some of the additional measures used that were extraneous to the main hypotheses and focus instead on the measures of executive functioning, so that participants do not become unduly fatigued before the completion of testing.

Additional future directions. Although only the Big Five personality traits of Conscientiousness and Neuroticism had predictive validity for self-reported symptoms of psychopathology in this study, nonperfectionists, maladaptive perfectionists, and

adaptive perfectionists did in fact show significant differences across all five Big Five personality factors. For example, nonperfectionists had significantly lower Extraversion and Conscientiousness subscale scores than adaptive perfectionists. They also had significantly lower Neuroticism scores than maladaptive perfectionists. Finally, nonperfectionists had significantly lower Agreeableness subscale scores than maladaptive perfectionists or adaptive perfectionists.

Regarding maladaptive perfectionists, these participants had significantly lower Extraversion, Conscientiousness, and Intellect/Imagination subscale scores than adaptive perfectionists. They also had significantly higher Agreeableness and Conscientiousness subscale scores than nonperfectionists, as well as significantly higher Neuroticism subscales scores than both nonperfectionists and adaptive perfectionists. In comparison, adaptive perfectionists had significantly higher Extraversion and Conscientiousness subscale scores than maladaptive perfectionists or nonperfectionists. They also had significantly lower Neuroticism subscale scores than maladaptive perfectionists and significantly higher Intellect/Imagination subscale scores than maladaptive perfectionists. Finally, adaptive perfectionists had significantly higher Agreeableness subscale scores than nonperfectionists.

Even though Neuroticism and Conscientiousness were the only two relevant Big Five personality factors in this study, the finding that the three perfectionism groups differed across all five of the Big Five personality traits leaves room for the idea that a variety of interesting interactions between perfectionism classification and the personality traits of Extraversion, Agreeableness, and Intellect/Imagination might exist for other dependent variables related to personality. This possibility is worth exploring in

future studies. For example, research has shown that individual differences in trait levels of Extraversion and Agreeableness hold predictive value for optimism levels (Sharpe, Martin, & Roth, 2011). Since clinical perfectionism has been found to be typified by several cognitive and information-processing biases (Lo & Abbott, 2013), it would therefore be interesting to investigate whether there are interaction effects for the perfectionism facets of Standards and Discrepancy, the Big Five factors of Extraversion and Agreeableness, and levels of optimism on the prevalence of information-processing biases across groups.

A final direction that future research could take would be to try and utilize a clinical assessment measure of executive functioning that is more akin to the precise, highly sensitive tasks used to assess executive functioning in laboratory tasks. Although most of the tasks used in laboratory paradigms are either too expensive, too time-consuming, or both to use in clinical practice, the Test of Variables of Attention (T.O.V.A.) test is a computerized performance task that is already in regular use in clinical settings (Greenberg, 2011). This test assesses performance for the executive functioning domains of attention and inhibitory control with accuracy down to the millisecond, so it would be interesting to see if nonperfectionists, maladaptive perfectionists, and adaptive perfectionists demonstrated differences in performance on such a precise measure.

Concluding Remarks

In conclusion, the current research found that scores on objective neuropsychological assessment measures of attention, fluency, planning and decision making, working memory, and processing speed were unrelated to perfectionism classification. This was true regardless of whether or not the covariates of age, history

of head injury, past or present mental health concerns, current psychotropic drug use, currently experienced cognitive symptoms, and scores on measures of depression, anxiety, eating pathology, and obsessive-compulsive disorder were controlled for. Furthermore, there were no significant differences between adaptive and maladaptive perfectionists on the Behavioral Regulation Index, Metacognition Index, or Global Executive Composite of the BRIEF-A (a self-report measure of executive functioning) once the covariates were controlled for.

However, significant results were found for self-reported symptoms of executive dysfunction among nonperfectionists and adaptive perfectionists; specifically, adaptive perfectionists reported significantly fewer difficulties with tasks requiring the use of metacognitive abilities than nonperfectionists.

The results of this study also demonstrated that maladaptive perfectionists endorsed significantly greater symptom levels of eating disorder pathology than both adaptive perfectionists or nonperfectionists. Maladaptive perfectionists also endorsed greater symptom levels of depression and anxiety than adaptive perfectionists, but not greater symptom levels than nonperfectionists. Furthermore, maladaptive perfectionists did not report significantly greater symptom levels of obsessive-compulsive pathology than any other perfectionism group. It was also the case that adaptive perfectionists endorsed lower symptom levels of depression than maladaptive perfectionists and nonperfectionists. Adaptive perfectionists also endorsed lower symptom levels of anxiety and eating pathology than maladaptive perfectionists. However, adaptive perfectionists did not report significantly lower symptom levels of obsessive-compulsive pathology than any other perfectionism group.

