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THE INTERNAL AND EXTERNAL EXPECTANCIES SCALE: DEVELOPMENT AND VALIDATION.

Joanne Raptis

THE INTERNAL AND EXTERNAL EXPECTANCIES SCALE: DEVELOPMENT AND VALIDATION.

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by

Joanne Raptis

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Joanne Raptis	Raymond DiGiuseppe Ph.D.

ABSTRACT

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Healthy lifestyle habits are widely known to improve physical and psychological wellbeing, but many struggle to regularly practice these behaviors. As an overarching solution has yet to emerge, it may prove more fruitful to instead personalize behavior change recommendations and interventions. The present study examined whether individual responsiveness to internal and external expectations can be measured, as it could be a useful behavioral factor to target with tailored treatment recommendations. This construct was first postulated by popular author Gretchen Rubin (2015) but has yet to be studied empirically.

For the current project, the Internal and External Expectancies Scale (IEES) was developed to be more comprehensive and addresses structural limitations of the currently available Four Tendencies Quiz (FTQ). The scale's psychometric properties and validity were assessed. Participants were 407 adults (85% female; 64% White) ages 18 - 77 (M = 27.3; SD = 13.6) who were recruited from online groups and a university participant pool. They completed a series of measures that included the IEES, a shortened version of the FTQ (FTQ-SF), a measure of the Big Five personality factors (20-IPIP-B5), and one of overall wellbeing (PROMIS-GH). Exploratory factor analysis (EFA) examined the best simple structures emerging from the data, and confirmatory factor analysis compared null, theorized, and EFA-informed models. The internal consistency of the best-fitting model's factors was assessed. Correlations were run between the resulting IEES

subscales, 20-IPIP-B5, PROMIS-GH, and FTQ-SF for further examination of scale validity, relevance, and to compare the two measures of expectation responsiveness.

A bifactor model where items loaded on either an internal or external expectation factor and one of three contexts emerged as the strongest. This indicates that expectation sensitivity and resistance are poles of a single continuum and that individuals' responses are more consistent within contexts than across, as a general personality trait may have implied. The IEES had several significant moderate correlations with established measures of personality and wellbeing, and these were stronger than the results of correlations of the FTQ-SF. However, the EFA and internal consistency scores suggest the need for further refinement to fully account for the importance of assessing context.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I:

INTRODUCTION AND LITERATURE REVIEW

Lifestyle habits

The Effects of Lifestyle Habits on Physical and Mental Health

It is widely known and accepted that adhering to positive lifestyle habits and healthy behaviors benefits overall health across various domains. Studies consistently implicate certain key activities in improved physical and psychological well-being, and these include engaging in regular exercise, maintaining proper nutrition, limiting substance use, taking one's prescribed medications, and completing psychotherapy homework (Wickham et al., 2020; Li et al., 2018; Kazantzis et al., 2016).

The positive impact of these lifestyle behaviors on physical health is well documented. These findings can all be summarized by Li and colleagues' (2018) analyses, which estimated that five key lifestyle habits (specifically having a healthy diet, physical activity level, bodyweight, alcohol intake, and abstaining from smoking) each yielded approximately two years of increased life expectancy. The immediate benefits of exercise include improved sleep quality and mood and decreased anxiety and blood pressure. Over the long term, regular physical activity reduces the risk of several devastating conditions such as certain cancers, stroke, heart disease, diabetes, dementia, depression, and falling (Centers for Disease Control and Prevention [CDC], 2020). Voluminous amounts of vigorous activity are not required for these preventative gains; individuals who are active approximately 150 minutes a week are estimated to be at a 33% lower risk of all-cause mortality than those who are sedentary (U.S. Department of Health and Human Services, 2018). The benefits of a healthy diet also cannot be

overstated. Balanced nutrition is essential for preventing certain serious illnesses and supporting a healthy immune system. (Masters et al., 2013; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2020). Dramatic drops in health risk and mortality rates can also be achieved through smoking cessation (Jha et al., 2013), and eliminating alcohol misuse would reduce the burden of over 200 diseases and injury-related conditions such as liver disease, HIV/AIDS, cardiovascular pathologies, and motor vehicle accidents (World Health Organization, 2018). In addition to these behaviors, treatment adherence also has critical implications both for individual and public health and the economy. It has been estimated that improved medication adherence could save Americans over $100 billion and prevent 125,000 deaths yearly (Cutler et al., 2018; Bosworth et al., 2011).

