2020

Maladaptive Personality Traits and Health Behaviors, Health Perceptions, and Inflammatory Biomarkers in Older Adults

Joshua R. Oltmanns
University of Kentucky, jroltmanns@gmail.com
Author ORCID Identifier:
https://orcid.org/0000-0001-6670-6995
Digital Object Identifier: https://doi.org/10.13023/etd.2020.239

STUDENT AGREEMENT:

I represent that my thesis or dissertation and abstract are my original work. Proper attribution has been given to all outside sources. I understand that I am solely responsible for obtaining any needed copyright permissions. I have obtained needed written permission statement(s) from the owner(s) of each third-party copyrighted matter to be included in my work, allowing electronic distribution (if such use is not permitted by the fair use doctrine) which will be submitted to UKnowledge as Additional File.

I hereby grant to The University of Kentucky and its agents the irrevocable, non-exclusive, and royalty-free license to archive and make accessible my work in whole or in part in all forms of media, now or hereafter known. I agree that the document mentioned above may be made available immediately for worldwide access unless an embargo applies.

I retain all other ownership rights to the copyright of my work. I also retain the right to use in future works (such as articles or books) all or part of my work. I understand that I am free to register the copyright to my work.

REVIEW, APPROVAL AND ACCEPTANCE

The document mentioned above has been reviewed and accepted by the student's advisor, on behalf of the advisory committee, and by the Director of Graduate Studies (DGS), on behalf of the program; we verify that this is the final, approved version of the student's thesis including all changes required by the advisory committee. The undersigned agree to abide by the statements above.

Joshua R. Oltmanns, Student

Dr. Thomas A. Widiger, Major Professor

Dr. Mark T. Fillmore, Director of Graduate Studies

MALADAPTIVE PERSONALITY TRAITS AND HEALTH BEHAVIORS, HEALTH PERCEPTIONS, AND INFLAMMATORY BIOMARKERS IN OLDER ADULTS

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Arts and Sciences
at the University of Kentucky

By
Joshua Reid Oltmanns
Lexington, Kentucky
Director: Dr. Thomas A. Widiger, Professor of Psychology
Lexington, Kentucky
2020

https://orcid.org/0000-0001-6670-6995

ABSTRACT OF DISSERTATION

MALADAPTIVE PERSONALITY TRAITS AND HEALTH BEHAVIORS, HEALTH PERCEPTIONS, AND INFLAMMATORY BIOMARKERS IN OLDER ADULTS

Traits from dimensional models of normal-range personality have been shown to predict physical health outcomes including health behaviors, health perceptions, disease, and mortality. Maladaptive traits of personality disorders may predict even more variance in physical health indicators. Dimensional models of maladaptive personality traits are replacing categorical models of personality disorder, and the five-factor model of personality disorder (FFMPD) has been shown to be a useful dimensional model of maladaptive traits. However, there has been little work investigating the criterion validity of the FFMPD for predicting physical health indicators. The present study examines FFMPD scales in the prediction of health behaviors, heath perceptions, and inflammatory biomarkers across two timepoints in a large, representative community sample of older adults. Findings indicate that the FFMPD scales explain a moderate amount of variance in the physical health variables across time. Exploratory analyses indicate that the FFMPD traits have incremental validity over covariates, normal-range personality traits, and categorical personality disorders. Results are considered in the broader context of the personality and health literature and future research directions are discussed.

KEYWORDS: Personality traits, physical health, aging, five-factor model, personality disorder, maladaptive personality

Joshua Reid Oltmanns

04/20/2020

Date

MALADAPTIVE PERSONALITY TRAITS AND HEALTH BEHAVIORS, HEALTH PERCEPTIONS, AND INFLAMMATORY BIOMARKERS IN OLDER ADULTS

By
Joshua Reid Oltmanns

Thomas A. Widiger
Director of Dissertation

Mark Fillmore
Director of Graduate Studies

04/20/2020
Date

TABLE OF CONTENTS

LIST OF TABLES iv
CHAPTER 1. INTRODUCTION 1
1.1 PERSONALITY, HEALTH BEHAVIORS, AND HEALTH PERCEPTIONS 3
1.2 PERSONALITY AND INSOMNIA 6
1.3 PERSONALITY AND BIOMARKERS OF INFLAMMATION 8
1.4 THE PRESENT STUDY 11
CHAPTER 2. METHOD 12
2.1 PROCEDURE 12
2.2 PARTICIPANTS 12
2.3 MEASURES 13
2.4 STATISTICAL ANALYSES 19
CHAPTER 3. RESULTS 21
CHAPTER 4. DISCUSSION 37
4.1 LIMITATIONS 43
4.2 CONCLUSIONS 45
REFERENCES 46
VITA 56

LIST OF TABLES

Table 1. Maladaptive Variants of the Five-Factor Model Facets 16
Table 2. Descriptive Statistics for Waves 1 and 2 BPD Variables 22
Table 3. Descriptive Statistics for Waves 1 and 2 OCPD Variables 23
Table 4. Descriptive Statistics for Waves 1 and 2 AVPD Variables 24
Table 5. Descriptive Statistics for Waves 1 and 2 Physical Health Indicator Variables .. 25
Table 6. Correlations Among Wave 1 FFBI and Wave 2 Self- and Informant-Report Physical Health Indicators 26
Table 7. Correlations Among Wave 1 FFOCI Scales and Wave 2 Self- and Informant-Report Physical Health Indicators 27
Table 8. Correlations Among Wave 1 FFAvA Scales and Wave 2 Self- and Informant-Report Physical Health Indicators 28
Table 9. Correlations Among Wave 1 FFMPD Scales and Wave 2 Biomarkers 29
Table 10. Five-Factor Obsessive-Compulsive Inventory Scales' Incremental Validity over NEO and MAPP..... 30
Table 11. Five-Factor Avoidant Inventory Scales' Incremental Validity over NEO and MAPP..... 31
Table 12. Five-Factor Borderline Scales Predicting Physical Health Indicators Over Covariates 33
Table 13. Five-Factor Avoidant Scales Predicting Physical Health Indicators Over Covariates 34
Table 14. FFMPD Incremental Validity Over Covariates and Corresponding NEO Facets 36

CHAPTER 1. INTRODUCTION

Over 50% of Americans suffer from chronic health conditions (Kung, Hoyert, Xu, & Murphy, 2008). A well-established base of research demonstrates that personality is an important predictor of health outcomes, including physical disease, health functioning, and longevity (Friedman & Kern, 2014; Ozer & Benet-Martinez, 2006; T. W. Smith, Williams, & Segerstrom, 2015; Turiano, Chapman, Gruenewald, & Mroczek, 2015). The impact of the adaptive personality trait domain of conscientiousness, for example—one of five domains from the five-factor model (FFM) of personality—has been shown to have a larger effect on mortality than socioeconomic status (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). *Maladaptive* personality traits that define personality disorders may have an even larger connection with health outcomes than do "normal" ranges of the five domains of the FFM (Gleason, Weinstein, Balsis, & Oltmanns, 2014). Personality disorders as defined by the traditional *Diagnostic and Statistical Manual of Mental Disorders* (DSM) have been associated with healthcare over-utilization, risk for chronic health issues, poor treatment adherence, and psychopathology (Pietrzak, Wagner, & Petry, 2007; Skodol et al., 2005; Zanarini, Frankenburg, Hennen, Reich, & Silk, 2005).

Personality disorder classification, however, is undergoing a significant change from a categorical model, based on the traditional DSM personality disorder types, to a dimensional model consisting of five maladaptive personality trait domains (American Psychiatric Association, 2013; Widiger & Trull, 2007). The five trait domains included in Section III of DSM-5 for emerging measures and models include negative affectivity, detachment, psychoticism, antagonism, and disinhibition. DSM-5 stated that, “these five broad domains are maladaptive variants of the five domains of the extensively validated

and replicated personality model known as the 'Big Five' or Five Factor Model of personality" (APA 2013, p. 773).

The FFM is a compelling framework through which to understand both normative personality and maladaptive personality/personality disorders. It consists of the five broad domains of neuroticism, extraversion, openness, agreeableness, and conscientiousness. Originally based on the representation of personality terms in language, the FFM is an integrative framework that accommodates scales from alternative dimensional models of personality (O'Connor, 2002) and provides a cohesive nomenclature for research (Goldberg, 1993; John, Naumann, & Soto, 2008; Ozer & Reise, 1994). The five factors have well documented childhood antecedents (Caspi, Roberts, & Shiner, 2005; Mervielde, De Clercq, De Fruyt, & Van Leeuwen, 2005), empirical support across eastern and western cultures (Allik, 2005) and a demonstrated temporal stability across the lifespan (Roberts & DelVecchio, 2000). The domains of the FFM have also demonstrated predictive validity for a variety of consequential life outcomes such as career success, criminal activity, happiness, psychopathology, marital failure and success, and longevity (Ozer & Benet-Martinez, 2006; Roberts et al., 2007).

Beginning with hypotheses by Widiger, Trull, Clarkin, Sanderson, and Costa (1994), it was proposed that, in addition to its usefulness for understanding normal ranges of personality, the FFM might also be a useful framework for the study of personality disorder. Resulting empirical work (e.g., Lawton, Shields, & Oltmanns, 2011; Miller, 2012; Samuel, Edmundson, & Widiger, 2011; Trull, Widiger, Lynam, & Costa, 2003) has shown that the FFM description of personality disorder has strong convergent validity with clinical measures of personality disorder. Meta-analyses of this research have

supported the FFM/personality disorder coordination (Samuel & Widiger, 2008; Saulsman & Page, 2004), as have qualitative reviews of this research (e.g., Clark, 2007; Livesley, 2001). The FFM descriptions of personality disorder have been shown to correlate as highly with measures of personality disorder as measures of personality disorder correlate amongst themselves (Trull et al., 2003). In order to extend this research, Widiger, Lynam, and colleagues (Lynam, 2012; Widiger, Lynam, Miller, & Oltmanns, 2012) introduced new measures of personality disorder that were developed creating scales assessing maladaptive variants of respective FFM facets that assess each respective personality disorder. For example, the Five Factor Obsessive-Compulsive Inventory (FFOCI; Samuel, Riddell, Lynam, Miller, & Widiger, 2012) includes 12 subscales, assessing obsessive-compulsive personality variants of FFM conscientiousness (i.e., Perfectionism, Fastidiousness, Punctiliousness, Workaholism, Doggedness, and Ruminative Deliberation), introversion (i.e., Detached Coldness and Risk Aversion), neuroticism (i.e., Excessive Worry); and low openness (i.e., Constricted, Inflexibility, and Dogmatism). These "FFMPD" measures are thus assessing maladaptive variants of normal range personality traits, which is an advantage because they are grounded in an already extensive amount of empirical support that has been gathered regarding the normal-range FFM.

1.1 PERSONALITY, HEALTH BEHAVIORS, AND HEALTH PERCEPTIONS

Personality has been associated with physical health behaviors, biomarkers of inflammation, physical diseases, and mortality (Bogg & Roberts, 2004; T. W. Smith et al., 2015; Turiano et al., 2015). FFM personality traits explain a significant amount of variance in physical health behaviors and health outcomes (Strickhouser, Zell, & Krizan,

2017). In particular, FFM personality traits have been associated with two frequently used measures of health behaviors: the Health Behavior Checklist (HBCL) (Vickers, Conway, & Hervig, 1990) and the Health Status Inventory (HSI) (Hays & Morales, 2001). The HBCL contains four subscales: Wellness Maintenance, Accident Control, Traffic Risk, and Substance Risk. Across several studies, conscientiousness has emerged as a robust predictor of these scales (more Wellness Maintenance and Accident Control, less Traffic Risk and Substance Risk) (Booth-Kewley & Vickers, 1994; Chuah, Drasgow, & Roberts, 2006; Crede, Harms, Niehorster, & Gaye-Valentine, 2012; Wasylkiw & Fekken, 2002). Extraversion and agreeableness often display relationships with the HBCL subscales (extraversion correlating with more Traffic Risk and Substance Risk, agreeableness with less Traffic Risk and more Accident Control), but these relationships have been smaller and less consistent. Even across multiple *brief* measures of the FFM, the domains from each measure explain a medium amount of variance ($> R = .30$) in the Wellness Maintenance, Traffic Risk, and Substance Risk subscales of the HBCL, and a smaller amount of variance in the Accident Control subscale (Crede et al., 2012). In a longitudinal study of 477 participants across three years, increases in the conscientiousness domain across time were associated with increases in positive health behaviors on the HBCL (Takahashi, Edmonds, Jackson, & Roberts, 2013). Facets of the FFM (i.e., subscale traits more specific than FFM domain-level traits) can provide more nuanced information about personality-health relationships: In a facet-level study of conscientiousness and health behaviors, the Impulse Control facet was moderately associated with Substance Risk and Traffic Risk and the Industriousness facet was moderately associated with Wellness Maintenance (Edmonds, Bogg, & Roberts, 2009).

Together, these studies indicate that conscientiousness is the most robust FFM domain associated with health behaviors, with other domains also having relationships with health behaviors that may vary with measure and facet within the domain.

In addition to health behaviors, general health perceptions have been associated with FFM personality traits (Wasylkiw & Fekken, 2002). General health perceptions are an important piece of physical health because they have been shown to be associated with mortality above and beyond more objective measures of physical health (DeSalvo, Bloser, Reynolds, He, & Muntner, 2006). Neuroticism has been associated, in particular, with worse perceptions of physical functioning (King, Jackson, Morrow-Howell, & Oltmanns, 2015), and extraversion, agreeableness, conscientiousness, and openness have been associated with the HSI total score (including emotional functioning scales) (Powers & Oltmanns, 2013). In a community sample of 698 older adults on Medicare, currently facing physical health problems and actively receiving treatment for health conditions, there were no significant associations between the FFM domains and general physical health perceptions (Löckenhoff, Sutin, Ferrucci, & Costa, 2008). However, in a second sample of 393 slightly younger and healthier community older adults, the authors found that neuroticism and conscientiousness were associated with general health perceptions (neuroticism negatively and conscientiousness positively). At the facet level, Löckenhoff et al. (2008) found that, in both samples, anxiousness, depressiveness, and vulnerability (from neuroticism) were associated with role limitations due to physical problems and lower general health perceptions and activity (from extraversion) and self-discipline (from conscientiousness) were both associated with better perceptions of physical functioning and general health perceptions. In the younger sample, positive emotions

(from extraversion) and order (from conscientiousness) were also associated with better general health perceptions. Longitudinally, Takahashi et al. (2013) found that domain-level conscientiousness predicted more positive general health perception scores as well as increases in general health perceptions in a sample of 477 adults across a period of three years.

DSM personality disorders have also been associated with physical health problems. For example, personality disorders have been associated with higher rates of obesity, cardiovascular disease, and arthritis (Dixon-Gordon, Whalen, Layden, & Chapman, 2015; El-Gabalawy, Katz, & Sareen, 2010; Powers & Oltmanns, 2012). There are fewer studies on personality disorders, health behaviors, and health perceptions than there are on FFM traits and these constructs. However, several studies have documented important associations: DSM personality disorder measured by semi-structured interview predicted HSI Physical Functioning, Role Limitations due to Physical Problems, Pain, Energy/Fatigue, and General Health Perceptions over and above covariates, including major depressive disorder, across six months (Powers & Oltmanns, 2012). In a sample of 16,884 older adults, five DSM personality disorders predicted physical health-related quality of life (PHRQoL): Three of them (obsessive-compulsive, dependent, and paranoid) were associated with PHRQoL over and above psychosocial covariates (Holzer & Huang, 2019).