Despite these initially significant results, the significant effects of perfectionism classification on self-reported symptoms of depression, anxiety, and eating pathology disappeared entirely when scores on the mini-IPIP, a measure of Big Five personality traits, were controlled for. Instead, scores for the personality traits of Conscientiousness and Neuroticism accounted for the statistically significant portion of the variance in psychopathology scores.

Overall, the results of this study suggest that there are no objective differences in executive functioning between nonperfectionists, maladaptive perfectionists, and adaptive perfectionists, at least for the specific executive functions that are measured with a standard clinical neuropsychological battery. Furthermore, the results cast doubt on the BRIEF-A as a valid self-report measure of executive functioning in a non-clinical sample, specifically in regard to its convergent validity with objective measures of executive functioning. Finally, the findings of this study emphasize the importance of considering the interactions between multidimensional perfectionism classification, perfectionism dimensions, and the Big Five personality traits of Conscientiousness and Neuroticism when attempting to predict which patients will be at risk for depression, eating pathology, and obsessive-compulsive disorder.

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APPENDIX A-DEMOGRAPHIC AND PSYCHIATRIC HISTORY QUESTIONNAIRE

- Date of Birth/Age
- Sex: Male, Female
- Gender: Male, Female, Genderqueer/Androgynous, Transgender, Other
- Race: White, Black, Asian, White Hispanic, Black Hispanic, Native American, Pacific Islander, Multiracial, Other
- Primary language English?
- Major or Intended Major?
- Religion?
- Do you have a current or past history of any of the following psychiatric concerns: Attention-Deficit Hyperactivity Disorder (ADHD), Sleep disorders, Eating disorders, Depression, Anxiety disorders, Schizophrenia, Post Traumatic Stress Disorder, or any other mental illness?
- Are you currently taking any of the following medications:
 - Pain medications (Codeine, Oxycontin, Hydrocodon, Morphine, etc)
 - Anti-anxieties (Ativan, Xanax, Klonopine, Valium, etc)
 - Mood elevators/stabilizers (Paxil, Zoloft, Celexa, Lithium, etc)
 - ADHD medications (Adderall, Ritalin, Amphetamine Salts, etc)
 - Sleep aids (Lunesta, Ambien, Trazodone, etc)
 - Anti-Psychotics (Thorazine, Haldol, Risperdal, Geodon, etc)
 - Illegal drugs (heroin, cocaine, methamphetamine, etc)
- Ask at end of online survey: Do you think you are a perfectionist? If so, does being a perfectionist help or hinder you in your work and/or daily activities?

APPENDIX B-REVISED ALMOST PERFECT SCALE

Instructions

The following items are designed to measure attitudes people have toward themselves, their performance, and toward others. There are no right or wrong answers. Please respond to all of the items. Use your first impression and do not spend too much time on individual items in responding.

Respond to each of the items using the scale below to describe your degree of agreement with each item. Fill in the appropriate number circle on the computer answer sheet that is provided.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

1. I have high standards for my performance at work or at school.
2. I am an orderly person.
3. I often feel frustrated because I can't meet my goals.
4. Neatness is important to me.
5. If you don't expect much out of yourself, you will never succeed.
6. My best just never seems to be good enough for me.
7. I think things should be put away in their place.
8. I have high expectations for myself.
9. I rarely live up to my high standards.
10. I like to always be organized and disciplined.
11. Doing my best never seems to be enough.

12. I set very high standards for myself.
13. I am never satisfied with my accomplishments.
14. I expect the best from myself.
15. I often worry about not measuring up to my own expectations.
16. My performance rarely measures up to my standards.
17. I am not satisfied even when I know I have done my best.
18. I try to do my best at everything I do.
19. I am seldom able to meet my own high standards of performance.
20. I am hardly ever satisfied with my performance.
21. I hardly ever feel that what I've done is good enough.
22. I have a strong need to strive for excellence.
23. I often feel disappointment after completing a task because I know I could have done it better.