These same lifestyle behaviors not only improve physical wellbeing but also have demonstrated robust effects on treating and preventing certain psychiatric symptomatology. Time and again, these behaviors correlate with significantly lower rates of depression and longitudinally with improvements in overall mental health (Buttery et al., 2014; Velten et al., 2018; Walsh, 2011). Increased suicide risk across the developmental spectrum has been associated with cigarette use, higher alcohol consumption, and a sedentary lifestyle (Berardelli et al., 2018). Conversely, a study by Taylor and colleagues (2018) found that the frequency of positive depression screens was significantly lower over time among multiple sclerosis patients who reported a moderate alcohol intake, identified as non-smoking and nutrition-conscious, and engaged in regular exercise at baseline as compared to their counterparts. In clinical trials, prescribed physical activity has demonstrated psychologically therapeutic benefits independent of

traditional mental health interventions and, in certain studies, with effect sizes comparable to those of psychiatric medications (Schuch et al., 2016; Berk et al., 2013). Exercise has strong support as a preventative measure against depression in longitudinal analyses (Sidhu et al., 2009), and dietary interventions have also yielded reduced depression symptoms in meta-analyses (Firth et al., 2019).

Consequently, clinical practice guidelines increasingly recognize and recommend lifestyle behavior interventions as important in managing mood disorders- as exemplified by the biopsychosocial lifestyle (BPLS) model in Australia and New Zealand (Malhi et al., 2015; Manger, 2019). With depression as a leading cause of disability globally, affecting over 264 million people (World Health Organization, 2021), these emerging findings and guidelines are promising. Lifestyle medicine may significantly improve mental health and prevent psychological suffering on a public health scale and as part of an integrated stepped healthcare model.

Challenges to Healthy Lifestyle Habits

Despite the widely recognized benefits of adhering to healthy habits, many people struggle to consistently implement these behaviors in their lives. Much of this failure cannot be attributed to a lack of desire; numerous statistics highlight the good intentions, awareness, and desire for health behavior change, but there are similarly glaring numbers illustrating the difficulty of adopting these habits. There is ultimately a gaping discrepancy between what people are advised to do, what they want to do, and what they do.

Lists of the most popular New Year's resolutions are consistently topped by intentions to increase exercise and lose weight, or similar variants thereof (YouGov,

2017, 2018, 2020). However, a 2020 poll suggested that less than 20% met any of their resolutions by the end of the year, with less than 10% reporting satisfactory success (YouGov, 2020). Less than half of American adults get the recommended weekly amount of aerobic and muscle strengthening physical activity, and an estimated 40% struggle with obesity (Hales et al., 2020; Carlson et al., 2015). This is significant, as the Institute for Health Metrics and Evaluation estimates that almost 700,000 deaths occur each year nationally due to nutrition and obesity related illnesses (2021). Despite nearly 70% of smokers expressing the desire to quit, doing so is incredibly difficult, and thus, cigarettes are still responsible for millions of deaths globally in any given year (Reitsma et al., 2021; White et al., 2018). In addition, medication nonadherence is also exceedingly common and alarmingly costly in terms of medical expenses and human lives (Cutler et al., 2018; Viswanathan et al., 2012). Notably, one of the more commonly cited reasons patients gave for nonadherence is forgetting, as opposed to intentional avoidance (Brown & Bussell, 2011).