1.2 PERSONALITY AND INSOMNIA

Studies of FFM personality traits and insomnia have been increasing in number. Each domain has been associated with insomnia symptoms, with neuroticism (Blanken et al., 2019; Calkins, Hearon, Capozzoli, & Otto, 2013; Emert, Tutek, & Lichstein, 2017;

Fang et al., 2019; Gamaldo et al., 2019; Hintsanen et al., 2014; Huang, Peck, Mallya, Lupien, & Fiocco, 2016; Kim et al., 2015; Otaka et al., 2019; Ren et al., 2019; Stephan, Sutin, Bayard, Krizan, & Terracciano, 2018; van de Laar, Leufkens, Bakker, Pevernagie, & Overeem, 2017) and conscientiousness (Emert et al., 2017; Gamaldo et al., 2019; Hintsanen et al., 2014; Huang et al., 2016; Kim et al., 2015; Stephan et al., 2018; van de Laar et al., 2017) showing the most robust associations (neuroticism with more insomnia symptoms and conscientiousness with fewer insomnia symptoms), and extraversion (Fang et al., 2019; Hintsanen et al., 2014; Stephan et al., 2018; van de Laar et al., 2017), openness (Gamaldo et al., 2019), and agreeableness (Hintsanen et al., 2014) obtaining less consistent associations with insomnia symptoms. Large and/or longitudinal studies have shown particularly strong evidence for associations between neuroticism (Blanken et al., 2019; Hintsanen et al., 2014; Kim et al., 2015; Ren et al., 2019), conscientiousness (Kim et al., 2015; Stephan et al., 2018), and extraversion (Stephan et al., 2018) and insomnia symptoms. At the facet level, Gamaldo and colleagues (2019) found specific associations with insomnia for the following facets of the Big Five Inventory (John et al., 2008), which has two facets per FFM domain: Anxiety and Depression (from neuroticism), Assertiveness and Activity (extraversion), Self-Discipline (conscientiousness), and Aesthetics (openness). Using a short version of the NEO-Personality Inventory-Revised (NEO PI-R; Costa & McCrae, 1992), Kim and colleagues (2015) found positive correlations of insomnia with anxiousness, angry hostility, depressiveness, self-consciousness, impulsiveness, and vulnerability (from neuroticism), and feelings (from openness), and negative correlations of insomnia with gregariousness, activity, and positive emotions (extraversion), values (openness), trust,

straightforwardness and compliance (agreeableness), and competence, dutifulness, and self-discipline (conscientiousness).

Personality disorders have also been associated with insomnia, although the literature on personality disorders and insomnia is smaller (J. R. Oltmanns, 2019). Borderline personality features, in particular, have consistently been associated with self-reported insomnia symptoms in large samples at moderate effect sizes (DeShong & Tucker, 2019; Grove, Smith, Crowell, & Ellis, 2017; Harty, Duckworth, Thompson, Stuewig, & Tangney, 2010; J. R. Oltmanns, Weinstein, & Oltmanns, 2014; Plante, Frankenburg, Fitzmaurice, & Zanarini, 2013; Selby, 2013; Van Veen, Karsten, & Lancel, 2017). Further, borderline personality features remain associated with insomnia symptoms when statistically controlling for other personality disorder features and forms of psychopathology, such as major depression (Harty et al., 2010; J. R. Oltmanns et al., 2014). Insomnia symptoms have also been documented in antisocial personality disorder (Kamphuis, Karsten, de Weerd, & Lancel, 2013; Ruiter, Lichstein, Nau, & Geyer, 2012; Semiz et al., 2008; Van Veen et al., 2017). Other personality disorders have less frequent and less consistent relationships with insomnia, including avoidant, obsessive-compulsive, dependent, schizotypal, and schizoid personality features (Petrov, Emert, & Lichstein, 2019; Ruiter et al., 2012).

1.3 PERSONALITY AND BIOMARKERS OF INFLAMMATION

FFM personality trait domains have also been associated with biomarkers of inflammation (Luchetti, Barkley, Stephan, Terracciano, & Sutin, 2014; Wagner et al., 2019). In particular, the relationship between conscientiousness and lower levels of C-reactive protein (CRP) and interleukin-6 (IL-6) have been most robust (Allen & Laborde,

2017; Luchetti et al., 2014). Neuroticism has shown relationships with higher levels of CRP and IL-6 (Armon, Melamed, Shirom, Berliner, & Shapira, 2013; Graham et al., 2018; Sutin et al., 2010), but this relationship has failed to replicate several times (Allen & Laborde, 2017; Marsland et al., 2007; Mottus, Luciano, Starr, Pollard, & Deary, 2013; Wagner et al., 2019). Extraversion, openness, and agreeableness have also shown relationships with biomarkers, but they have been less frequent and less replicated (Allen & Laborde, 2017; Chapman et al., 2009; Luchetti et al., 2014; Mottus et al., 2013; Sutin et al., 2010). At the facet-level, angry hostility and impulsivity (from neuroticism) were both significantly associated with higher levels of CRP and IL-6, and activity (from extraversion) and order and self-control (from conscientiousness) were all associated with lower levels of CRP and IL-6 (Sutin et al., 2010). Sutin and colleagues also found that all other facets of NEO-PI-R conscientiousness (competence, dutifulness, achievement striving, and deliberation) were negatively associated with IL-6, and vulnerability (from neuroticism) was positively associated with IL-6. The activity facet (from extraversion) was also uniquely associated with inflammatory markers (Chapman et al., 2009).

There may be explanations for inconsistency in associations between FFM traits and inflammatory biomarkers. First, the associations are typically small and would then require very large sample sizes to be significant, which are not always used. Second, brief measures of FFM traits are often used in this research, and are often only examined at the domain-level for that reason. Measures with more items also provide more reliable assessments, which suffer less from attenuation (providing more robust statistical associations). Further, longer measures allow for the examination of specific facet-level associations. If facets within FFM domains have varying relationships with inflammatory

biomarkers, not examining the facet-level may obfuscate more specific facet-level relationships and muddy findings at the domain-level. The present study examines associations between personality and inflammatory biomarkers in a relatively large sample with facet-level assessments.

There are fewer studies on DSM personality disorders and inflammatory biomarkers. Further, the studies that do exist are often cross-sectional and examine small samples, which are less informative than large sample-size, longitudinal studies. However, associations have been found between schizotypal personality disorder and CRP (Gong et al., 2019) and general personality disorder and CRP (Hinze-Selch, Daubener, Erdag, & Wilms, 2010) in larger samples (i.e., between $N = 100$ and $N = 900$).

While there are fewer DSM personality disorder studies on biomarkers, there are several studies on other maladaptive personality traits and inflammatory biomarkers. "Type D" personality (a combination of negative affect and social inhibition) has been linked to IL-6 (Mommersteeg et al., 2012). However, in a sample of $N = 712$ community participants, Type D participants did not differ from non-Type D participants in CRP or IL-6 (van Dooren et al., 2016). Trait hostility has also been linked with CRP and IL-6 (Boisclair Demarble, Moskowitz, Tardif, & D'Antono, 2014; Elovainio et al., 2011; Marsland, Prather, Petersen, Cohen, & Manuck, 2008; Mwendwa et al., 2013; T. W. Smith, Uchino, Bosch, & Kent, 2014), trait depressiveness with CRP (Mwendwa et al., 2013), alexithymia with CRP (De Berardis et al., 2008), and impulsivity with IL-6 (Isung et al., 2014). However, some findings have failed to replicate (Kojima et al., 2014) and the literature is small. These studies are far from definitive and further research is needed

with large longitudinal samples and maladaptive personality traits measured within a coherent multidimensional framework, such as the FFM.

1.4 THE PRESENT STUDY

The current study examines multiple measures of maladaptive variants of the FFM (i.e., the FFBI, FFOCI, and FFAvA), as well as measures of DSM personality disorders (the Multi-Source Assessment of Personality Pathology) (T. F. Oltmanns & Turkheimer, 2006) and normal-range FFM traits (the NEO-PI-R) (Costa & McCrae, 1992) to explore longitudinal relationships with health behaviors, health perceptions, and biomarkers of inflammation. The FFMPD measures have not yet been examined longitudinally in the prediction of health outcomes. It is therefore important to examine the connection between FFMPD measures and physical health outcomes, which are measured in the present study using subjective assessments (the HBCL and HSI) as well as biological measures of stress and inflammation (CRP and IL-6). Physical health behaviors and perceptions are also assessed via informant-reports, which will add, in addition to biological markers, a multi-method aspect to the assessment of health behaviors and perceptions. Results from the present study will improve knowledge of how personality relates to physical health and could inform clinical interventions for treating maladaptive personality styles, such as those already developed for increasing conscientiousness (Magidson, Roberts, Collado-Rodriguez, & Lejuez, 2014) and decreasing neuroticism (Barlow et al., 2011).

CHAPTER 2. METHOD

2.1 PROCEDURE

Beginning in 2007 and over the course of three and a half years, 1,630 participants were recruited from the St. Louis area using listed phone numbers purchased from a private sampling company. The Kish Method was used to determine who the target was in the household (Kish, 1949). Since baseline, there have been 12 follow-ups, with four being full-scale in-person assessments. At full-scale assessments, participants provide informed consent, complete semi-structured interviews for personality pathology and common mental disorders, a life narrative interview, and a battery of self-report questionnaires about their personality, health, and relationships. Participants are compensated $60 for the three-hour full-scale assessment. Wave 1 data for the present study were collected at the third full-scale in-person assessment (overall, the tenth follow-up assessment). Wave 2 data were collected at a fourth in-person assessment, two years after Wave 1. At Waves 1 and 2 for the present study, participants also nominated an "informant" (i.e., someone who "knows them best"), to also complete brief questionnaires about target participant's health.

2.2 PARTICIPANTS

Wave 1 was completed by $N = 1{,}060$ participants ($M_{age} = 65.9$ years, $SD = 2.9$ years), with 791 consenting to a blood draw for biomarker collection. Wave 2 was completed by $n = 937$ participants, with 828 consenting to the blood draw for biomarker collection. Participants were 55% female, 66% white, 32% black, and 2% other. Health questionnaire data were collected from $N = 849$ informants at Wave 1 and from $n = 562$ informants at Wave 2. Informants were 51% romantic partners, 26% other family

members, 21% friends, and 2% other. On average, informants had known the target participants for 38 years.

2.3 MEASURES

NEO-Personality Inventory-Revised (NEO-PI-R). The NEO-Personality Inventory-Revised (Costa & McCrae, 1992) is a widely validated 240-item self-report measure that provides an assessment of the five domains of the FFM (neuroticism, extraversion, openness, agreeableness, and conscientiousness), as well as six lower-order facets of each domain, for a total of 30 facet-level subscales. Items are answered on a Likert-scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Median coefficient alpha for the NEO-PI-R facets at Wave 1 was .73 and ranged from .58 (Excitement-Seeking) to .84 (Depression). Median coefficient alpha at Wave 2 was .72 and ranged from .61 (Excitement-Seeking) to .85 (Depression).

Multi-Source Assessment of Personality Pathology (MAPP). The Multi-Source Assessment of Personality Pathology (T. F. Oltmanns & Turkheimer, 2006) is an 80-item self-report measure of the diagnostic criteria of the ten DSM personality disorder types. Criteria are translated into lay language and participants rate themselves on each criterion from 0 *(I am never like this*) to 5 (*I am always like this*). The measure has been shown to provide a reliable estimate of the symptoms of the DSM personality disorders (T. F. Oltmanns & Turkheimer, 2006). Coefficient alphas for the MAPP scales at Wave 1 were .68 (Borderline), .65 (Obsessive-Compulsive), and .82 (Avoidant). Coefficient alphas for the MAPP scales at Wave 2 were .72 (Borderline), .68 (Obsessive-Compulsive), and .81 (Avoidant).

Five-Factor Model Personality Disorder Scales (FFMPD). Three FFMPD measures used in the current study were chosen based on personality pathology prevalence rates in the SPAN sample at baseline. Borderline, avoidant, and obsessive-compulsive personality disorders showed higher prevalence than other personality disorders. Measuring maladaptive variants of the FFM in the present study are the Five Factor Borderline Inventory (FFBI; Mullins-Sweatt et al., 2012), the Five-Factor Obsessive-Compulsive Inventory (FFOCI; Samuel et al., 2012), and the Five-Factor Avoidant Assessment (FFAvA; Lynam, Loehr, Miller, & Widiger, 2012). Additional studies on these measures have expanded support for their construct validity (e.g., Carter, Guan, Maples, Williamson, & Miller, 2016; Crego, Samuel, & Widiger, 2015; DeShong, Lengel, Sauer-Zavala, O'Meara, & Mullins-Sweatt, 2015; Haas & Miller, 2015). Abbreviated versions of these instruments were used, for which there is published validation evidence (e.g., DeShong, Mullins-Sweatt, Miller, Widiger, & Lynam, 2016; Griffin et al., 2018). These studies have documented that the abbreviated versions (with four-item scales) replicate closely the results obtained for the original versions. FFMPD items are rated on a Likert-type scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Table 1 lists the FFMPD scales arranged by their assessment of maladaptive neuroticism, extraversion, and conscientiousness. The FFBI-SF is a 48-item self-report measure assessing twelve maladaptive variant scales of FFM facets, with seven from neuroticism (Anxious Uncertainty, Dysregulated Anger, Despondence, Self-Disturbance, Behavioral Dysregulation, Affective Dysregulation, and Fragility), three from antagonism (Distrustfulness, Manipulativeness, and Oppositional), one from openness (Dissociative Tendencies), and one from low conscientiousness (Rashness). The FFOCI-

SF is a 48-item self-report measure assessing twelve maladaptive variant scales of FFM facets with six from conscientiousness (Perfectionism, Fastidiousness, Punctiliousness, Workaholism, Doggedness, and Ruminative Deliberation), two from introversion (Detached Coldness and Risk Aversion), three from low openness (Constricted, Inflexibility, and Dogmatism), and one from neuroticism (Excessive Worry). The FFAvA-SF is a 40-item measure assessing ten maladaptive variant scales of FFM facets, with four from introversion (Social Dread, Shrinking, Risk Averse, and Joylessness), four from neuroticism (Evaluation Apprehension, Despair, Mortified, and Overcome), one from low openness (Rigidity), and one from agreeableness (Timorousness).

Median coefficient alpha for the FFMPD scales at Wave 1 was .71 and ranged from .35 (FFOCI Punctiliousness) to .84 (FFBI Dysregulated Anger). Median coefficient alpha at Wave 2 was .73 and ranged from .34 (FFOCI Punctiliousness) to .86 (FFBI Dissociative Tendencies).

RAND-36 Health Status Inventory (HSI). The HSI (Hays & Morales, 2001) is a self-report measure of health functioning that includes eight subscales, five of which describe physical functioning used in the present study: Physical Functioning (e.g., how much participants were limited in activities like exercise, household chores, and walking), Role Limitations due to Physical Problems (e.g., was limited in/accomplished less due to physical health problems), Pain (e.g., "How much bodily pain have you had during the past 4 weeks?"), General Health Perceptions (e.g., "My health is excellent"), and Energy/Fatigue (e.g., "Did you feel worn out?"). The lower-order subscales can be combined to create composite general, physical, and emotional health scores. The physical health composite (PHC) is used in the present study. The measure has validation

Table 1. Maladaptive Variants of the Five-Factor Model Facets

FFM Domains and Facets	Borderline (FFBI-SF)	Obsessive-Compulsive (FFOCI-SF)	Avoidant (FFAvA-SF)
Neuroticism			
Anxiousness	Anxious Uncertainty	Excessive Worry	Evaluation Apprehension
Angry Hostility	Dysregulated Anger		
Depressiveness	Despondence		Despair
Self-Consciousness	Self-Disturbance		Mortified
Impulsiveness	Behavioral Dysregulation		
Vulnerability	Affective Dysregulation & Fragility		Overcome
Extraversion			
Warmth		Detached Coldness (-)	
Gregariousness			Social Dread (-)
Assertiveness			Shrinking (-)
Activity			
Excitement-Seeking		Risk Aversion (-)	Risk Averse (-)
Positive Emotionality			Joylessness (-)
Conscientiousness			
Competence		Perfectionism	
Order		Fastidious	
Dutifulness		Punctilious	
Achievement Striving		Workaholism	
Self-Discipline		Doggedness	
Deliberation	Rashness (-)	Ruminative Deliberation	

Note. (-) = scale assesses the opposite pole of the corresponding NEO-PI-R facet.

support for the assessment of health perceptions (Moorer, Suurmeijer, Foets, & Molenaar, 2001). Median coefficient alphas for the HSI scales at Wave 1 were .91 (Physical Functioning), .89 (Role Limitations Due to Physical Problems), .86 (Energy/Fatigue), .78 (Pain), and .82 (General Health Perceptions). Median coefficient alphas for the HSI scales at Wave 2 were .91 (Physical Functioning), .87 (Role Limitations Due to Physical Problems), .87 (Energy/Fatigue), .77 (Pain), and .81 (General Health Perceptions). Informants completed a 10-item general short version of the HSI. Coefficient alpha for the ten items on the informant-HSI was .87 at Wave 1 and .85 at Wave 2.