Scoring APS-R

Standards = 1, 5, 8, 12, 14, 18, 22

Order = 2, 4, 7, 10

Discrepancy = 3, 6, 9, 11, 13, 15, 16, 17, 19, 20, 21, 23

APPENDIX C-MINI-INTERNATIONAL PERSONALITY ITEM POOL

Instructions

Here are 20 statements; please evaluate the extent to which you agree with them. Please answer honestly with regard to how you see yourself in the present moment, not how you would like to be in the future. There are no incorrect answers nor any answers that are inherently more desirable than others.

1	2	3	4	5
Very	Moderately	Neither	Moderately	Very
Inaccurate	Inaccurate	Inaccurate	Accurate	Accurate
		nor Accurate		

1. I am the life of the party.
2. I sympathize with others' feelings.
3. I get chores done right away.
4. I have frequent mood swings.
5. I have a vivid imagination.
6. I don't talk a lot.
7. I am not interested in other people's problems.
8. I often forget to put things back in their proper place.
9. I am relaxed most of the time.
10. I am not interested in abstract ideas.
11. I talk to a lot of different people at parties.
12. I feel others' emotions.
13. I like order.

- 14. I get upset easily.
- 15. I have difficulty understanding abstract ideas.
- 16. I keep in the background.
- 17. I am not really interested in others.
- 18. I make a mess of things.
- 19. I seldom feel blue.
- 20. I do not have a good imagination.

Scoring the Mini-IPIP

Factor One: Extraversion

(+) Keyed: 1, 11
Reverse Keyed: 6, 16

Factor Two: Agreeableness

(+) Keyed: 2, 12
Reversed Keyed: 7, 17

Factor Three: Conscientiousness

(+) Keyed: 3, 13
Reverse Keyed: 8, 18

Factor Four: Neuroticism

(+) Keyed: 4, 14
Reverse Keyed: 9, 19

Factor Five: Intellect/Imagination

(+) Keyed: 5
Reverse Keyed: 10, 15, 20

APPENDIX D-PATIENT HEALTH QUESTIONNAIRE-9 ITEM

Instructions

Over the last 2 weeks, how often have you been bothered by any of the following problems?

0	1	2	3
Not at all	Several days	More than half the days	Nearly every day

1. Little interest or pleasure in doing things
2. Feeling down, depressed, or hopeless
3. Trouble falling or staying asleep, or sleeping too much
4. Feeling tired or having little energy
5. Poor appetite or overeating
6. Feeling bad about yourself—or that you are a failure or have let yourself or your family down
7. Trouble concentrating on things, such as reading the newspaper or watching television
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual
9. Thoughts that you would be better off dead or of hurting yourself in some way

Scoring the PHQ-9

Add up the scores for all 9 items = Total Score.

None = 0-4; Mild = 5-9; Moderate = 10-14; Moderately Severe = 15-19; Severe = 20-27

APPENDIX E-OVERALL ANXIETY SEVERITY AND IMPAIRMENT SCALE

Directions

The following items ask about anxiety and fear. These symptoms may include panic attacks, situational anxieties, worries, flashbacks, hypervigilance, or startle. Include all of your anxiety symptoms when answering these questions. For each item, indicate the answer that best describes your experience *over the past week*.

1. In the past week, how often have you felt anxious?

0 = *No* anxiety in the past week.

1 = *Infrequent* anxiety. Felt anxious a few times.

2 = *Occasional* anxiety. Felt anxious as much of the time as not. It was hard to relax.

3 = *Frequent* anxiety. Felt anxious most of the time. It was very difficult to relax.

4 = *Constant* anxiety. Felt anxious all of the time and never really relaxed.

2. In the past week, when you have felt anxious, how intense or severe was your anxiety?

0 = *Little or None*: Anxiety was absent or barely noticeable.

1 = *Mild*: Anxiety was at a low level. It was possible to relax when I tried.

Physical symptoms were only slightly uncomfortable.

2 = *Moderate*: Anxiety was distressing at times. It was hard to relax or concentrate, but I could do it if I tried. Physical symptoms were uncomfortable.

3 = *Severe*: Anxiety was intense much of the time. It was very difficult to relax or focus on anything else. Physical symptoms were extremely uncomfortable.

4 = *Extreme*: Anxiety was overwhelming. It was impossible to relax at all.

Physical symptoms were unbearable.