Current interventions for improving adherence to doctors' orders and healthy lifestyle behaviors are numerous but yield inconsistent outcomes. Therefore, attempts at definitive research-informed actions to improve both public health policies and individual treatment plans have been splintered, inconclusive, and allowing for only weak conclusions (Hagger et al., 2020; Michie et al., 2018). Large metanalyses of over a hundred intervention studies for health-related behavior change recommendations found only a handful enhanced adherence to and outcomes, and these improvements were small (Nieuwlaat et al., 2014). Many of the examined interventions involved increasing the delivery of health education, counseling, or support by allied health workers, family, or

peers. Increasing health education produced significant, albeit small, effect sizes in some studies but not universally. Thus, no outstanding common elements were identified as being particularly potent. Consequently, there is a lack of and urgent need for robust evidence-based public health programs and approaches to designing treatment plans that improve adherence to an extensive range of health-related behaviors in both medical and psychological contexts on a global scale for a diverse range of individuals (Hagger et al., 2020; Michie et al., 2018; Allen & Morey, 2010).

The lack of a cohesive solution suggests the need for a more precise and personal approach to designing behavioral intervention recommendations. There is significant variance in the reasons for which people attribute their failure to follow recommendations and engage in health behaviors, as well as variation in individual personality related to certain key determinants such as motivation, self-efficacy, social influences, and attitudes or outcome expectancies (Conner & Norman, 2017; Fishbein & Ajzen, 2010). This variety is likely responsible, in part, for the difference in intervention program outcomes. Perhaps certain individuals thrive in environments emphasizing abstinence, such as Alcoholics Anonymous, while others may better resist cycling through restriction and caving using moderation, such as those in Moderation Management programs. One individual may regularly attend a fitness class when held accountable by having paid in advance, while another could succeed by simply committing a block of time on her calendar in advance. A third individual might try both strategies and still snooze through his early morning alarms. Ultimately, the obstacles to health behaviors and the personalities of the different individuals facing them are immensely diverse, and there is, therefore, a need for greater personalizing of behavioral intervention recommendations

for individual patients, clients, and communities to improve both treatment outcomes and overall wellbeing on both a micro and global scale.

The Four Tendencies Framework (FTF)

Introduction

The present dissertation examines whether an individual's response patterns to internal and external expectations can be assessed because it may prove useful in tailoring behavioral recommendations to improve adherence to professional advisement and healthy lifestyle behaviors. This hypothesized personality variable was first identified by author Gretchen Rubin. In her popular book *Better Than Before* (Rubin, 2015), she identified four "tendencies" or personality types with different patterns of responding to external (outer) and internal (inner) expectations (Figure 1). External expectations are those that others place on an individual, such as a project deadline set by a boss or a scheduled meeting; the accountability is external to the subject. Inner expectations are those that individuals place on themselves and to which they hold themselves accountable independently. Examples would include personally driven goals such as New Year's resolutions. Rubin proposed that most individuals fall into one of four tendencies or types based on how they meet or resist internal and external expectations: Upholders, Obligers, Questioners, and Rebels. According to the theory, Upholders eagerly meet both external and internal expectations and are often described as disciplined and routine-oriented. Obligers are particularly sensitive to external expectations but have difficulty meeting internal expectations. These individuals keep the promises they make to others more often than those they make to themselves. Questioners resist external expectations but respond readily to internal expectations, which they have internalized as sensible. They

question arbitrary expectations from others and require strong evidence and personally compelling reasons for engaging in a behavior. Rebels are theorized to resist all expectations and react negatively when feeling pushed or pressured in any capacity. They value freedom and the ability to choose without holding to previously defined commitments from others or themselves.

Given that key determinants in healthy behaviors involve motivational and social influences, the Four Tendencies Framework (FTF) may help address treatment nonadherence and difficulties maintaining healthy lifestyle habits. It follows from the framework that desired behaviors for physical and mental wellbeing can be increased by assessing an individual's tendency and tailoring interventions to fit this aspect of their personality. Recommendations and exercises may be more readily adopted when constructed in ways that the individual finds most motivating. While Rubin's theory has gained mass appeal, with over 3 million people having taken her online assessment (Rubin, n.d.), neither the theoretical underpinnings of the framework nor its applied effects have been examined scientifically and with published results at the time of writing.