Health Behavior Checklist (HBCL). Health behaviors were assessed using the HBCL (Vickers et al., 1990), a 40-item questionnaire that assesses health behaviors with subscales: Wellness Maintenance (e.g., "I exercise to stay healthy"), Traffic Risk (e.g., "I speed while driving"), Accident Control (e.g., "I destroy old and unused medicines"), and Substance Risk (e.g., "I do not drink alcohol"). Items are rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The HBCL has shown longitudinal associations with physical health in large samples (Takahashi et al., 2013). Coefficient alphas for the HBCL scales at Wave 1 were .74 (Wellness Maintenance), .70 (Accident Control), .74 (Traffic Risk), and .33 (Substance Risk). Coefficient alphas for the HBCL scales at Wave 2 were .75 (Wellness Maintenance), .69 (Accident Control), .72 (Traffic Risk), and .31 (Substance Risk). Informants completed a 10-item short version of the HBCL. Coefficient alpha for the informant-HBCL was .59 at Wave 1 and .59 at Wave 2.

Insomnia Severity Index (ISI). The ISI (Bastien, Vallières, & Morin, 2001) is a 7-item questionnaire about insomnia symptoms over the past two weeks. Items are rated

from 0 (*no distress*) to 4 (*significant distress*). Difficulties with sleep onset latency, wake after sleep onset, early waking, and associated distress are assessed. The ISI has extensive validation support showing internal consistency, sensitivity, and specificity in the identification of insomnia disorder (Morin, Belleville, Belanger, & Ivers, 2011). Coefficient alpha for the ISI was .88 at Wave 1 and .89 at Wave 2.

Biomarkers. At both waves of the present study, morning fasting blood samples (30ml) were collected during a phlebotomy session by research assistants trained in phlebotomy in EDTA tubes (Purple Top) from consenting participants between 7:30am-10:00am via peripheral (primarily antecubital) venipuncture in an independent session closely following the in-person assessments. Samples were processed according to standard operating procedures before being stored at -80º C (Tuck et al., 2009).

Samples were assayed for cytokines at Washington University in St. Louis. IL-6 and CRP were assayed in duplicate using commercially available enzyme-linked immunosorbent assays (IL-6: Quantikine HS Human IL-6 ELISA, R&D Systems, Minneapolis, MN, USA; CRP: EIA-3954 High Sensitivity C-Reactive Protein ELISA DRG International Inc., USA). Intra- (IL-6: 5%, CRP: 4%) and inter- (IL-6: 14%, CRP: 13%) assay coefficients of variation were acceptable. Samples producing unreliable measures (i.e., intra-assay CVs >20%) of IL-6 (n=38; 4.8%) or CRP (n=22; 2.8%), even after being re-assayed in duplicate were excluded leaving 753 and 769 measured data points for IL-6 and CRP, respectively, at Wave 1 and 669 and 667 measured data points for IL-6 and CRP, respectively, at Wave 2.

Covariates. At the phlebotomy sessions, several covariates were assessed. Weight and height (to calculate body-mass index) and mean arterial pressure were measured in

person. Average total sleep, caffeine use, and medications used (prescription, over the counter, and supplements) were provided by participants on a questionnaire. Medications were put into the following classes: statins, beta blockers, calcium blockers, ACE inhibitors, benzodiazepines, hormonal medicines, aspirin, prescription pain medications, NSAIDs, steroids, or anti-depressants (e.g., TCA, SSRI, or SNRI).

2.4 STATISTICAL ANALYSES

A data-driven analytic plan was developed using correlation and regression to examine the associations between FFMPD facets and the indicators of health behaviors, health perceptions, and inflammation biomarkers. The incremental validity of FFMPD facets over DSM and FFM personality scales was also tested. The plan was preregistered (link: http://osf.io/8ystq) and is described in sequence in the Results section.

The expectation maximization (EM) procedure was used to impute missing data for all personality and outcome measures with no more than 20% data missing. EM has been shown to create estimates of population parameters that are more accurate than substitution of mean values (Enders, 2006). Exceptions for which scoring was not appropriate for EM procedure were the self-report HSI (because scoring is based on *t*-scores) and self-report ISI (because questions implied “no symptoms” if they were left blank). For the self-report HSI, scores were scaled if no more than 2 responses were missing. For the self-report ISI, total scores were used.

To minimize the influence of extreme outliers and non-normality in values of the biomarkers, biomarker variables were log transformed and outlier values were winsorized to 3 standard deviations before analysis. Biomarkers were correlated with all covariates before regression analysis. Significant covariates were included as controls in initial steps

of the hierarchical regression analyses. Boxplots of personality variables did not indicate problems with significant outliers. Analyses with non-normally distributed self-report variables were completed both with and without log transformations of the non-normal variables. Results were nearly identical, with no differences in standardized estimates of more than .02. Results using non-transformed variables are presented here for ease of interpretability.

Additional exploratory analyses were conducted including age, gender, and race as control variables. In the biomarker analyses, medications and other biological variables that were significantly correlated with the outcomes were also included as control variables. For the CRP analyses, Wave 1 BMI, beta blockers, calcium, steroid, anti-depressant, mean arterial pressure, sleep, and Wave 2 BMI, sleep, calcium, ACE ARBs, prescription pain medications, steroid, TCA, and beta blockers were included as controls. For the IL-6 analyses, Wave 1 BMI, beta blockers, calcium, statins, ACE ARBs, prescription pain, antidepressant, mean arterial pressure, sleep, lifetime smoking, current smoking, and Wave 2 BMI, sleep, calcium, ACE ARBs, prescription pain, steroid, and beta blockers were included as controls.

CHAPTER 3. RESULTS

Statistical analyses were preregistered (link: http://osf.io/8ystq) and analyses were carried out according to the preregistration. Descriptive statistics of study variables are provided in Tables 2-5 and correlations of the FFMPD scales with the self-report health variables are provided in Tables 6-8, and with the biomarkers in Table 9. Correlations significant at $p < .001$ between 1) the NEO facets and the physical health indicators, 2) the DSM personality disorder scales and the physical health indicators, and 3) the FFMPD scales and the physical health indicators were carried forward into multiple regression models predicting each physical health indicator separately. These models consisted of 1) NEO facets of borderline personality disorder predicting the physical health indicators, 2) NEO facets of obsessive-compulsive personality disorder predicting the physical health indicators, 3) NEO facets of avoidant personality disorder predicting the physical health indicators, 4) FFBI facets predicting the physical health indicators, 5) FFOCI facets predicting the physical health indicators, and 6) FFAvA facets predicting the physical health indicators. Facets significant in those regression models were then carried forward to hierarchical regressions. Hierarchical regressions were completed including the significant NEO facets in the first step, the corresponding DSM scale in the second step (if it was significantly correlated with the outcome), and the significant FFMPD facets in the last step. Results from the FFOCI and FFAvA models are presented in Tables 10 and 11, respectively. The FFBI facets did not predict the physical health indicators at $p < .001$ in the last step of their respective models, with the exception of FFBI Despondence, which predicted HSI Energy/Fatigue over and above other significant NEO facets and DSM borderline personality disorder, $\beta = -.22$, $p < .001$.

Table 2. Descriptive Statistics for Waves 1 and 2 BPD Variables

	Wave 1				Wave 2			
	Mean	*SD*	Skew	Kurtosis	Mean	*SD*	Skew	Kurtosis
FB								
ANX	7.78	3.51	0.88	0.08	7.73	3.73	0.93	0.00
FB_DA	6.40	3.30	1.65	2.28	6.27	3.16	1.64	2.24
FB_DP	6.02	2.88	1.91	3.53	6.04	3.09	1.92	3.50
FB_SD	6.07	2.78	1.66	2.64	6.20	2.93	1.52	1.96
FB_BD	6.07	2.81	1.64	2.66	6.11	2.75	1.40	1.42
FB_AD	6.13	2.99	1.79	3.34	5.95	2.86	1.87	3.62
FB_F	4.96	1.88	3.18	13.78	4.95	1.81	2.70	9.17
FB_DT	4.77	1.95	3.48	14.67	4.84	2.18	3.29	11.73
FB_D	6.95	3.15	1.14	0.86	6.95	3.40	1.16	0.63
FB_M	5.61	2.47	1.90	3.77	5.50	2.35	1.99	4.31
FB_O	5.80	2.27	1.61	2.88	5.66	2.18	1.77	3.89
FB_R	6.46	2.97	1.50	2.23	6.30	3.01	1.40	1.32
MAPP								
BDL	4.13	3.51	1.78	7.00	12.67	3.47	1.46	2.66
NEON1	13.16	4.88	0.33	0.16	13.33	5.22	0.21	-0.06
NEON2	11.07	4.54	0.54	0.93	10.97	4.45	0.47	0.59
NEON3	10.77	5.49	0.73	0.81	10.84	5.69	0.82	0.71
NEON4	13.11	4.48	0.52	0.57	13.12	4.57	0.49	0.43
NEON5	14.95	4.25	0.10	-0.19	15.15	4.14	0.04	0.06
NEON6	9.14	4.01	0.82	1.98	9.21	4.10	0.55	1.03
NEOO1	16.98	4.57	0.26	-0.26	17.04	4.59	0.21	-0.17
NEOA1	21.46	4.22	-0.42	0.84	21.32	4.52	-0.56	0.60
NEOA2	22.47	3.90	-0.13	-0.11	22.59	3.97	-0.34	0.56
NEOA4	19.38	3.93	-0.17	0.56	19.52	3.98	-0.22	0.21
NEOC6	19.12	3.86	-0.24	0.16	19.88	3.70	-0.15	0.05

Note. W1 *N*s = 1052-1601; W2 *N*s 882-895. FB = FFBI, ANX = Anxious Uncertainty, DA = Dysregulated Anger, DP = Despondence, SD = Self-Disturbance, BD = Behavioral Dysregulation, AD = Affective Dysregulation, F = Fragility, D = Distrustfulness, M = Manipulativeness, O = Oppositional, DT = Dissociative Tendencies, R = Rashness, MAPP = Multi-Source Assessment of Personality Pathology, BDL = Borderline, NEO = NEO-Personality Inventory-Revised, N1 = Anxiety, N2 = Angry Hostility, N3 = Depression, N4 = Self-Consciousness, N5 = Impulsiveness, N6 = Vulnerability, O1 = Fantasy, A1 = Trust, A2 = Straightforwardness, A4 = Compliance, C6 = Deliberation.

Table 3. Descriptive Statistics for Waves 1 and 2 OCPD Variables

	Wave 1				Wave 2			
	Mean	*SD*	Skew	Kurtosis	Mean	*SD*	Skew	Kurtosis
FO_EW	10.38	4.07	0.27	-0.83	10.33	4.26	0.28	-0.92
FO_DC	7.94	3.19	0.70	-0.18	7.88	3.11	0.75	0.05
FO_RA	13.66	3.10	-0.22	-0.43	13.62	3.10	-0.21	-0.52
FO_C	10.34	3.15	0.13	-0.39	10.21	3.14	0.09	-0.66
FO_I	11.14	3.08	0.02	-0.45	10.79	3.03	0.00	-0.47
FO_DM	11.27	3.59	0.18	-0.42	11.38	3.65	0.17	-0.49
FO_P	15.33	2.54	-0.37	-0.24	15.42	2.60	-0.56	0.39
FO_F	12.71	2.93	0.03	-0.42	12.85	3.05	0.05	-0.39
FO_PC	15.15	2.25	-0.35	0.35	15.20	2.20	-0.23	0.11
FO_W	12.50	2.96	0.00	-0.33	12.53	3.00	-0.08	-0.44
FO_DS	13.40	3.13	-0.26	-0.31	13.41	3.14	-0.29	-0.22
FO_RD	13.84	2.93	-0.24	-0.19	13.74	2.88	-0.17	-0.37
MAPP OBC	9.51	4.35	0.46	0.31	17.27	4.28	0.35	-0.12
NEON1	13.16	4.88	0.33	0.16	13.33	5.22	0.21	-0.06
NEOE1	23.04	4.15	-0.40	0.43	23.07	4.23	-0.31	0.13
NEOE5	14.68	4.35	-0.09	-0.07	14.48	4.45	-0.11	-0.27
NEOO3	20.17	3.76	0.09	-0.04	20.08	3.76	0.08	-0.12
NEOO4	15.80	3.93	-0.03	-0.23	15.52	3.98	0.10	-0.11
NEOO6	21.32	4.25	-0.27	0.10	21.24	4.15	-0.26	0.12
NEOC1	23.45	3.57	-0.46	1.15	23.58	3.48	-0.33	0.67
NEOC2	17.97	4.28	-0.23	0.23	17.93	4.26	-0.14	0.21
NEOC3	23.95	3.66	-0.31	0.29	23.81	3.56	-0.35	0.21
NEOC4	18.79	4.20	-0.05	0.02	18.68	4.24	-0.07	0.05
NEOC5	20.86	4.66	-0.59	0.60	20.69	4.71	-0.59	0.60
NEOC6	19.12	3.86	-0.24	0.16	19.88	3.70	-0.15	0.05

Note. W1 *N*s = 1049-1601; W2 *N*s 880-895. FO = FFOCI, EW = Excessive Worry, DC = Detached Coldness, RA = Risk Aversion, C = Constricted, I = Inflexibility, DM = Dogmatism, P = Perfectionism, F = Fastidiousness, PC = Punctiliousness, W = Workaholism, DS = Doggedness, RD = Ruminative Deliberation, MAPP = Multi-Source Assessment of Personality Pathology, OBC = Obsessive-Compulsive, NEO = NEO-Personality Inventory-Revised, N1 = Anxiety, E1 = Warmth, E5 = Excitement-Seeking, O3 = Feelings, O4 = Actions, O6 = Values, C1 = Competence, C2 = Order, C3 = Dutifulness, C4 = Achievement-Striving, C5 = Self-Discipline, C6 = Deliberation.

Table 4. Descriptive Statistics for Waves 1 and 2 AVPD Variables

	Wave 1				Wave 2			
Scales	Mean	*SD*	Skew	Kurtosis	Mean	*SD*	Skew	Kurtosis
FAVA_EA	6.83	2.92	1.15	1.09	6.70	3.10	1.38	1.52
FAVA_D	7.03	3.10	1.26	1.43	7.03	3.23	1.19	0.92
FAVA_M	6.80	3.08	1.51	2.59	6.52	2.95	1.58	2.60
FAVA_O	8.03	2.90	0.73	0.45	7.85	2.81	0.64	0.10
FAVA_SD	9.63	3.60	0.43	-0.45	9.91	3.61	0.43	-0.53
FAVA_S	9.86	3.16	0.39	-0.16	9.91	3.27	0.33	-0.24
FAVA_RA	14.62	3.49	-0.38	-0.57	14.76	3.51	-0.51	-0.36
FAVA_J	8.27	3.17	0.70	0.12	8.35	3.26	0.68	0.04
FAVA_R	11.10	2.57	0.29	-0.06	11.20	2.59	0.25	-0.28
FAVA_T	15.90	2.77	-0.47	-0.24	16.27	2.75	-0.59	-0.13
MAPP AVD	4.56	4.00	1.46	3.13	11.42	3.86	1.25	1.68
NEON1	13.16	4.88	0.33	0.16	13.33	5.22	0.21	-0.06
NEON3	10.77	5.49	0.73	0.81	10.84	5.69	0.82	0.71
NEON4	13.11	4.48	0.52	0.57	13.12	4.57	0.49	0.43
NEON6	9.14	4.01	0.82	1.98	9.21	4.10	0.55	1.03
NEOE2	16.40	5.05	-0.30	-0.11	16.18	5.07	-0.24	-0.13
NEOE3	16.66	4.56	-0.15	-0.10	16.23	4.71	-0.10	0.01
NEOE5	14.68	4.35	-0.09	-0.07	14.48	4.45	-0.11	-0.27
NEOE6	20.05	4.88	-0.36	0.40	19.99	5.04	-0.35	-0.02
NEOO4	15.80	3.93	-0.03	-0.23	15.52	3.98	0.10	-0.11
NEOA5	20.03	4.15	-0.19	0.22	20.23	4.08	-0.28	0.28

Note. W1 *N*s = 1049-1601; W2 *N*s 882-895. FAVA = FFAvA, EA = Evaluation Apprehension, D = Despair, M = Mortified, O = Overcome, SD = Social Dread, S = Shrinking, Risk, RA = Risk Averse, J = Joylessness, R = Rigidity, T = Timorousness, MAPP = Multi-Source Assessment of Personality Pathology, AVD = Avoidant, NEO = NEO-Personality Inventory-Revised, N1 = Anxiety, N3 = Depression, N4 = Self-Consciousness, N6 = Vulnerability, E2 = Gregariousness, E3 = Assertiveness, E5 = Excitement-Seeking, E6 = Positive Emotions, O4 = Actions, A5 = Modesty.