3. In the past week, how often did you avoid situations, places, objects, or activities because of anxiety or fear?

0 = *None*: I do not avoid places, situations, activities, or things because of fear.

1 = *Infrequent*: I avoid something once in a while, but will usually face the situation or confront the object. My lifestyle is not affected.

2 = *Occasional*: I have some fear of certain situations, places, or objects, but it is still manageable. My lifestyle has only changed in minor ways. I always or almost always avoid the things I fear when I'm alone, but can handle them if someone comes with me.

3 = *Frequent*: I have considerable fear and really try to avoid the things that frighten me. I have made significant changes in my life style to avoid the object, situation, activity, or place.

4 = *All the Time*: Avoiding objects, situations, activities, or places has taken over my life. My lifestyle has been extensively affected and I no longer do things that I used to enjoy.

4. In the past week, how much did your anxiety interfere with your ability to do the things you needed to do at work, at school, or at home?

0 = *None*: No interference at work/home/school from anxiety

1 = *Mild*: My anxiety has caused some interference at work/home/school. Things are more difficult, but everything that needs to be done is still getting done.

2 = *Moderate*: My anxiety definitely interferes with tasks. Most things are still getting done, but few things are being done as well as in the past.

3 = *Severe*: My anxiety has really changed my ability to get things done. Some tasks are still being done, but many things are not. My performance has definitely suffered.

4 = *Extreme*: My anxiety has become incapacitating. I am unable to complete tasks and have had to leave school, have quit or been fired from my job, or have been unable to complete tasks at home and have faced consequences like bill collectors, eviction, etc.

5. In the past week, how much has anxiety interfered with your social life and relationships?

0 = *None*: My anxiety doesn't affect my relationships.

1 = *Mild*: My anxiety slightly interferes with my relationships. Some of my friendships and other relationships have suffered, but, overall, my social life is still fulfilling

2 = *Moderate*: I have experienced some interference with my social life, but I still have a few close relationships. I don't spend as much time with others as in the past, but I still socialize sometimes.

3 = *Severe*: My friendships and other relationships have suffered a lot because of anxiety. I do not enjoy social activities. I socialize very little.

4 = *Extreme*: My anxiety has completely disrupted my social activities. All of my relationships have suffered or ended. My family life is extremely strained.

For scoring, add up the scores. Cutoff score of 8 suggests clinically significant anxiety.

APPENDIX F-EATING ATTITUDES TEST

Directions

Please fill out the below form as accurately, honestly, and completely as possible. There are no right or wrong answers.

Check a response for each of the following statements:

3 = Always 2 = Usually 1 = Often 0 = Sometimes 0 = Rarely 0 = Never

1. Am terrified about being overweight.
2. Avoid eating when I am hungry.
3. Find myself preoccupied with food.
4. Have gone on eating binges when I feel that I may not be able to stop.
5. Cut my food into small pieces.
6. Aware of the calories content of foods that I eat.
7. Particularly avoid food with a high carbohydrate content (i.e., bread, rice, potatoes, etc.)
8. Feel that others would prefer if I ate more often.
9. Vomit after I have eaten.
10. Feel extremely guilty after eating.
11. Am preoccupied with a desire to be thinner.
12. Think about burning up calories when I exercise.
13. Other people think that I am too thin.
14. Am preoccupied with the thought of having fat on my body.
15. Take longer than others to eat my meals.
16. Avoid foods with sugar in them.

17. Eat diet foods.
18. Feel that food controls my life.
19. Display self-control around food.
20. Feel that others pressure me to eat.
21. Give too much time and thought to food.
22. Feel uncomfortable after eating sweets.
23. Engage in dieting behavior.
24. Like my stomach to be empty.
25. Have the impulse to vomit after meals.
26. Enjoy trying new rich foods.

Scoring the EAT-26

Score for Questions 1-25: 3 = Always, 2 = Usually, 1 = Often

0 = Sometimes, Rarely, Never

Score for Question 26: 3 = Never, 2 = Rarely, 1 = Sometimes

0 = Often, Usually, Always

Add the scores for each item together for a total score. Scores above 20 indicate eating disorder risk.