Table 5. Descriptive Statistics for Waves 1 and 2 Physical Health Indicator Variables

	Wave 1				Wave 2			
Scale	Mean	*SD*	Skew	Kurtosis	Mean	*SD*	Skew	Kurtosis
ISI	5.87	4.91	1.11	1.11	6.09	5.02	1.03	0.90
WELLNESS	36.57	6.06	-0.45	0.41	36.42	6.16	-0.51	0.78
ACCIDENT	20.75	3.93	-0.31	0.44	20.66	3.86	-0.26	0.38
TRAFFIC	26.33	4.34	-0.15	-0.27	26.59	4.20	-0.26	-0.07
SUBSTANCE	11.50	2.32	-0.49	0.47	11.61	2.21	-0.50	0.51
HBCL GHP	60.69	8.05	-0.44	0.10	60.58	8.24	-0.48	0.44
HSI PF	464.68	94.90	-0.99	-0.06	459.84	94.97	-0.95	-0.13
HSI RLP	243.83	65.68	-1.11	-0.40	238.04	67.17	-0.94	-0.72
HSI PA	110.58	38.90	-0.68	-0.29	109.35	38.05	-0.54	-0.53
HSI GHP	303.72	79.43	-0.45	-0.46	317.12	82.58	-0.82	0.03
HSI EF	191.90	76.68	-0.18	-0.70	191.70	77.47	-0.15	-0.76
HSI PHC	59.57	9.81	-0.90	-0.03	54.45	5.89	-0.35	-0.33
I-HBCL	38.11	5.04	-0.30	0.07	38.47	5.02	-0.30	-0.29
I-HSI	2.10	0.69	1.33	1.74	2.06	0.65	1.35	1.73
IL-6	2.65	5.72	11.91	161.29	3.44	9.67	15.31	295.12
CRP	5.83	12.02	6.37	51.63	3.74	6.63	5.24	37.33

*Note. N*s for W1 self-report questionnaires 1039-1053, W1 biomarkers 650-769, and W1 informant-reports 741-845. *N*s for W2 self-report questionnaires 633-906, W2 biomarkers 666-669, and W2 informant-reports 433-562. ISI = Insomnia Severity Index, HBCL = Health Behavior Checklist, HSI = Health Status Inventory, GHP = General Health Perceptions, PF = Physical Functioning, RLP = Role Limitations due to Physical Problems, PA = Pain, EF = Energy/Fatigue, PHC = Physical Health Composite, I = informant.

Table 6. Correlations Among Wave 1 FFBI and Wave 2 Self- and Informant-Report Physical Health Indicators

Scale	W2 ISI	W2 IHB	W2 IHSI	W2 PF	W2 RLP	W2 PA	W2 HSI G	W2 EF	W2 PHC	W2 WEL	W2 ACC	W2 TRF	W2 SUB	W2 HB G
W1 FB_ANX	**.31**	.03	**.22**	**-.19**	**-.18**	**-.17**	**-.28**	**-.34**	**-.22**	-.08	**-.12**	.05	.01	-.11
W1 FB_DA	**.24**	-.07	**.22**	**-.15**	**-.16**	**-.15**	**-.22**	**-.24**	**-.17**	-.07	**-.12**	-.07	-.09	**-.12**
W1 FB_DP	**.31**	-.07	**.25**	**-.23**	**-.19**	**-.21**	**-.34**	**-.40**	**-.27**	**-.19**	**-.18**	-.02	-.06	**-.23**
W1 FB_SD	**.32**	-.12	**.25**	**-.26**	**-.19**	**-.22**	**-.30**	**-.39**	**-.24**	**-.19**	**-.18**	-.04	-.06	**-.24**
W1 FB_BD	**.25**	-.16	**.16**	**-.18**	**-.14**	**-.15**	**-.25**	**-.27**	**-.20**	**-.16**	**-.15**	**-.15**	-.10	**-.21**
W1 FB_AD	**.33**	-.09	**.24**	**-.26**	**-.22**	**-.23**	**-.34**	**-.37**	**-.29**	**-.13**	**-.17**	-.06	-.10	**-.19**
W1 FB_F	**.27**	-.10	**.26**	**-.22**	**-.17**	**-.17**	**-.27**	**-.29**	**-.23**	**-.15**	**-.12**	.00	**-.12**	**-.22**
W1 FB_DT	**.22**	**-.16**	**.19**	**-.20**	**-.13**	**-.15**	**-.20**	**-.23**	**-.18**	**-.13**	**-.12**	-.04	**-.15**	**-.18**
W1 FB_D	**.30**	-.07	**.17**	**-.23**	**-.15**	**-.19**	**-.27**	**-.33**	**-.27**	**-.19**	**-.13**	-.01	-.04	**-.23**
W1 FB_M	.10	**-.17**	.01	-.04	-.03	-.02	-.11	-.08	-.07	**-.12**	-.09	**-.19**	-.08	**-.14**
W1 FB_O	**.19**	-.10	.12	**-.14**	-.10	-.11	**-.20**	**-.22**	**-.17**	**-.12**	-.11	-.09	-.05	**-.17**
W1 FB_R	**.23**	-.10	**.18**	**-.15**	**-.14**	**-.16**	**-.24**	**-.23**	**-.21**	**-.16**	**-.18**	**-.16**	-.09	**-.21**

Note. Bold = $p < .001$. W1 = Wave 1, W2 = Wave 2, FB = FFBI, ANX = Anxious Uncertainty, DA = Dysregulated Anger, DP = Despondence, SD = Self-Disturbance, BD = Behavioral Dysregulation, AD = Affective Dysregulation, F = Fragility, D = Distrustfulness, M = Manipulativeness, O = Oppositional, DT = Dissociative Tendencies, R = Rashness, ISI = Insomnia Severity Index, HB = Health Behavior Checklist, HSI = Health Status Inventory, GHP = General Health Perceptions, PF = Physical Functioning, RLP = Role Limitations due to Physical Problems, PA = Pain, EF = Energy/Fatigue, PHC = Physical Health Composite, I = informant, WEL = HBCL Wellness, ACC = HBCL Accident, TRF = HBCL Traffic Risk, SUB = HBCL Substance Risk, G = General Health Perceptions.

Table 7. Correlations Among Wave 1 FFOCI Scales and Wave 2 Self- and Informant-Report Physical Health Indicators

Scale	W2 ISI	W2 IHB	W2 IHSI	W2 PF	W2 RLP	W2 PA	W2 HSI G	W2 EF	W2 PHC	W2 WEL	W2 ACC	W2 TRF	W2 SUB	W2 HB G
W1 FO_EW	**.32**	.04	.14	**-.16**	**-.15**	**-.14**	**-.24**	**-.32**	**-.20**	-.07	**-.12**	.09	-.01	-.08
W1 FO_DC	**.14**	-.10	.12	**-.13**	-.06	-.11	**-.24**	**-.21**	**-.23**	**-.24**	**-.24**	-.08	.03	**-.26**
W1 FO_RA	.09	.07	.04	**-.21**	-.09	-.04	-.12	**-.14**	**-.14**	**-.13**	-.01	**.30**	**.12**	**-.14**
W1 FO_C	-.01	-.09	-.06	-.08	.01	.00	-.13	-.06	-.10	**-.22**	**-.12**	-.06	.04	**-.23**
W1 FO_I	.05	.06	.04	**-.14**	-.01	-.02	**-.16**	**-.14**	**-.17**	**-.20**	**-.13**	.10	.08	**-.21**
W1 FO_DM	.00	.06	.02	**-.14**	-.03	-.04	-.07	-.04	-.12	-.09	**.15**	.09	.07	**-.12**
W1 FO_P	-.04	.03	-.03	.04	.02	-.03	.10	.08	.08	.07	**.18**	.09	.09	.10
W1 FO_F	-.01	.02	-.03	.03	.05	.01	.06	.10	.07	.11	**.16**	.08	.04	.11
W1 FO_PC	-.04	.12	-.06	.00	.02	.02	.09	.07	.07	.10	**.21**	**.17**	.10	.11
W1 FO_W	-.06	.06	**-.15**	.03	.05	.02	.09	.12	.08	.06	**.18**	.00	.04	.05
W1 FO_DS	-.04	.11	-.12	.10	.08	.05	.13	**.17**	.10	**.13**	**.20**	.07	.06	**.14**
W1 FO_RD	-.05	.10	-.05	.01	.06	.07	.07	.07	.04	.09	**.19**	**.25**	.10	.10

Note. Bold = $p < .001$. W1 = Wave 1, W2 = Wave 2, FO = FFOCI, EW = Excessive Worry, DC = Detached Coldness, RA = Risk Aversion, C = Constricted, I = Inflexibility, DM = Dogmatism, P = Perfectionism, F = Fastidiousness, PC = Punctiliousness, W = Workaholism, DS = Doggedness, RD = Ruminative Deliberation, ISI = Insomnia Severity Index, HB = Health Behavior Checklist, HSI = Health Status Inventory, PF = Physical Functioning, RLP = Role Limitations due to Physical Problems, PA = Pain, EF = Energy/Fatigue, PHC = Physical Health Composite, I = informant, WEL = HBCL Wellness, ACC = HBCL Accident, TRF = HBCL Traffic Risk, SUB = HBCL Substance Risk, G = General Health Perceptions.

Table 8. Correlations Among Wave 1 FFAvA Scales and Wave 2 Self- and Informant-Report Physical Health Indicators

Scale	W2 ISI	W2 IHB	W2 IHSI	W2 PF	W2 RLP	W2 PA	W2 HSI G	W2 EF	W2 PHC	W2 WEL	W2 ACC	W2 TRF	W2 SUB	W2 HB G
W1 FAVA_EA	**.24**	.01	.09	**-.21**	-.11	**-.18**	**-.26**	**-.31**	**-.26**	**-.16**	**-.15**	-.01	-.04	**-.19**
W1 FAVA_D	**.36**	-.09	**.23**	**-.31**	**-.19**	**-.27**	**-.38**	**-.44**	**-.35**	**-.25**	**-.20**	.00	-.05	**-.30**
W1 FAVA_M	**.20**	.01	.09	**-.23**	-.10	**-.15**	**-.25**	**-.28**	**-.24**	**-.20**	**-.17**	-.01	-.02	**-.22**
W1 FAVA_O	**.24**	-.06	**.22**	**-.23**	-.11	**-.16**	**-.27**	**-.24**	**-.25**	**-.13**	**-.20**	.03	-.03	**-.17**
W1 FAVA_SD	**.14**	.03	.07	-.10	-.07	-.09	**-.20**	**-.25**	**-.17**	**-.21**	**-.24**	.00	.07	**-.22**
W1 FAVA_S	**.13**	.02	.10	**-.15**	-.09	-.06	**-.18**	**-.20**	**-.14**	**-.20**	**-.20**	.06	.02	**-.20**
W1 FAVA_RA	.06	**.19**	.04	**-.17**	-.08	-.02	**-.15**	-.12	-.11	-.09	-.06	**.40**	**.12**	-.07
W1 FAVA_J	**.27**	-.10	**.33**	**-.28**	**-.18**	**-.19**	**-.39**	**-.41**	**-.32**	**-.26**	**-.22**	.02	.00	**-.31**
W1 FAVA_R	.05	.09	.02	-.11	-.03	.03	**-.16**	-.12	-.12	**-.14**	**-.13**	.09	.10	**-.13**
W1 FAVA_T	-.01	.08	.00	.05	-.02	.05	.08	-.06	.11	.06	.01	.10	.06	.08

Note. Bold = $p < .001$. W1 = Wave 1, W2 = Wave 2, FA = FFAvA, EA = Evaluation Apprehension, D = Despair, M = Mortified, O = Overcome, SD = Social Dread, S = Shrinking, Risk, RA = Risk Averse, J = Joylessness, R = Rigidity, T = Timorousness, ISI = Insomnia Severity Index, HB = Health Behavior Checklist, HSI = Health Status Inventory, PF = Physical Functioning, RLP = Role Limitations due to Physical Problems, PA = Pain, EF = Energy/Fatigue, PHC = Physical Health Composite, I = informant, WEL = HBCL Wellness, ACC = HBCL Accident, TRF = HBCL Traffic Risk, SUB = HBCL Substance Risk, G = General Health Perceptions.

Table 9. Correlations Among Wave 1 FFMPD Scales and Wave 2 Biomarkers

FFBI Scale	W2 CRP	W2 IL-6	FFOCI Scale	W2 CRP	W2 IL-6	FAVA Scale	W2 CRP	W2 IL-6
W1 FB_ANX	.01	.07	W1 FO_EW	.02	.01	W1 FAVA_EA	-.03	-.03
W1 FB_DA	.00	.05	W1 FO_DC	-.01	-.01	W1 FAVA_D	.00	.05
W1 FB_DP	.01	.06	W1 FO_RA	.09	.06	W1 FAVA_M	.00	-.01
W1 FB_SD	.03	.11	W1 FO_C	-.03	-.01	W1 FAVA_O	-.01	.03
W1 FB_BD	.01	.08	W1 FO_I	.01	.03	W1 FAVA_SD	-.03	-.02
W1 FB_AD	.03	.08	W1 FO_DM	.11	.04	W1 FAVA_S	.01	.02
W1 FB_F	.04	.12	W1 FO_P	.02	-.04	W1 FAVA_RA	.09	.04
W1 FB_DT	.01	.13	W1 FO_F	.03	-.06	W1 FAVA_J	.01	.08
W1 FB_D	.04	.06	W1 FO_PC	.09	.02	W1 FAVA_R	-.03	-.03
W1 FB_M	-.02	.06	W1 FO_W	.06	.03	W1 FAVA_T	-.03	-.03
W1 FB_O	-.04	.02	W1 FO_DS	.06	.01			
W1 FB_R	-.04	.06	W1 FO_RD	.08	.06			

Note. W1 = Wave 1, W2 = Wave 2, FB = FFBI, ANX = Anxious Uncertainty, DA = Dysregulated Anger, DP = Despondence, SD = Self-Disturbance, BD = Behavioral Dysregulation, AD = Affective Dysregulation, F = Fragility, D = Distrustfulness, M = Manipulativeness, O = Oppositional, DT = Dissociative Tendencies, R = Rashness, FO = FFOCI, EW = Excessive Worry, DC = Detached Coldness, RA = Risk Aversion, C = Constricted, I = Inflexibility, DM = Dogmatism, P = Perfectionism, F = Fastidiousness, PC = Punctiliousness, W = Workaholism, DS = Doggedness, RD = Ruminative Deliberation, FA = FFAvA, EA = Evaluation Apprehension, D = Despair, M = Mortified, O = Overcome, SD = Social Dread, S = Shrinking, Risk, RA = Risk Averse, J = Joylessness, R = Rigidity, T = Timorousness, ISI = Insomnia Severity Index, HB = Health Behavior Checklist, HSI = Health Status Inventory, PF = Physical Functioning, RLP = Role Limitations due to Physical Problems, PA = Pain, EF = Energy/Fatigue, PHC = Physical Health Composite, I = informant, WEL = HBCL Wellness, ACC = HBCL Accident, TRF = HBCL Traffic Risk, SUB = HBCL Substance Risk, G = General Health Perceptions. Correlations greater than or equal to .10 significant at $p < .01$.

Table 10. Five-Factor Obsessive-Compulsive Inventory Scales' Incremental Validity over NEO and MAPP Predicting Physical Indicators

Wave 2 Outcome	Last step Adj R^2	Last step Δ R^2	Wave 1 Predictor	*b*	95% CI lower	95% CI upper	β
ISI	.12	.01	NEO N1	0.19	0.10	0.28	.19
			FFOCI EW	0.20	0.09	0.31	.17
I-HSI	.02	.02	FFOCI W	-0.03	-0.05	-0.01	-.15
WELLNESS	.02	.02	FFOCI DS	0.26	0.12	0.39	.13
ACCIDENT	.14	.03	NEO E1	0.20	0.12	0.29	.22
			NEO C6	0.16	0.09	0.23	.16
			FFOCI DM	0.18	0.11	0.25	.16
TRAFFIC	.14	.05	NEO C6	0.20	0.11	0.29	.18
			FFOCI RA	0.32	0.22	0.42	.23
HBC GHP	.15	.04	NEO C3	0.66	0.50	0.82	.29
			FFOCI DC	-0.53	-0.70	-0.37	-.21
HSI PA	.02	.02	FFOCI EW	-1.32	-1.97	-0.66	-.14
HSI GHP	.15	.03	NEO N1	-5.11	-6.87	-3.35	-.32
			FFOCI DC	-4.43	-6.36	-2.50	-.18
HSI PHC	.15	.02	NEO N1	-0.32	-0.43	-0.20	-.27
			NEO O6	0.23	0.13	0.32	.17
			FFOCI DC	-0.26	-0.39	-0.13	-.15

Note. All last steps and predictors significant at $p < .001$. ISI = insomnia severity index, I = informant, HSI = health status inventory, HBC = health behavior checklist, GHP = general health perceptions, PA = pain, PHC = physical health composite, N1 = Anxiety, E1 = Warmth, O6 = Values, C3 = Dutifulness, C6 = Deliberation, EW = Excessive Worry, W = Workaholism, DS = Doggedness, DM = Dogmatism, DC = Detached Coldness.