APPENDIX G-OBSESSIVE COMPULSIVE INVENTORY-REVISED

Directions

The following statements refer to experiences that many people have in their everyday lives. Select the number that best describes HOW MUCH that experience has DISTRESSED or BOTHERED you during the PAST MONTH. The numbers refer to the following verbal labels:

0 = Not at all	1 = A little	2 = Moderately	3 = A lot	4 = Extremely
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1. I have saved up so many things that they get in the way.
2. I check things more often than necessary.
3. I get upset if objects are not arranged properly.
4. I feel compelled to count while I am doing things.
5. I find it difficult to touch an object when I know it has been touched by strangers or certain people.
6. I find it difficult to control my own thoughts.
7. I collect things I don't need.
8. I repeatedly check doors, windows, drawers, etc.
9. I get upset if others change the way I arranged things.
10. I feel I have to repeat certain numbers.
11. I sometimes have to wash or clean myself simply because I feel contaminated.
12. I am upset by unpleasant thoughts that come into my mind against my will.
13. I avoid throwing things away because I am afraid I might need them later.
14. I repeatedly check gas and water taps and light switches after turning them off.

15. I need things to be arranged in a particular way.

16. I feel that there are good and bad numbers.

17. I wash my hands more often and longer than necessary.

18. I frequently get nasty thoughts and have difficulty in getting rid of them .

Scoring: Scores are generated by adding the item scores. The possible range of scores is 0-72. Mean score for persons with OCD is 28.0 (SD = 13.53). Recommended cutoff score is 21, with scores at or above this level indicating the likely presence of OCD.

APPENDIX H-POSITIVE AND NEGATIVE AFFECT SCHEDULE (PANAS)

Directions

This scale consists of a number of words that describe different feelings and emotions.

Read each item and then list the number from the scale below next to each word.

Indicate to what extent you feel this way right now, that is, at the present moment.

1	2	3	4	5
Very Slightly or Not at All	A Little	Moderately	Quite a Bit	Extremely

____ 1. Interested *

____ 2. Distressed

____ 3. Excited *

____ 4. Upset

____ 5. Strong *

____ 6. Guilty

____ 7. Scared

____ 8. Hostile

____ 9. Enthusiastic *

____ 10. Proud *

____ 11. Irritable

____ 12. Alert *

____ 13. Ashamed

____ 14. Inspired *

____ 15. Nervous

_____ 16. Determined *

_____ 17. Attentive *

_____ 18. Jittery

_____ 19. Active *

_____ 20. Afraid

Scoring Instructions:

Positive Affect Score: Add the scores on items 1, 3, 5, 9, 10, 12, 14, 16, 17, and 19.

Scores can range from 10 to 50, with higher scores representing higher levels of positive affect. Mean Scores: Momentary = 29.7 (*SD* = 7.9).

Negative Affect Score: Add the scores on items 2, 4, 6, 7, 8, 11, 13, 15, 18, and 20.

Scores can range from 10 to 50, with lower scores representing lower levels of negative affect. Mean Score: Momentary = 14.8 (*SD* = 5.4).

APPENDIX I-IRB NOTIFICATION OF INITIAL STUDY APPROVAL

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB

To: [Ansley Taylor Corson](#)

CC: [Matthew Whited](#)

Date: 9/28/2017

[UMCIRB 17-001849](#)

Re: Executive Functioning Deficits in the Transdiagnostic Process of Multidimensional Perfectionism

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 9/28/2017 to 9/27/2018. The research study is eligible for review under expedited category #7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Corson_Dissertation Proposal	Study Protocol or Grant Application
Historical Interview Questions	Interview/Focus Group Scripts/Questions
Lab Consent for Dissertation .doc	Consent Forms
Online Consent for Dissertation.doc	Consent Forms
Self-Report Measures	Surveys and Questionnaires

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX J-INFORMED CONSENT TO PARTICIPATE IN RESEARCH: ONLINE

East Carolina University



Informed Consent to Participate in Research

Information to consider before taking part in research that has no more than minimal risk.

Title of Research Study: Executive Functioning Deficits in the Transdiagnostic Process of Multidimensional Perfectionism

Principal Investigator: Ansley Taylor Corson, M.A.

Institution/Department or Division: Psychology

Address: 237 Rawl

Telephone #: (252)-328-1069

Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.

Why am I being invited to take part in this research?

The purpose of this research is to explore the possible usefulness of objective neuropsychological assessment measures of executive functioning in assessing potential executive functioning deficits in perfectionists. You are being invited to take part in this research because you are an ECU student who is at least 18 years old. The decision to take part in this research is yours to make. By doing this research, we hope to learn whether executive functioning can be reliably assessed in perfectionists with objective neuropsychological assessment measures.