Table 11. Five-Factor Avoidant Inventory Scales' Incremental Validity over NEO and MAPP Predicting Physical Health Indicators

Wave 2 Outcome	Last step Adj R^2	Last step ΔR^2	Wave 1 Predictor	*b*	95% CI lower	95% CI upper	β
ISI	.15	.02	NEO N3	0.19	0.11	0.27	.21
			FAVA D	0.33	0.19	0.47	.21
I-HBC	.03	.04	FAVA RA	0.27	0.14	0.40	.19
I-HSI	.11	.11	FAVA J	0.06	0.05	0.08	.33
ACCIDENT	.09	.02	NEO N6	-0.21	-0.28	-0.14	-.22
			FAVA SD	-0.18	-0.26	-0.10	-.17
TRAFFIC	.15	.13	FAVA RA	0.49	0.40	0.57	.41
HBC GHP	.11	.05	FAVA J	-0.49	-0.70	-0.28	-.19
HSI PF	.09	.06	FAVA D	-8.30	-10.67	-5.94	-.28
HSI PA	.07	.07	FAVA D	-3.28	-4.14	-2.42	-.27
HSI GHP	.18	.06	FAVA D	-5.46	-8.10	-2.82	-.20
			FAVA J	-5.36	-8.24	-2.49	-.21
HSI EF	.25	.06	NEO N3	-2.59	-3.89	-1.29	-.19
			FAVA D	-4.58	-6.93	-2.22	-.18
			FAVA J	-4.64	-6.59	-2.69	-.19
HSI PHC	.14	.10	FAVA D	-0.45	-0.62	-0.28	-.23
			FAVA J	-0.32	-0.48	-0.17	-.18

Note. All last steps and predictors significant at $p < .001$. ISI = insomnia severity index, I = informant, HBC = health behavior checklist, HSI = health status inventory, GHP = general health perceptions, PF = physical functioning, PA = pain, EF = energy/fatigue, PHC = physical health composite, N3 = Depression, N6 = Vulnerability, D = Despair, RA = Risk Averse, J = Joylessness, SD = Social Dread.

To further examine these results, the physical health indicator variables at Wave 1 were added to the models in a new first step. In these models, only FFAvA Joylessness, FFAvA Risk Aversion, and FFAvA Despair remained significant individual predictors in the last steps of their respective models (predicting informant-rated health status inventory; β = .13, Traffic Risk; β = .12, and HSI Pain; β = -.12, respectively).

The previously described preregistered regression models included several facets in each step. The large number of predictors likely reduced the power of the analyses (J. Cohen, Cohen, West, & Aiken, 2003). Further, there was multicollinearity among the predictors (e.g., the FFBI scales' median intercorrelation was r = .51), which can affect the estimates of individual predictors in the models. In some preregistered analyses, single FFMPD scales were tested against multiple NEO scales, and most models included NEO and FFMPD facets that assess different specific components of personality. To avoid these issues and test incremental validity of the FFMPD scales in a more straightforward way, exploratory regression analyses were completed examining the predictive validity of the FFMPD facets one by one. These analyses also included covariates: the physical health indicators at Wave 1 and demographic variables that were significantly correlated with the Wave 2 physical health indicators (e.g., age, gender, race). Controlling for the physical health indicator variables at Wave 1 represents a tough test of the personality variables, as significant results would now indicate that the personality variables predict change in the physical health indicator variables across time. The significant predictors in these models are presented in Tables 12 (FFBI) and 13 (FFAvA). None of the FFOCI facets were significantly predictive of change in the physical health indicators in these models.

Table 12. Five-Factor Borderline Scales Predicting Physical Health Indicators Over Covariates

Wave 2 Outcome	Wave 1 Predictor Scale	*b*	95% lower	95% upper	β
ISI	FFBI Anxious Uncertainty	0.16	0.09	0.24	.11
	FFBI Dysregulated Anger	0.14	0.06	0.22	.09
	FFBI Despondence	0.19	0.10	0.29	.11
	FFBI Self-Disturbance	0.20	0.10	0.30	.11
	FFBI Behavioral Dysregulation	0.19	0.09	0.28	.10
	FFBI Dissociative Tendencies	0.30	0.16	0.45	.11
	FFBI Distrustfulness	0.20	0.11	0.28	.12
	FFBI Rashness	0.20	0.11	0.29	.12
WELLNESS	FFBI Despondence	-0.24	-0.35	-0.13	-.11
	FFBI Self-Disturbance	-0.23	-0.35	-0.12	-.10
	FFBI Fragility	-0.40	-0.58	-0.22	-.11
	FFBI Distrustfulness	-0.17	-0.28	-0.07	-.09
	FFBI Rashness	-0.19	-0.30	-0.08	-.09
HBC GHP	FFBI Despondence	-0.32	-0.46	-0.19	-.11
	FFBI Self-Disturbance	-0.33	-0.47	-0.19	-.11
	FFBI Behavioral Dysregulation	-0.29	-0.43	-0.15	-.09
	FFBI Fragility	-0.57	-0.79	-0.35	-.12
	FFBI Dissociative Tendencies	-0.45	-0.66	-0.23	-.09
	FFBI Distrustfulness	-0.24	-0.36	-0.11	-.09
	FFBI Rashness	-0.29	-0.42	-0.15	-.10
HSI PF	FFBI Self-Disturbance	-3.13	-4.72	-1.54	-.09
HSI PA	FFBI Despondence	-1.72	-2.55	-0.89	-.13
HSI GHP	FFBI Despondence	-2.66	-4.16	-1.15	-.09
HSI EF	FFBI Despondence	-2.74	-4.28	-1.20	-.10
	FFBI Self-Disturbance	-3.22	-4.81	-1.62	-.11
	FFBI Behavioral Dysregulation	-2.65	-4.17	-1.14	-.09
	FFBI Distrustfulness	-2.44	-3.80	-1.08	-.10
PHC	FFBI Despondence	-0.24	-0.36	-0.12	-.12
	FFBI Distrustfulness	-0.20	-0.31	-0.09	-.10
	FFBI Rashness	-0.21	-0.32	-0.09	-.10

Note. All significant at $p < .001$. ISI = Insomnia Severity Index, I-HSI = informant-reported heath status inventory, HBC = health behavior checklist, GHP = general health perceptions, HSI = health status inventory, PF = physical functioning, PA = pain, EF = energy/fatigue, PHC = physical health composite, CRP = c-reactive protein.

Table 13. Five-Factor Avoidant Scales Predicting Physical Health Indicators Over Covariates

Wave 2 Outcome	Wave 1 Predictor Scale	*b*	95% lower	95% upper	β
ISI	FAVA Despair	0.21	0.13	0.30	.13
	FAVA Shrinking	0.13	0.06	0.21	.09
	FAVA Joylessness	0.14	0.07	0.22	.09
I-HSI	FAVA Joylessness	0.03	0.01	0.04	.13
WELLNESS	FAVA Despair	-0.18	-0.29	-0.08	-.09
	FAVA Shrinking	-0.18	-0.28	-0.08	-.09
ACCIDENT	FAVA Social Dread	-0.12	-0.17	-0.06	-.11
	FAVA Risk Averse	0.11	0.05	0.18	.09
HBC GHP	FAVA Evaluation Apprehension	-0.22	-0.35	-0.09	-.08
	FAVA Despair	-0.26	-0.38	-0.13	-.10
	FAVA Mortified	-0.23	-0.35	-0.10	-.08
	FAVA Overcome	-0.23	-0.36	-0.10	-.08
HSI PF	FAVA Evaluation Apprehension	-2.65	-4.10	-1.21	-.08
	FAVA Despair	-2.68	-4.09	-1.28	-.09
	FAVA Mortified	-3.14	-4.53	-1.75	-.10
	FAVA Overcome	-2.47	-3.93	-1.00	-.08
	FAVA Joylessness	-2.80	-4.15	-1.45	-.10
HSI GHP	FAVA Despair	-2.46	-3.87	-1.05	-.09
	FAVA Joylessness	-2.42	-3.74	-1.09	-.10
HSI PA	FAVA Despair	-1.55	-2.31	-0.78	-.13
HSI EF	FAVA Evaluation Apprehension	-2.88	-4.26	-1.50	-.11
	FAVA Despair	-3.39	-4.80	-1.99	-.14
	FAVA Social Dread	-2.10	-3.20	-1.00	-.10
	FAVA Joylessness	-3.14	-4.47	-1.82	-.13
PHC	FAVA Evaluation Apprehension	-0.29	-0.40	-0.18	-.14
	FAVA Despair	-0.28	-0.39	-0.16	-.14
	FAVA Mortified	-0.23	-0.35	-0.12	-.12
	FAVA Overcome	-0.25	-0.37	-0.13	-.12
	FAVA Social Dread	-0.17	-0.26	-0.07	-.10
	FAVA Joylessness	-0.26	-0.36	-0.15	-.14
CRP	FAVA Despair	-0.03	-0.04	-0.01	-.16

Note. All significant at $p < .001$. ISI = Insomnia Severity Index, I-HSI = informant-reported heath status inventory, HBC = health behavior checklist, GHP = general health perceptions, HSI = health status inventory, PF = physical functioning, PA = pain, EF = energy/fatigue, PHC = physical health composite, CRP = c-reactive protein.

In a further set of exploratory analyses, incremental validity of the FFMPD scales over their direct corresponding NEO-PI-R facets was tested. For example, in one model NEO-PI-R Anxiety was included as a control in an initial step before FFAvA Evaluation Apprehension (a maladaptive variant of the facet of anxiousness) was included in the next step. In these analyses, 46 of 61 FFMPD facets remained significant predictors of the variance in the outcomes at $p < .05$. Twenty-nine were still significant at $p < .01$. Fifteen had incremental validity at $p < .001$. The 15 FFMPD facets and their directly corresponding NEO-PI-R facets over which they showed incremental validity at $p < .001$ are presented in Table 14.

Table 14. FFMPD Incremental Validity Over Covariates and Corresponding NEO Facets

Wave 2 Outcome	Wave 1 Predictor	β	*p*	Adj R^2	ΔR^2	ΔF	*df*
ISI	NEO O1	.00	.970	.48	.011	17.22	807
	FFBI DT	.11	.000				
ISI	NEO C6	.00	.926	.48	.010	16.06	807
	FFBI R	.12	.000				
Wellness	NEO N4	-.01	.610	.51	.007	10.95	776
	FFBI SD	-.09	.001				
Wellness	NEO N6	-.02	.486	.51	.008	12.55	776
	FFBI F	-.10	.000				
HSI G	NEO N4	-.01	.680	.59	.008	15.37	775
	FFBI SD	-.10	.000				
HSI G	NEO N5	.00	.905	.59	.007	14.23	775
	FFBI BD	-.10	.000				
HSI G	NEO N6	-.01	.638	.60	.010	19.26	775
	FFBI F	-.11	.000				
HSI G	NEO O1	.00	.920	.59	.009	16.63	775
	FFBI DT	-.09	.000				
HSI G	NEO C6	.03	.271	.59	.006	11.50	775
	FFBI R	-.09	.001				
PF	NEO E6	-.03	.352	.63	.007	12.87	689
	FAVA J	-.12	.000				
PF	NEO E6	-.04	.248	.63	.006	12.49	708
	FAVA J	-.12	.000				
EF	NEO N3	-.03	.355	.54	.007	11.11	708
	FAVA D	-.12	.001				
EF	NEO E6	-.03	.394	.54	.011	16.38	708
	FAVA J	-.15	.000				
PHC	NEO N1	-.05	.109	.46	.011	13.64	686
	FAVA EA	-.12	.000				
CRP	NEO N3	.03	.546	.44	.018	12.00	352
	FAVA D	-.18	.001				

Note. ISI = Insomnia Severity Index, Wellness = Wellness Maintenance, HSI G = Health Status Inventory General Health Perceptions, PF = Physical Functioning, EF = Energy/Fatigue, PHC = Physical Health Composite, CRP = C-reactive protein, NEO = NEO-PI-R, FB = Five-Factor Borderline Inventory, FAVA = Five-Factor Avoidant Inventory, O1 = Fantasy, C6 = Deliberation, N1 = Anxiety, N3 = Depression, N4 = Self-Consciousness, N5 = Impulsiveness, N6 = Vulnerability, E6 = Positive Emotions, DT = Dissociative Tendencies, R = Rashness, SD = Self-Disturbance, F = Fragility, BD = Behavioral Dysregulation, J = Joylessness, D = Despair, EA = Evaluation Apprehension.

CHAPTER 4. DISCUSSION

Personality has well-documented effects on important outcomes in life (Ozer & Benet-Martinez, 2006; Roberts et al., 2007). In particular, research indicates that personality is associated with physical health (T. W. Smith et al., 2015; Strickhouser et al., 2017). However, less research has examined how maladaptive personality traits relate to physical health. The present study provides initial work examining the criterion validity of facets from the FFMPD—a dimensional model of personality disorder with a large and growing body of research support—for predicting physical health indicators.

Results from the present study indicate that maladaptive FFMPD facets have significant associations with health behaviors and health perceptions across time in older adults. FFMPD facets were correlated with biomarkers of inflammation across time, but did not provide incremental validity about biomarkers above covariates. Findings of the longitudinal and incremental associations of the FFMPD with health behaviors and health perceptions were particularly strong, as the associations remained in many instances while controlling for demographic control variables, outcome variables at Wave 1, as well as normal range personality and DSM personality disorder. These incremental analyses indicate FFMPD scales predict changes in physical health behavior and perceptions across time in older adults.

Findings from the present study support prior research results and theoretical suggestions that a dimensional model of personality disorder improves the traditional categorical model of personality disorder. The present findings suggest that maladaptive variants of the personality traits from the FFM are important to describing problems in physical health functioning. For example, while higher levels of the adaptive FFM scale

NEO-PI-R Anxiety predict general perceptions of physical health, higher levels of a maladaptive variant of anxiousness, FFAvA Evaluation Apprehension, predict even more variance in general perceptions of physical health (Table 14). Likewise, while higher levels of the adaptive FFM scale NEO-PI-R Fantasy predict insomnia symptoms, higher levels of its maladaptive variant, FFBI Dissociative Tendencies, predict even more variance in insomnia symptoms (Table 14). Results signal that the maladaptive variants of FFM traits have implications for physical health behaviors and perceptions because they predict outcomes over and above the adaptive variants of the same traits.

The DSM personality disorder scales correlated with the physical health outcomes, but regression analyses indicted that the DSM personality disorders did not predict unique variance in the physical health outcomes that the FFMPD model did not predict. There are several reasons why the DSM personality disorders may not be as successful for predicting physical health outcomes as the FFMPD, which relate to some of the core problems of the DSM approach to the classification and assessment of personality disorders. First, they suffer from inadequate coverage of the full range of maladaptive personality functioning. The FFMPD provides a more comprehensive model of personality functioning because it traces its roots to the Big Five, a trait model derived from factor analysis of virtually every trait term within the English and other languages (De Raad & Mlacic, 2017). To the extent that the Big Five includes every maladaptive trait term, it naturally follows that the FFM, aligned with the Big Five, accounts for virtually every maladaptive personality trait (Widiger & Crego, 2019). Second, the DSM system may be less adequate for predicting health outcomes because of the heterogeneity within the DSM personality disorder criteria. Individuals may be diagnosed with the

same personality disorder, for example borderline personality disorder, with almost entirely different symptoms. Thus, a score for borderline personality disorder is not composed of specific content—as the FFMPD facets are—and this may interfere with criterion validity. Finally, DSM personality disorder assessments often assess each symptom with only one item. The FFMPD framework conceptualizes each trait (i.e., symptom) as a homogeneous construct that requires more than one item to assess. This focus on construct homogeneity likely improves criterion validity because the FFMPD scales are more comprehensive, and therefore more reliable, and a more reliable measure is a more powerful predictor (G. T. Smith, McCarthy, & Zapolski, 2009). This is in part because it will not suffer as much from attenuation. The improvements in criterion validity for physical health indicators in the present study likely reflect the improvements of a dimensional model of personality disorder over a categorical one, as a whole.

Several specific findings emerge from the present study as most notable. First, the FFAvA Despair scale predicted many outcomes including showing incremental validity over the NEO and DSM personality scales. Correlations between Wave 1 Despair and Wave 2 general health perceptions, energy/fatigue, insomnia symptoms, and physical functioning reached moderate effect sizes (i.e., between .30-.50; J. Cohen, 1992). In the preregistered analyses, the scale showed incremental validity over NEO facets and the MAPP predicting insomnia symptoms, physical functioning, pain, general health perceptions, energy/fatigue, and the physical health composite score. This was in addition to outperforming all other FFAvA scales that also significantly predicted these outcomes and were included in the same regression analyses. In the exploratory analyses, the scale predicted eight self-report health behavior and perception scales over and above

demographic covariates *and* levels of the health behavior and perception scales at Wave 1. These findings indicate that the four-item Despair scale is a significant predictor of physical health behaviors and perceptions across time in older adults, and a predictor of increases in problems in these areas across time.

Multiple FFMPD scales showed robust relationships with health behaviors and perceptions. FFOCI Excessive Worry showed incremental validity over the NEO and MAPP predicting insomnia symptoms and pain, and FFOCI Detached Coldness showed incremental validity over the NEO and MAPP predicting general health perceptions and the physical health composite score. However, these relationships did not remain significant when controlling for covariates. FFAvA Joylessness showed moderate effect sizes in correlations with informant-reported health status, general health perceptions, energy/fatigue, and the physical health composite score, and showed incremental validity over the NEO and MAPP in predicting these variables, *as well as* incremental validity over covariates. This more robust result indicates that trait-level joylessness may contribute to multiple areas of physical health-related outcomes; and predict increases in perceptions of physical health-related problems from both self- and informant-perspectives.

Other FFMPD scales that predicted multiple outcomes with incremental validity over covariates and/or NEO and MAPP variables included FFBI Self-Disturbance, FFBI Despondence, FFBI Behavioral Dysregulation, FFBI Rashness, FFAvA Social Dread, FFAvA Evaluation Apprehension, FFAvA Mortified, and FFAvA Shrinking. Some FFMPD scales displayed broader relationships with health behaviors and perceptions (e.g., Despair associated with most negative health behaviors and perceptions), while

others have more specific connections (e.g., Social Dread predicted lower accident control and more fatigue). The performance of the FFMPD scales generally provides support for the idea that a dimensional framework for studying personality disorder improves criterion validity for physical health outcomes.

While FFAvA Risk Averse showed a significant positive effect for fewer traffic accidents at a moderate effect size, it also correlated negatively with physical functioning, showing that while a maladaptive conscientiousness behavior may be adaptive in some contexts (e.g., inhibition of behavior thereby avoiding risks), it does not come without maladaptivity in other contexts. This finding of a positive relationship with traffic safety—but negative health perceptions—was replicated by the FFOCI Risk Averse scale. Risk aversion may motivate safer driving behaviors, but also drive negative perceptions of physical health (in this case, physical functioning). That is, people who avoid risk may more anxiously evaluate their health. This unique pattern underscores the importance of adopting a dimensional framework, at the facet-level, to examine more nuanced relationships between maladaptive personality traits and health.

The present study benefitted from the inclusion of informant-report measures of health behaviors and general health perceptions in addition to self-reports. Targets who scored higher on FFOCI Workaholism and FFAvA Joylessness were perceived as less healthy by informants, over and above NEO and MAPP scores. The Joylessness connection was at a moderate effect size. The results indicate that informants perceive people higher on Joylessness as less physically healthy; and perhaps people higher on Joylessness are less physically healthy. Results also indicated that target participants who rated themselves higher on Risk Averse were rated higher on health behaviors by

informants[1]. These findings are important because they provide multi-method validation of FFMPD scales. Future work including informant-reports of the FFMPD scales will be especially useful to cross-validate findings of the associations between FFMPD scales and health behaviors and perceptions.

More research is needed on personality and physical health. While the amount is increasing, there is still much to learn. In particular, there is very little about maladaptive personality traits and physical health. This is a problem especially because maladaptive personality may have even stronger relationships with physical health than adaptive-range personality traits, as evidenced in the present study. Correlations suggested in some cases there are moderate-sized effects—that FFMPD traits predict around 10% of the variance in a respective physical health indicator. This is a significant amount of information about future health markers. There are few other predictors of future physical health outcomes that explain more than 10% of the variance in the outcome. This indicates that personality could be one (of many) important predictors of physical health—especially if facet-level associations are taken into account.

The present findings provide further evidence that personality should be considered in medical settings. Personality assessments in medical care could provide useful pieces of information about future medical risk. In addition to gathering more data to answer questions about the specific associations between FFMPD and health, this raises further questions: for example, how best could measures of personality be integrated into healthcare settings, and how best could they be used? While studies have

[1] While this is a "positive" relationship, and Risk Averse is a maladaptive trait, this finding still provides construct validity evidence for the Risk Averse facet scale. It makes sense that people high on Risk Averse would display more positive health behaviors (but high levels of the trait may cause problems in other areas of their lives—for example, in the present study, lower self-reported perceptions of physical functioning).

begun to consider these issues (Israel et al., 2014), there are more gains to be made and issues to consider in order to make use of the research indicating that personality predicts health (e.g., assessment choices, length of assessments, cutoff scores, feedback to patients, treatment strategies, destigmatization of maladaptive traits).

4.1 LIMITATIONS

The present study provided a first look at the criterion validity of the FFMPD scales for the prediction of physical health behaviors, perceptions, and inflammatory biomarkers. The study used multi-method assessment and employed a large representative community sample of older adults, a population where physical health problems become more prominent and where personality-health associations may be particularly important to understand. However, it will be important to extend these methods to understand relationships between FFMPD and physical health indicators in adults of all ages. Future studies could be improved with further multi-method assessment and larger sample sizes. In the future, it will be important to obtain informant-reports of the FFMPD traits—self–other agreement on personality traits is important for validating the constructs. Further, it is sometimes the case that informant-reports of personality predict important health outcomes that self-reports do not (Klein, 2003; T. W. Smith et al., 2007), making it even more important to examine how informant-reports of FFMPD traits predict physical health indicators.

Additionally, the present study used only three of eight existing FFMPD measures (Widiger et al., 2012). The measures used were selected based on prevalence of pathology found in the sample at baseline and on the fact that the FFMPD measures included in the present study mainly assessed traits unique to neuroticism, extraversion,

and conscientiousness, which are the FFM domains most often associated with physical health (T. W. Smith et al., 2015). While this was useful for the present study, the full range of FFM domains and FFMPD traits should be tested to examine connections with physical health.

A few of the self-report personality and health scales had low internal consistency, which could have affected the results. For example, Substance Risk had a coefficient alpha of ~.30. This might reflect the fact that the scale only had 3 items, with each assessing a different substance—there was one for alcohol, one for smoking, and one for other drugs. Future research would do well to have longer and separate scales for each drug of interest. Additionally—while median coefficient alphas for personality scales were much higher and psychometrically acceptable—the FFOCI Punctiliousness and FFAvA Rigidity scales had the lowest alphas at both waves, at unacceptable levels (~.35 and ~.40, respectively). This indicates that perhaps these short-form scale items are not homogeneous and should be revised—at least for the assessment of Punctiliousness and Rigidity in older adults. These scales also had perhaps the least frequent correlations with the outcomes (Substance Risk, another scale with low internal consistency, also had few significant correlations with the personality variables), which may have been a result of attenuation due to low reliability.

Another area for improvement involves the examination of inflammatory biomarkers. While the sample size was not a problem for the examination of self-report outcomes, the effect sizes of personality predicting biomarkers are smaller, and these smaller effects likely require larger sample sizes. This is potentially why there were few statistically significant effects of personality predicting biomarkers (using a *p* value of

<.001). The most useful prior studies of FFM traits and biomarkers employed thousands of participants. Only using several hundred in the present study (as all participants did not consent to the blood draw) may not have provided enough power to tease apart significant effects. For this reason, it should not be concluded from the present study that the FFMPD traits are not associated with biomarkers in older adults.

Finally, future research should examine the mechanisms through which personality traits influence physical health-related outcomes. The present study answered initial questions about the utility of the FFMPD scales. Data from the present sample are still being collected, providing opportunities to examine longitudinal links between personality, health behaviors, health perceptions, biomarkers, and outcomes such as disease onset and mortality across more than two timepoints in the future.

4.2 CONCLUSIONS

Research indicates that personality is an important predictor of physical health. The present study is a staging point for continued research on dimensional models of maladaptive personality traits and physical health. Results from the present study indicate that FFMPD traits predict health behaviors, health perceptions, and biomarkers of inflammation, with incremental validity over demographic covariates, normative models of personality traits, and DSM personality disorders for predicting health behaviors and health perceptions. Continued research in this area will further illuminate associations between maladaptive personality and health, and can lead to ideas about how to implement personality assessment in healthcare settings. Capitalizing on the connections between personality and health may be an important way to eventually maximize healthcare providers' ability to help patients avoid long-term physical health problems.

REFERENCES

Allen, M. S., & Laborde, S. (2017). Five factor personality traits and inflammatory biomarkers in the English longitudinal study of aging. *Personality and Individual Differences, 111*, 205-210. doi:10.1016/j.paid.2017.02.028

Allik, J. (2005). Personality dimensions across cultures. *Journal of Personality Disorders, 19*(3), 212-232. doi:10.1521/pedi.2005.19.3.212

Armon, G., Melamed, S., Shirom, A., Berliner, S., & Shapira, I. (2013). The associations of the Five Factor Model of personality with inflammatory biomarkers: A four-year prospective study. *Personality and Individual Differences, 54*(6), 750-755. doi:10.1016/j.paid.2012.11.035

Association, A. P. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, D.C.: Author.

Barlow, D. H., Ellard, K. K., Fairholme, C., Farchione, T. J., Boisseau, C., Allen, L., & Ehrenreich-May, J. (2011). *Unified protocol for the transdiagnostic treatment of emotional disorders*. New York: Oxford University Press.

Bastien, C. H., Vallières, A., & Morin, C. M. (2001). Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Medicine, 2*(4), 297-307. doi:http://dx.doi.org/10.1016/S1389-9457(00)00065-4

Blanken, T. F., Benjamins, J. S., Borsboom, D., Vermunt, J. K., Paquola, C., Ramautar, J., . . . Van Someren, E. J. W. (2019). Insomnia disorder subtypes derived from life history and traits of affect and personality. *The Lancet Psychiatry, 6*(2), 151-163. doi:10.1016/S2215-0366(18)30464-4

Bogg, T., & Roberts, B. W. (2004). Conscientiousness and health-related behaviors: a meta-analysis of the leading behavioral contributors to mortality. *Psychological Bulletin, 130*(6), 887-919. doi:10.1037/0033-2909.130.6.887

Boisclair Demarble, J., Moskowitz, D. S., Tardif, J. C., & D'Antono, B. (2014). The relation between hostility and concurrent levels of inflammation is sex, age, and measure dependent. *Journal of Psychosomatic Research, 76*(5), 384-393. doi:10.1016/j.jpsychores.2014.02.010

Booth-Kewley, S., & Vickers, R. R., Jr. (1994). Associations between major domains of personality and health behavior. *Journal of Personality, 62*(3), 281-298. doi:10.1111/j.1467-6494.1994.tb00298.x

Calkins, A. W., Hearon, B. A., Capozzoli, M. C., & Otto, M. W. (2013). Psychosocial predictors of sleep dysfunction: the role of anxiety sensitivity, dysfunctional beliefs, and neuroticism. *Behavioral Sleep Medicine, 11*(2), 133-143. doi:10.1080/15402002.2011.643968

Carter, N. T., Guan, L., Maples, J. L., Williamson, R. L., & Miller, J. D. (2016). The Downsides of Extreme Conscientiousness for Psychological Well-being: The Role of Obsessive Compulsive Tendencies. *Journal of Personality, 84*(4), 510-522. doi:10.1111/jopy.12177

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: stability and change. *Annual Review of Psychology, 56*, 453-484. doi:10.1146/annurev.psych.55.090902.141913

Chapman, B. P., Khan, A., Harper, M., Stockman, D., Fiscella, K., Walton, J., . . . Moynihan, J. (2009). Gender, race/ethnicity, personality, and interleukin-6 in

urban primary care patients. *Brain, Behavior, and Immunity, 23*(5), 636-642. doi:10.1016/j.bbi.2008.12.009

Chuah, S. C., Drasgow, F., & Roberts, B. W. (2006). Personality assessment: Does the medium matter? No. *Journal of Research in Personality, 40*(4), 359-376. doi:10.1016/j.jrp.2005.01.006

Clark, L. A. (2007). Assessment and diagnosis of personality disorder: perennial issues and an emerging reconceptualization. *Annual Review of Psychology, 58*, 227-257. doi:10.1146/annurev.psych.57.102904.190200

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155-159. doi:10.1037//0033-2909.112.1.155

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). Data-Analytic Strategies Using Multiple Regression/Correlation. In *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (3rd ed.). New York, NY: Routledge.

Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) professional manual*. Odessa, FL: Psychological Assessment Resources.

Crede, M., Harms, P., Niehorster, S., & Gaye-Valentine, A. (2012). An evaluation of the consequences of using short measures of the Big Five personality traits. *Journal of Personality and Social Psychology, 102*(4), 874-888. doi:10.1037/a0027403

Crego, C., Samuel, D. B., & Widiger, T. A. (2015). The FFOCI and other measures and models of OCPD. *Assessment, 22*(2), 135-151. doi:10.1177/1073191114539382

De Berardis, D., Serroni, N., Campanella, D., Carano, A., Gambi, F., Valchera, A., . . . Ferro, F. M. (2008). Alexithymia and its relationships with C-reactive protein and serum lipid levels among drug naive adult outpatients with major depression. *Progress in Neuro-Psychopharmacology & Biological Psychiatry, 32*(8), 1982-1986. doi:10.1016/j.pnpbp.2008.09.022

De Raad, B., & Mlacic, B. (2017). The lexical foundation of the Big Five factor model. In W. T. A. (Ed.), *The Oxford handbook of the five factor model* (pp. 191-216). New York, NY: Oxford University Press.

DeSalvo, K. B., Bloser, N., Reynolds, K., He, J., & Muntner, P. (2006). Mortality prediction with a single general self-rated health question. A meta-analysis. *Journal of General Internal Medicine, 21*(3), 267-275. doi:10.1111/j.1525-1497.2005.00291.x

DeShong, H. L., Lengel, G. J., Sauer-Zavala, S. E., O'Meara, M., & Mullins-Sweatt, S. N. (2015). Construct validity of the five factor borderline inventory. *Assessment, 22*(3), 319-331. doi:10.1177/1073191114548029

DeShong, H. L., Mullins-Sweatt, S. N., Miller, J. D., Widiger, T. A., & Lynam, D. R. (2016). Development of a Short Form of the Five-Factor Borderline Inventory. *Assessment, 23*(3), 342-352. doi:10.1177/1073191115581475

DeShong, H. L., & Tucker, R. P. (2019). Borderline personality disorder traits and suicide risk: The mediating role of insomnia and nightmares. *Journal of Affective Disorders, 244*, 85-91. doi:10.1016/j.jad.2018.10.097

Dixon-Gordon, K. L., Whalen, D. J., Layden, B. K., & Chapman, A. L. (2015). A systematic review of personality disorders and health outcomes. *Canadian Psychology/Psychologie canadienne, 56*(2), 168-190. doi:10.1037/cap0000024

Edmonds, G. W., Bogg, T., & Roberts, B. W. (2009). Are personality and behavioral measures of impulse control convergent or distinct predictors of health behaviors? *Journal of Research in Personality, 43*(5), 806-814. doi:10.1016/j.jrp.2009.06.006

El-Gabalawy, R., Katz, L. Y., & Sareen, J. (2010). Comorbidity and associated severity of borderline personality disorder and physical health conditions in a nationally representative sample. *Psychosomatic Medicine, 72*(7), 641-647. doi:10.1097/PSY.0b013e3181e10c7b

Elovainio, M., Merjonen, P., Pulkki-Raback, L., Kivimaki, M., Jokela, M., Mattson, N., . . . Keltikangas-Jarvinen, L. (2011). Hostility, metabolic syndrome, inflammation and cardiac control in young adults: The Young Finns Study. *Biological Psychology, 87*(2), 234-240. doi:10.1016/j.biopsycho.2011.03.002

Emert, S. E., Tutek, J., & Lichstein, K. L. (2017). Associations between sleep disturbances, personality, and trait emotional intelligence. *Personality and Individual Differences, 107*, 195-200. doi:10.1016/j.paid.2016.11.050

Enders, C. K. (2006). A primer on the use of modern missing-data methods in psychosomatic medicine research. *Psychosomatic Medicine, 68*, 427-436.