If you volunteer to take part in this research, you will be one of about 160 people to do so.

Are there reasons I should not take part in this research?

You should not participate in this research if you are under 18 years of age.

What other choices do I have if I do not take part in this research?

You can choose not to participate. If you are seeking credit for one of your classes during Spring and Fall semesters, you can fulfill your research requirement in Introduction to Psychology by participating in any of a number of available research studies which are listed on the Sona website (<http://ecu.sona-systems.com>). You can also participate in alternative activities to research to fulfill this requirement. The primary research alternative is reading articles and completing knowledge quizzes on these articles. Times when you can sign up to complete these knowledge quizzes are also listed on the Sona website. During Summer sessions, your instructor will provide you with information about ways to fulfill any research requirement in Introduction to Psychology. If you are enrolled in another Psychology course, your instructor can provide you with information about alternatives to participating in this research.

Where is the research going to take place and how long will it last?

This research will take place online. The total amount of time you will be asked to volunteer for this study is approximately 30 minutes. After you complete this online study, you will be permitted to volunteer for a second part of the study, if you choose. This second part will take place on campus and will consist of completing neuropsychological assessment measures. This second part will take approximately 120 minutes and will occur in the PASS Clinic, located on the 3rd floor of the Rawl building on ECU's main campus.

What will I be asked to do?

You will be asked to do the following: You will be asked to fill out some questionnaires regarding demographic, behavioral, physical, and mental health factors in your life.

What might I experience if I take part in the research?

We don't know of any risks (the chance of harm) associated with this research. Any risks that may occur with this research are no more than what you would experience in everyday life. We don't know if you will benefit from taking part in this study. There may not be any personal benefit to you but the information gained by doing this research may help others in the future.

Will I be paid for taking part in this research?

We will not pay you for the time you volunteer while being in this study. You will receive 0.5 hours of research credit for your Introduction to Psychology course (if research is required). If you are enrolled in another Psychology course, please contact your instructor to determine what credit you can receive for participating, if any. Even if you do not wish to acquire research credit, you are welcome to participate in this study.

What will it cost me to take part in this research?

It will not cost you any money to be part of the research.

Who will know that I took part in this research and learn personal information about me?

ECU and the people and organizations listed below may know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research:

- Any agency of the federal, state, or local government that regulates human research. This includes the Department of Health and Human Services (DHHS), the North Carolina Department of Health, and the Office for Human Research Protections
- The University & Medical Center Institutional Review Board (UMCIRB) and its staff have responsibility for overseeing your welfare during this research and may need to see research records to identify you.

How will you keep the information you collect about me secure? How long will you keep it?

Data collected from this study will be kept securely for seven years. All identifying information (your name and email address) will be separated from responses. Data collected solely for the purposes of providing class credit will be disassociated with your identifying information as soon as credit is granted.

What if I decide I do not want to continue in this research?

You can stop at any time after it has already started. There will be no consequences if you stop and you will not be criticized. You will not lose any benefits that you should normally receive.

Who should I contact if I have questions?

The people conducting this study will be available to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator, Ansley Taylor Corson at corsona14@students.ecu.edu or at (252)-328-1069 anytime.

If you have questions about your rights as someone taking part in research, you may call the Office of Research Research Integrity & Compliance (ORIC) at 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director of the ORIC, at 252-744-1971.

Are there any Conflicts of Interest I should know about?

Neither the Principal Investigator, nor any of the sub-investigators, have any conflict of interest to declare.

I have decided I want to take part in this research. What should I do now?

Read the following and if you agree, you should consent to participate:

- I have read all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By consenting to participate, I am not giving up any of my rights.
- I can print a copy of this consent document, and it is mine to keep.

By checking this box and clicking continue, you are consenting to participate in this research:

“Continue”

“Do NOT Continue”

APPENDIX K-INFORMED CONSENT TO PARTICIPATE IN RESEARCH: LAB

East Carolina University



Informed Consent to Participate in Research

Information to consider before taking part in research that has no more than minimal risk.

Title of Research Study: Executive Functioning Deficits in the Transdiagnostic Process of Multidimensional Perfectionism

Principal Investigator: Ansley Taylor Corson, M.A.

Institution/Department or Division: Psychology

Address: 237 Rawl

Telephone #: (252)-328-1069

Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.

Why am I being invited to take part in this research?