Fang, Y., Kang, X., Feng, X., Zhao, D., Song, D., & Li, P. (2019). Conditional effects of mindfulness on sleep quality among clinical nurses: The moderating roles of extraversion and neuroticism. *Psychology, Health & Medicine, 24*(4), 481-492. doi:10.1080/13548506.2018.1492731

Friedman, H. S., & Kern, M. L. (2014). Personality, well-being, and health. *Annual Review of Psychology, 65*, 719-742. doi:10.1146/annurev-psych-010213-115123

Gamaldo, A. A., Sardina, A. L., Sutin, A., Cruz, T. E., Salas, R. M. E., Gamaldo, C. E., . . . Andel, R. (2019). Facets of personality related to sleep habits in Black adults. *Sleep Health*. doi:10.1016/j.sleh.2019.10.004

Gleason, M. E., Weinstein, Y., Balsis, S., & Oltmanns, T. F. (2014). The enduring impact of maladaptive personality traits on relationship quality and health in later life. *Journal of Personality, 82*(6), 493-501. doi:10.1111/jopy.12068

Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist, 48*(1), 26-34. doi:10.1037//0003-066x.48.1.26

Gong, J., Wang, Y., Liu, J., Fu, X., Cheung, E. F. C., & Chan, R. C. K. (2019). The interaction between positive schizotypy and high sensitivity C-reactive protein on response inhibition in female individuals. *Psychiatry Research, 274*, 365-371. doi:10.1016/j.psychres.2019.02.064

Graham, E. K., Bastarache, E. D., Milad, E., Turiano, N. A., Cotter, K. A., & Mroczek, D. K. (2018). Physical activity mediates the association between personality and biomarkers of inflammation. *SAGE Open Medicine, 6*, 2050312118774990. doi:10.1177/2050312118774990

Griffin, S. A., Suzuki, T., Lynam, D. R., Crego, C., Widiger, T. A., Miller, J. D., & Samuel, D. B. (2018). Development and Examination of the Five-Factor Obsessive-Compulsive Inventory-Short Form. *Assessment, 25*(1), 56-68. doi:10.1177/1073191116643818

Grove, J. L., Smith, T. W., Crowell, S. E., & Ellis, J. H. (2017). Preliminary Evidence for Emotion Dysregulation as a Mechanism Underlying Poor Sleep Quality in Borderline Personality Disorder. *Journal of Personality Disorders, 31*(4), 542-552. doi:10.1521/pedi_2016_30_261

Haas, B. W., & Miller, J. D. (2015). Borderline personality traits and brain activity during emotional perspective taking. *Personality Disorders: Theory, Research, and Treatment, 6*(4), 315-320. doi:10.1037/per0000130

Harty, L., Duckworth, R., Thompson, A., Stuewig, J., & Tangney, J. P. (2010). Are inmates' subjective sleep problems associated with borderline personality, psychopathy, and antisocial personality independent of depression and substance dependence? *The Journal of Forensic Psychiatry & Psychology, 21*(1), 23-39. doi:10.1080/14789940903194095

Hays, R. D., & Morales, L. S. (2001). The RAND-36 measure of health-related quality of life. *Annals of Medicine, 33*(5), 350-357. doi:10.3109/07853890109002089

Hintsanen, M., Puttonen, S., Smith, K., Törnroos, M., Jokela, M., Pulkki-Råback, L., . . . Keltikangas-Järvinen, L. (2014). Five-factor personality traits and sleep: Evidence from two population-based cohort studies. *Health Psychology, 33*(10), 1214-1223. doi:10.1037/hea0000105

Hinze-Selch, D., Daubener, W., Erdag, S., & Wilms, S. (2010). The diagnosis of a personality disorder increases the likelihood for seropositivity to Toxoplasma gondii in psychiatric patients. *Folia Parasitologica, 57*(2), 129-135. doi:10.14411/fp.2010.016

Holzer, K. J., & Huang, J. (2019). Physical health-related quality of life among older adults with personality disorders. *Aging & Mental Health, 23*(8), 1031-1040. doi:10.1080/13607863.2018.1468412

Huang, V., Peck, K., Mallya, S., Lupien, S. J., & Fiocco, A. J. (2016). Subjective Sleep Quality as a Possible Mediator in the Relationship between Personality Traits and Depressive Symptoms in Middle-Aged Adults. *PLoS ONE, 11*(6), e0157238. doi:10.1371/journal.pone.0157238

Israel, S., Moffitt, T. E., Belsky, D. W., Hancox, R. J., Poulton, R., Roberts, B., . . . Caspi, A. (2014). Translating personality psychology to help personalize preventive medicine for young adult patients. *Journal of Personality and Social Psychology, 106*(3), 484-498. doi:10.1037/a0035687

Isung, J., Aeinehband, S., Mobarrez, F., Nordstrom, P., Runeson, B., Asberg, M., . . . Jokinen, J. (2014). High interleukin-6 and impulsivity: determining the role of endophenotypes in attempted suicide. *Translational Psychiatry, 4*, e470. doi:10.1038/tp.2014.113

John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative Big Five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, (Ed); Robins, Richard W., (Ed); Pervin, Lawrence A., (Ed) (Ed.), *Handbook of personality: Theory and research* (3rd ed., pp. 114-158). New York, NY: The Guilford Press.

Kamphuis, J., Karsten, J., de Weerd, A., & Lancel, M. (2013). Sleep disturbances in a clinical forensic psychiatric population. *Sleep Medicine, 14*(11), 1164-1169. doi:10.1016/j.sleep.2013.03.008

Kim, H. N., Cho, J., Chang, Y., Ryu, S., Shin, H., & Kim, H. L. (2015). Association between Personality Traits and Sleep Quality in Young Korean Women. *PLoS ONE, 10*(6), e0129599. doi:10.1371/journal.pone.0129599

King, H. R., Jackson, J. J., Morrow-Howell, N., & Oltmanns, T. F. (2015). Personality accounts for the connection between volunteering and health. *The Journals of*

Gerontology: Series B: Psychological Sciences and Social Sciences, 70(5), 691-697. doi:10.1093/geronb/gbu012

Kish, L. (1949). A procedure for objective respondent selection within the household. *Journal of the American Statistical Association, 44*(247), 380-387.

Klein, D. N. (2003). Patients' versus informants' reports of personality disorders in predicting 7 1/2-year outcome in outpatients with depressive disorders. *Psychological Assessment, 15*(2), 216-222. doi:10.1037/1040-3590.15.2.216

Kojima, M., Kojima, T., Suzuki, S., Takahashi, N., Funahashi, K., Kato, D., . . . Ishiguro, N. (2014). Alexithymia, depression, inflammation, and pain in patients with rheumatoid arthritis. *Arthritis Care & Research, 66*(5), 679-686. doi:10.1002/acr.22203

Kung, H. C., Hoyert, D. L., Xu, J., & Murphy, S. L. (2008). Deaths: final data for 2005. *National Vital Statistics Reports, 56*(10), 1-120. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/18512336

Lawton, E. M., Shields, A. J., & Oltmanns, T. F. (2011). Five-factor model personality disorder prototypes in a community sample: self- and informant-reports predicting interview-based DSM diagnoses. *Personality Disorders: Theory, Research, and Treatment, 2*(4), 279-292. doi:10.1037/a0022617

Livesley, W. J. (2001). Conceptual and taxonomic issues. In W. J. Livesley (Ed.), *Handbook of personality disorders* (pp. 3-38). New York: Guilford.

Löckenhoff, C. E., Sutin, A. R., Ferrucci, L., & Costa, P. T., Jr. (2008). Personality traits and subjective health in the later years: The association between NEO-PI-R and SF-36 in advanced age is influenced by health status. *Journal of Research in Personality, 42*(5), 1334-1346. doi:10.1016/j.jrp.2008.05.006

Luchetti, M., Barkley, J. M., Stephan, Y., Terracciano, A., & Sutin, A. R. (2014). Five-factor model personality traits and inflammatory markers: new data and a meta-analysis. *Psychoneuroendocrinology, 50*, 181-193. doi:10.1016/j.psyneuen.2014.08.014

Lynam, D. R. (2012). Assessment of maladaptive variants of Five-Factor Model traits. *Journal of Personality, 80*(6), 1593-1614. doi:10.1111/j.1467-6494.2012.00775.x

Lynam, D. R., Loehr, A., Miller, J. D., & Widiger, T. A. (2012). A five-factor measure of avoidant personality: the FFAvA. *Journal of Personality Assessment, 94*(5), 466-474. doi:10.1080/00223891.2012.677886

Magidson, J. F., Roberts, B. W., Collado-Rodriguez, A., & Lejuez, C. W. (2014). Theory-driven intervention for changing personality: expectancy value theory, behavioral activation, and conscientiousness. *Developmental Psychology, 50*(5), 1442-1450. doi:10.1037/a0030583

Marsland, A. L., Gianaros, P. J., Prather, A. A., Jennings, J. R., Neumann, S. A., & Manuck, S. B. (2007). Stimulated production of proinflammatory cytokines covaries inversely with heart rate variability. *Psychosomatic Medicine, 69*(8), 709-716. doi:10.1097/PSY.0b013e3181576118

Marsland, A. L., Prather, A. A., Petersen, K. L., Cohen, S., & Manuck, S. B. (2008). Antagonistic characteristics are positively associated with inflammatory markers independently of trait negative emotionality. *Brain, Behavior, and Immunity, 22*(5), 753-761. doi:10.1016/j.bbi.2007.11.008

Mervielde, I., De Clercq, B., De Fruyt, F., & Van Leeuwen, K. (2005). Temperament, personality, and developmental psychopathology as childhood antecedents of personality disorders. *Journal of Personality Disorders, 19*(2), 171-201. doi:10.1521/pedi.19.2.171.62627

Miller, J. D. (2012). Five-Factor Model personality disorder prototypes: A review of their development, validity, and comparison to alternative approaches. *Journal of Personality, 80*(6), 1565-1591. doi:10.1111/j.1467-6494.2012.00773.x

Mommersteeg, P. M., Pelle, A. J., Ramakers, C., Szabo, B. M., Denollet, J., & Kupper, N. (2012). Type D personality and course of health status over 18 months in outpatients with heart failure: multiple mediating inflammatory biomarkers. *Brain, Behavior, and Immunity, 26*(2), 301-310. doi:10.1016/j.bbi.2011.09.010

Moorer, P., Suurmeijer, T. P. B. M., Foets, M., & Molenaar, I. W. (2001). Psychometric properties of the RAND-36 among three chronic diseases (multiple sclerosis, rheumatic diseases and COPD) in The Netherlands. *Quality of Life Research, 10*(7), 637-645. doi:10.1023/a:1013131617125

Morin, C. M., Belleville, G., Belanger, L., & Ivers, H. (2011). The Insomnia Severity Index: psychometric indicators to detect insomnia cases and evaluate treatment response. *SLEEP, 34*(5), 601-608. doi:10.1093/sleep/34.5.601

Mottus, R., Luciano, M., Starr, J. M., Pollard, M. C., & Deary, I. J. (2013). Personality traits and inflammation in men and women in their early 70s: the Lothian Birth Cohort 1936 study of healthy aging. *Psychosomatic Medicine, 75*(1), 11-19. doi:10.1097/PSY.0b013e31827576cc

Mullins-Sweatt, S. N., Edmundson, M., Sauer-Zavala, S., Lynam, D. R., Miller, J. D., & Widiger, T. A. (2012). Five-factor measure of borderline personality traits. *Journal of Personality Assessment, 94*(5), 475-487. doi:10.1080/00223891.2012.672504

Mwendwa, D. T., Ali, M. K., Sims, R. C., Cole, A. P., Lipscomb, M. W., Levy, S. A., . . . Campbell, A. L. (2013). Dispositional depression and hostility are associated with inflammatory markers of cardiovascular disease in African Americans. *Brain, Behavior, and Immunity, 28*, 72-82. doi:10.1016/j.bbi.2012.10.019

O'Connor, B. P. (2002). A quantitative review of the comprehensiveness of the five-factor model in relation to popular personality inventories. *Assessment, 9*(2), 188-203. doi:10.1177/1073191102092010

Oltmanns, J. R. (2019). Personality Disorders, Maladaptive Personality Traits, and Sleep Problems: Findings and Future Directions. In Z. Križan (Ed.), *Sleep, Personality, and Social Behavior* (pp. 239-254). Cham: Springer International Publishing.

Oltmanns, J. R., Weinstein, Y., & Oltmanns, T. F. (2014). Borderline personality pathology and insomnia symptoms in community-dwelling older adults. *Personality and Mental Health, 8*, 178-187. doi:10.1002/pmh.1259

Oltmanns, T. F., & Turkheimer, E. (2006). Perceptions of self and others regarding pathological personality traits. In R. F. Krueger & J. L. Tackett (Eds.), *Personality and psychopathology* (pp. 71-111). New York, NY: The Guilford Press.

Otaka, H., Murakami, H., Nakayama, H., Murabayashi, M., Mizushiri, S., Matsumura, K., . . . Daimon, M. (2019). Association between insomnia and personality traits

among Japanese patients with type 2 diabetes mellitus. *Journal of Diabetes Investigation, 10*(2), 484-490. doi:10.1111/jdi.12927

Ozer, D. J., & Benet-Martinez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology, 57*, 401-421. doi:10.1146/annurev.psych.57.102904.190127

Ozer, D. J., & Reise, S. P. (1994). Personality assessment. *Annual Review of Psychology, 45*, 357-388. doi:10.1146/annurev.ps.45.020194.002041

Petrov, M. E., Emert, S. E., & Lichstein, K. L. (2019). Obsessive-compulsive personality disorder features and response to behavioral therapy for insomnia among patients with hypnotic-dependent insomnia. *Behavioral Sleep Medicine, 17*(6), 740-752. doi:10.1080/15402002.2018.1483369

Pietrzak, R. H., Wagner, J. A., & Petry, N. M. (2007). DSM-IV personality disorders and coronary heart disease in older adults: results from The National Epidemiologic Survey on Alcohol And Related Conditions. *The Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 62*(5), P295-299. doi:10.1093/geronb/62.5.p295

Plante, D. T., Frankenburg, F. R., Fitzmaurice, G. M., & Zanarini, M. C. (2013). Relationship between sleep disturbance and recovery in patients with borderline personality disorder. *Journal of Psychosomatic Research, 74*(4), 278-282. doi:10.1016/j.jpsychores.2013.01.006

Powers, A. D., & Oltmanns, T. F. (2012). Personality disorders and physical health: A longitudinal examination of physical functioning, healthcare utilization, and health-related behaviors in middle-aged adults. *Journal of Personality Disorders, 26*(4), 524-538. doi:10.1521/pedi.2012.26.4.524

Powers, A. D., & Oltmanns, T. F. (2013). Personality pathology as a risk factor for negative health perception. *Journal of Personality Disorders, 27*(3), 359-370. doi:10.1521/pedi_2013_27_083

Ren, Y., Li, S., Zhou, S., Wang, Y., Li, L., Zhang, J., . . . Zhu, X. (2019). Optimism outweighs neuroticism and anxiety sensitivity to predict insomnia symptoms in women after surgery for breast cancer. *Support Care Cancer, 27*(8), 2903-2909. doi:10.1007/s00520-018-4610-6

Roberts, B. W., & DelVecchio, W. F. (2000). The rank-order consistency of personality traits from childhood to old age: a quantitative review of longitudinal studies. *Psychological Bulletin, 126*(1), 3-25. doi:10.1037/0033-2909.126.1.3

Roberts, B. W., Kuncel, N. R., Shiner, R., Caspi, A., & Goldberg, L. R. (2007). The Power of Personality: The Comparative Validity of Personality Traits, Socioeconomic Status, and Cognitive Ability for Predicting Important Life Outcomes. *Perspectives on Psychological Science, 2*(4), 313-345. doi:10.1111/j.1745-6916.2007.00047.x

Ruiter, M. E., Lichstein, K. L., Nau, S. D., & Geyer, J. D. (2012). Personality disorder features and insomnia status amongst hypnotic-dependent adults. *Sleep Medicine, 13*(9), 1122-1129. doi:10.1016/j.sleep.2012.05.004

Samuel, D. B., Edmundson, M., & Widiger, T. A. (2011). Five factor model prototype matching scores: convergence within alternative methods. *Journal of Personality Disorders, 25*(5), 571-585. doi:10.1521/pedi.2011.25.5.571

Samuel, D. B., Riddell, A. D., Lynam, D. R., Miller, J. D., & Widiger, T. A. (2012). A five-factor measure of obsessive-compulsive personality traits. *Journal of Personality Assessment, 94*(5), 456-465. doi:10.1080/00223891.2012.677885