The purpose of this research is to explore the possible usefulness of objective neuropsychological assessment measures of executive functioning in assessing potential executive functioning deficits in perfectionists. You are being invited to take part in this research because you are an ECU student who is at least 18 years old. The decision to take part in this research is yours to make. By doing this research, we hope to learn whether executive functioning can be reliably assessed in perfectionists with objective neuropsychological assessment measures.

If you volunteer to take part in this research, you will be one of about 160 people to do so.

Are there reasons I should not take part in this research?

You should not participate in this research if you are under 18 years of age, or if you have consumed alcohol or other illicit substances within the past 24 hours.

What other choices do I have if I do not take part in this research?

You can choose not to participate. If you are seeking credit for one of your classes during Spring and Fall semesters, you can fulfill your research requirement in Introduction to Psychology by participating in any of a number of available research studies which are listed on the Sona website (<http://ecu.sona-systems.com>). You can also participate in alternative activities to research to fulfill this requirement. The primary research alternative is reading articles and completing knowledge quizzes on these articles. Times when you can sign up to complete these knowledge quizzes are also listed on the Sona website. During Summer sessions, your instructor will provide you with information about ways to fulfill any research requirement in Introduction to Psychology. If you are enrolled in another Psychology course, your instructor can provide you with information about alternatives to participating in this research.

Where is the research going to take place and how long will it last?

The research will be conducted in the PASS Clinic, located on the third floor of the Rawl Building on ECU's main campus. You will need to come to Rawl 311 one time during the study. The total amount of time you will be asked to volunteer for the in-lab portion of this study is approximately 120 minutes over one day.

What will I be asked to do?

You will be asked to do the following: You will be asked to complete a variety of neuropsychological assessment measures that cover several domains, including intellectual functioning, executive functioning, memory functioning, and visuoconstructional ability.

What might I experience if I take part in the research?

We don't know of any risks (the chance of harm) associated with this research. Any risks that may occur with this research are no more than what you would experience in everyday life. We don't know if you will benefit from taking part in this study. There may not be any personal benefit to you but the information gained by doing this research may help others in the future.

Will I be paid for taking part in this research?

We will not pay you for the time you volunteer while being in this study. You will receive 2.0 hours of research credit for your Introduction to Psychology course (if research is required). If you are enrolled in another Psychology course, please contact your instructor to determine what credit you can receive for participating, if any. Even if you do not wish to acquire research credit, you are welcome to participate in this study.

What will it cost me to take part in this research?

It will not cost you any money to be part of the research.

Who will know that I took part in this research and learn personal information about me?

ECU and the people and organizations listed below may know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research:

- Any agency of the federal, state, or local government that regulates human research. This includes the Department of Health and Human Services (DHHS), the North Carolina Department of Health, and the Office for Human Research Protections
- The University & Medical Center Institutional Review Board (UMCIRB) and its staff have responsibility for overseeing your welfare during this research and may need to see research records to identify you.

How will you keep the information you collect about me secure? How long will you keep it?

Data collected from this study will be kept securely for seven years. All identifying information (your name and email address) will be separated from responses. Data collected solely for the purposes of providing class credit will be disassociated with your identifying information as soon as credit is granted.

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You can stop at any time after it has already started. There will be no consequences if you stop and you will not be criticized. You will not lose any benefits that you should normally receive.

Who should I contact if I have questions?

The people conducting this study will be available to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator, Ansley Taylor Corson at corsona14@students.ecu.edu or at (252)-328-1069 anytime.

If you have questions about your rights as someone taking part in research, you may call the Office of Research Research Integrity & Compliance (ORIC) at 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director of the ORIC, at 252-744-1971.

Are there any Conflicts of Interest I should know about?

Neither the Principal Investigator, nor any of the sub-investigators, have any conflict of interest to declare.

I have decided I want to take part in this research. What should I do now?

The person obtaining informed consent will ask you to read the following and if you agree, you should sign this form:

- I have read (or had read to me) all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By signing this informed consent form, I am not giving up any of my rights.
- I have been given a copy of this consent document, and it is mine to keep.

Participant's Name (PRINT)	Signature	Date
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Person Obtaining Informed Consent: I have conducted the initial informed consent process. I have orally reviewed the contents of the consent document with the person who has signed above, and answered all of the person’s questions about the research.

Person Obtaining Consent (PRINT)	Signature	Date
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