Samuel, D. B., & Widiger, T. A. (2008). A meta-analytic review of the relationships between the five-factor model and DSM-IV-TR personality disorders: a facet level analysis. *Clinical Psychology Review, 28*(8), 1326-1342. doi:10.1016/j.cpr.2008.07.002

Saulsman, L. M., & Page, A. C. (2004). The five-factor model and personality disorder empirical literature: A meta-analytic review. *Clinical Psychology Review, 23*(8), 1055-1085. doi:10.1016/j.cpr.2002.09.001

Selby, E. A. (2013). Chronic sleep disturbances and borderline personality disorder symptoms. *Journal of Consulting and Clinical Psychology, 81*(5), 941-947. doi:10.1037/a0033201

Semiz, U. B., Algul, A., Basoglu, C., Ates, M. A., Ebrinc, S., Cetin, M., . . . Gunay, H. (2008). The relationship between subjective sleep quality and aggression in male subjects with antisocial personality disorder. *Turkish Journal of Psychiatry, 19*(4), 373-381. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/19110979

Skodol, A. E., Grilo, C. M., Pagano, M. E., Bender, D. S., Gunderson, J. G., Shea, M. T., . . . McGlashan, T. H. (2005). Effects of personality disorders on functioning and well-being in major depressive disorder. *Journal of Psychiatric Practice, 11*(6), 363-368. doi:10.1097/00131746-200511000-00002

Smith, G. T., McCarthy, D. M., & Zapolski, T. C. (2009). On the value of homogeneous constructs for construct validation, theory testing, and the description of psychopathology. *Psychological Assessment, 21*(3), 272-284. doi:10.1037/a0016699

Smith, T. W., Uchino, B. N., Berg, C. A., Florsheim, P., Pearce, G., Hawkins, M., . . . Yoon, H. C. (2007). Hostile personality traits and coronary artery calcification in middle-aged and older married couples: different effects for self-reports versus spouse ratings. *Psychosomatic Medicine, 69*(5), 441-448. doi:10.1097/PSY.0b013e3180600a65

Smith, T. W., Uchino, B. N., Bosch, J. A., & Kent, R. G. (2014). Trait hostility is associated with systemic inflammation in married couples: an actor-partner analysis. *Biological Psychology, 102*, 51-53. doi:10.1016/j.biopsycho.2014.07.005

Smith, T. W., Williams, P. G., & Segerstrom, S. C. (2015). Personality and physical health. In M. Mikulincer, P. R. Shaver, M. L. Cooper, & R. J. Larsen (Eds.), *APA handbook of personality and social psychology, Volume 4: Personality processes and individual differences.* (pp. 639-661). Washington, DC: American Psychological Association.

Stephan, Y., Sutin, A. R., Bayard, S., Krizan, Z., & Terracciano, A. (2018). Personality and sleep quality: Evidence from four prospective studies. *Health Psychology, 37*(3), 271-281. doi:10.1037/hea0000577

Strickhouser, J. E., Zell, E., & Krizan, Z. (2017). Does personality predict health and well-being? A metasynthesis. *Health Psychology, 36*(8), 797-810. doi:10.1037/hea0000475

Sutin, A. R., Terracciano, A., Deiana, B., Naitza, S., Ferrucci, L., Uda, M., . . . Costa, P. T., Jr. (2010). High neuroticism and low conscientiousness are associated with interleukin-6. *Psychological Medicine, 40*(9), 1485-1493. doi:10.1017/S0033291709992029

Takahashi, Y., Edmonds, G. W., Jackson, J. J., & Roberts, B. W. (2013). Longitudinal correlated changes in conscientiousness, preventative health-related behaviors, and self-perceived physical health. *Journal of Personality, 81*(4), 417-427. doi:10.1111/jopy.12007

Trull, T. J., Widiger, T. A., Lynam, D. R., & Costa, P. T., Jr. (2003). Borderline personality disorder from the perspective of general personality functioning. *Journal of Abnormal Psychology, 112*(2), 193-202. doi:10.1037/0021-843x.112.2.193

Tuck, M. K., Chan, D. W., Chia, D., Godwin, A. K., Grizzle, W. E., Krueger, K. E., . . . Brenner, D. E. (2009). Standard Operating Procedures for Serum and Plasma Collection: Early Detection Research Network Consensus Statement Standard Operating Procedure Integration Working Group. *Journal of Proteome Research, 8*(1), 113-117. doi:10.1021/pr800545q

Turiano, N. A., Chapman, B. P., Gruenewald, T. L., & Mroczek, D. K. (2015). Personality and the leading behavioral contributors of mortality. *Health Psychology, 34*(1), 51-60. doi:10.1037/hea0000038

van de Laar, M., Leufkens, T., Bakker, B., Pevernagie, D., & Overeem, S. (2017). Phenotypes of sleeplessness: Stressing the need for psychodiagnostics in the assessment of insomnia. *Psychology, Health & Medicine, 22*(8), 902-910. doi:10.1080/13548506.2017.1286360

van Dooren, F. E., Verhey, F. R., Pouwer, F., Schalkwijk, C. G., Sep, S. J., Stehouwer, C. D., . . . Denollet, J. (2016). Association of Type D personality with increased vulnerability to depression: Is there a role for inflammation or endothelial dysfunction? - The Maastricht Study. *Journal of Affective Disorders, 189*, 118-125. doi:10.1016/j.jad.2015.09.028

Van Veen, M. M., Karsten, J., & Lancel, M. (2017). Poor sleep and its relation to impulsivity in patients with antisocial or borderline personality disorders. *Behavioral Medicine, 43*(3), 218-226. doi:10.1080/08964289.2017.1313719

Vickers, R. R., Jr., Conway, T. L., & Hervig, L. K. (1990). Demonstration of replicable dimensions of health behaviors. *Preventive Medicine, 19*(4), 377-401. doi:10.1016/0091-7435(90)90037-k

Wagner, E. N., Ajdacic-Gross, V., Strippoli, M. F., Gholam-Rezaee, M., Glaus, J., Vandeleur, C., . . . von Kanel, R. (2019). Associations of Personality Traits With Chronic Low-Grade Inflammation in a Swiss Community Sample. *Frontiers in Psychiatry, 10*, 819. doi:10.3389/fpsyt.2019.00819

Wasylkiw, L., & Fekken, G. C. (2002). Personality and self-reported health: Matching predictors and criteria. *Personality and Individual Differences, 33*(4), 607-620. doi:10.1016/S0191-8869(01)00175-1

Widiger, T. A., & Crego, C. (2019). The Five Factor Model of personality structure: an update. *World Psychiatry, 18*(3), 271-272. doi:10.1002/wps.20658

Widiger, T. A., Lynam, D. R., Miller, J. D., & Oltmanns, T. F. (2012). Measures to assess maladaptive variants of the five-factor model. *Journal of Personality Assessment, 94*(5), 450-455. doi:10.1080/00223891.2012.677887

Widiger, T. A., & Trull, T. J. (2007). Plate tectonics in the classification of personality disorder. *American Psychologist, 62*(2), 71-83. doi:10.1037/0003-066X.62.2.71

Widiger, T. A., Trull, T. J., Clarkin, J. F., Sanderson, C., & Costa, P. T., Jr. (1994). A description of the DSM-III-R and DSM-IV personality disorders with the five-factor model of personality. In P. T. Costa, Jr. & T. A. Widiger (Eds.), *Personality disorders and the five-factor model of personality.* (pp. 41-56). Washington, DC: American Psychological Association.

Zanarini, M. C., Frankenburg, F. R., Hennen, J., Reich, D. B., & Silk, K. R. (2005). The McLean Study of Adult Development (MSAD): overview and implications of the first six years of prospective follow-up. *Journal of Personality Disorders, 19*(5), 505-523. doi:10.1521/pedi.2005.19.5.505

VITA

JOSHUA R. OLTMANNS, M.S.

EDUCATION

2014	M.S.	Villanova University, Villanova, PA, General Experimental Psychology
2007	B.A.	Indiana University, Bloomington, IN, Music Business

PROFESSIONAL POSITIONS

2010-2012	Research Assistant, St. Louis Personality and Aging Network (SPAN) Washington University in St. Louis, Saint Louis, MO

HONORS

2017-2020	Ruth L. Kirschstein National Research Service Award, Predoctoral Fellowship, National Institute on Aging
2017	Poster Award, International Society for the Study of Personality Disorders
2016	Outstanding Pre-Doctoral Research Award, Department of Psychology, University of Kentucky
2016	Graduate Student Travel Award, Society for Personality and Social Psychology
2014	First Place Poster, Graduate Psychology, Sigma Xi Research Day, Villanova Chapter
2013	Summer Research Fellowship, Villanova University

PUBLICATIONS

Smith, G. T., Atkinson, E., Davis, H., Riley, E. N., & Oltmanns, J. R. (in press). The general factor of psychopathology. *Annual Review of Clinical Psychology, 16.* https://doi.org/10.1146/annurev-clinpsy-071119-115848

Widiger, T.A., Oltmanns, J. R., McCabe, G., & Smith, M. (in press). An integration of normal and abnormal personality structure: The five factor model. In T. A. Widiger (Ed.), *The Oxford handbook of personality disorders*. Oxford University Press.

Oltmanns, J. R., & Oltmanns, T. F. (in press). Self–other agreement on ratings of personality disorder symptoms and traits: Three meta-analyses. In T. D. Letzring and J. S. Spain (Eds.), *The handbook of accurate personality judgment: Theory and empirical findings.* Oxford University Press. http://dx.doi.org/10.1093/oxfordhb/9780190912529.013.19

Widiger, T. A., & Oltmanns, J. R. (in press). Personality and personality disorders. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality.* Guilford Press.

Oltmanns, J. R., Jackson, J. J., & Oltmanns, T. F. (2020). Personality change: Longitudinal self–other agreement and convergence with retrospective-reports. *Journal of Personality and Social Psychology, 118,* 1065-1079. https://doi.org/10.1037/pspp0000238

Crego, C., Oltmanns, J. R., & Widiger, T. A. (2020). Obtaining and losing the bipolarity of the five factor model through factor analysis. *Personality Disorders: Theory, Research, and Treatment, 11,* 119-130. https://doi.org/10.1037/per0000378

Oltmanns, J. R., Rivera-Rivera, J., Merchant, A., Cole, J., & Steiner, J. (2020). Personality psychopathology: Longitudinal prediction of change in BMI and weight post-bariatric surgery. *Health Psychology, 39,* 245-254. https://doi.org/10.1037/hea0000842

Oltmanns, J. R. & Widiger, T. A. (2020). The Five-Factor Personality Inventory for ICD-11: A facet-level assessment of the ICD-11 trait model. *Psychological Assessment, 32*, 60-71. https://doi.org/10.1037/pas0000763

Oltmanns, J. R. (2019). Personality disorders, maladaptive personality traits, and sleep problems: Findings and future directions. In Z. Krizan (Ed.), *Sleep, personality, and social behavior* (239-254). Springer Nature. https://doi.org/10.1007/978-3-030-30628-1_13

Oltmanns, J. R., & Widiger, T. A. (2019). Evaluating the assessment of the ICD-11 personality disorder diagnostic system. *Psychological Assessment, 31,* 674-684. https://doi.org/10.1037/pas0000693

Widiger, T. A., & Oltmanns, J. R. (2019). Five-factor model antagonism. In J. D. Miller and D. R. Lynam (Eds.), *Handbook of antagonism* (25-37). San Diego, CA: Academic Press. https://doi.org/10.1016/B978-0-12-814627-9.00002-5

Cruitt, P. J., Boudreaux, M. J., King, H. R., Oltmanns, J. R., & Oltmanns, T. F. (2019). Examining Criterion A: *DSM-5* level of personality functioning as assessed through life story interviews. *Personality Disorders: Theory, Research, and Treatment, 10,* 224-234. https://doi.org/10.1037/per0000321

Oltmanns, J. R., & Widiger, T. A. (2018). Assessment of fluctuation between grandiose and vulnerable narcissism: Development and initial validation of the FLUX scales. *Psychological Assessment, 30,* 1612-1634. https://doi.org/10.1037/pas0000616

Widiger, T. A., & Oltmanns, J. R. (2018). Exploring the dynamics of the five-factor model. *European Journal of Personality, 32,* 591-592. https://doi.org/10.1002/per.2174

Oltmanns, J. R., & Widiger, T. A. (2018). Maladaptive variants of adaptive traits and bloated specific factors. *Journal of Research in Personality, 76,* 177-185. https://doi.org/10.1016/j.jrp.2018.08.006

Oltmanns, J. R., & Carlson, C. R. (2018). Effective behavioral treatment for sleep in orofacial pain patients. *Dental Sleep Practice, Fall 2018,* 47-49.

Oltmanns, J. R., Smith, G. T., Oltmanns, T. F., & Widiger, T. A. (2018). General factors of psychopathology, personality, and personality disorder: Across domain

comparisons. *Clinical Psychological Science, 6,* 581-589. https://doi.org/10.1177/2167702617750150
Oltmanns, J. R., & Widiger, T. A. (2018). A self-report measure for the ICD-11 dimensional trait model proposal: The Personality Inventory for ICD-11. *Psychological Assessment, 30,* 154-169. https://doi.org/10.1037/pas0000459
Crego, C., Oltmanns, J. R., & Widiger, T. A. (2018). FFMPD Scales: Comparisons to the FFM, PID-5, and CAT-PD-SF. *Psychological Assessment, 30,* 62-73. https://doi.org/10.1037/pas0000495
Oltmanns, J. R., Crego, C., & Widiger, T. A. (2018). Informant assessment: The Informant Five-Factor Narcissism Inventory. *Psychological Assessment, 30,* 31-42. https://doi.org/10.1037/pas0000487
Widiger, T. A., Crego, C., Rojas, S. L., & Oltmanns, J. R. (2018). Basic personality model. *Current Opinion in Psychology, 21,* 18-22. https://doi.org/10.1016/j.copsyc.2017.09.007
Widiger, T. A., Gore, W. L., Crego, C., Rojas, S. L., & Oltmanns, J. R. (2017). Five-factor model and personality disorder. In T. A. Widiger (Ed.), *The Oxford handbook of the five-factor model*. Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199352487.013.4
Widiger, T. A. & Oltmanns, J. R. (2017). Alternative DSM-5 model for personality disorders. In A. Wenzel (Ed.), *The SAGE encyclopedia of abnormal and clinical psychology* (139-142). Thousand Oaks, CA: SAGE Publications. https://doi.org/10.4135/9781483365817.n56
Oltmanns, J. R., Markey, P. M., & French, J. E. (2017). Dissimilarity in physical attractiveness within romantic dyads and mate retention behaviors. *Journal of Social and Personal Relationships, 34,* 565-577. https://doi.org/10.1177/0265407516647203
Widiger, T. A., & Oltmanns, J. R. (2017). Neuroticism is a fundamental domain of personality with enormous public health implications. *World Psychiatry, 16,* 144-145. https://doi.org/10.1002/wps.20411
Widiger, T. A., & Oltmanns, J. R. (2017). The general factor of psychopathology and personality. *Clinical Psychological Science, 5*, 182-183. https://doi.org/10.1177/2167702616657042
Oltmanns, J. R., DeShong, H. L., Sanders, C. A., & Kurtz, J. E. (2016). Validation of the five-factor model personality disorder prototype counts with the Personality Assessment Inventory. *Journal of Psychopathology and Behavioral Assessment, 38,* 590-599. https://doi.org/10.1007/s10862-016-9549-7
Widiger, T.A., & Oltmanns, J. R. (2016). The ICD-11 proposals and field trials. *Personality and Mental Health, 10,* 120-122. https://doi.org/10.1002/pmh.1341
Oltmanns, J. R., & Widiger, T. A. (2016). Self-pathology, the five-factor model, and bloated specific factors: A cautionary tale. *Journal of Abnormal Psychology, 125,* 423-434. https://doi.org/10.1037/abn0000144
Widiger, T. A., Crego, C., & Oltmanns, J. R. (2015). The validation of a classification of psychopathology. *Psychological Inquiry, 26,* 272-278. https://doi.org/10.1080/1047840X.2015.1038211

Oltmanns, J. R., & Oltmanns, T. F. (2015). Borderline personality pathology, polysomnography, and self-reported sleep disturbance: A review. *Current Sleep Medicine Reports*, *1,* 141-149. https://doi.org/10.1007/s40675-015-0011-2

Oltmanns, J. R., Weinstein, Y., & Oltmanns, T. F. (2014). Borderline personality pathology and insomnia symptoms in community-dwelling older adults. *Personality and Mental Health, 8*, 178-187. https://doi.org/10.1002/pmh.1259