FTF and Existing Theories of Motivation and Personality

Before assessing a new theory, it is essential to examine how the novel concepts in question are similar to, differ from, and add to the preexisting and well-established related factors in its field. Therefore, the present section compares the FTF with prominent existing theories of motivation and personality, namely Self-determination theory (SDT; Ryan & Deci, 2000), Millon's evolutionary model of personality (Millon, 1990), and the Big-Five personality traits (B5; Goldberg, 1993). It appears that, while

certain characteristics described in the FTF overlap with those of other models, the framework and its components are not adequately, or as directly, captured by existing theories and associated scales. The FTF may therefore have unique clinical implications and utility.

FTF and Self-Determination Theory. Self-determination theory (SDT; Ryan & Deci, 2000) described the concepts of extrinsic and intrinsic motivation and proposed them as explanations for why people engage in certain behaviors. Extrinsic motivation is active when behaviors are controlled by external rewards and punishments, such as praise or penalties. Intrinsic motivation refers to a behavior being performed because it is rewarding or enjoyable or resonates with one's internal values, interests, and morals. Furthermore, SDT views extrinsic and intrinsic motivation as progressing along a valanced continuum, ranging from amotivation, to extrinsic, and finally to intrinsic motivation. The purported ultimate goal is achieving self-determination, to be driven by the value of behaviors themselves as opposed to being controlled by external factors. In line with this theory, intrinsic motivation has been associated with sustained and lasting behavior change (Juwono & Szabo, 2020; Teixeira et al., 2012; Vansteenkiste et al., 2004).

Both the FTF and SDT emphasize the importance of internal and external factors in regulating behavior but ultimately concern different aspects of an individual's psychological experience. Specifically, motivation and response patterns to expectations are related but distinct concepts; the SDT factors of intrinsic and extrinsic motivation characterize drivers of individual behaviors, while the FTF seeks to characterize underlying traits of individuals themselves in responding to different sources of those

motivations. Illustratively, there are currently no scales available that broadly measure the strength of one's responsiveness to internal and external motivators. However, several scales assess motivation in specific situations, such as sports (Pelletier et al., 1995) and academics (Vallerand et al., 1992). In the language of the FTF, a Questioner who resists external expectations and is sensitive to internal expectations can still be extrinsically motivated to complete a work deadline to avoid punishment. However, she may struggle more or feel less driven than an Upholder (who readily meets internal and external expectations) if the assignment seems unnecessary to her. An Obliger (one who is responsive to external but resistant to internal expectations) may likewise be intrinsically motivated to exercise because he genuinely enjoys it but may struggle to engage in a regular physical activity unless held accountable by a coach or workout partner.

FTF and Millon's Evolutionary Model of Personality. Millon's evolutionary model of personality conceptualizes trait patterns as groups of strategies for optimizing the attainment of positive reinforcement and minimizing the risk of punishment in the evolutionary drive to meet vital human needs (1990). These traits are understood as being both learned through experience and influenced by one's underlying biology. Millon hypothesized that individual personality patterns vary across three motivational dimensions or "polarities." The first motivation is "existence," which is captured by the pleasure-pain polarity. Individuals can be more oriented towards pursuing enhanced life experiences (i.e., hedonistic impulsivity on the extreme end) or towards avoiding negative experiences (i.e., anxious withdrawal on the other). The second motivation is "adaptation," which is captured by the active-passive polarity. This dimension relates to how one pursues rewards or flees punishment, positing that some are inclined towards

actively engaging with their environment while others more passively accommodate and adjust to their external situations. The third motivation is "replication," which concerns how individuals interact with others in pursuit of survival. Along the self-other polarity, individuals vary on the source from which they seek support, suggesting that some individuals are self-oriented in their pursuit of preservation and comfort while others are more other-oriented with the goal of mutual collaboration towards survival. Millon's model is, in some ways, more expansive than the FTF but does not render the latter obsolete. While the self-other polarity is the Millon factor most related to the FTF's focus on internal and external expectations, Millon theorized that the self and others are opposite sides of a single spectrum (i.e., an individual is more receptive to the self or others). At the same time, the FTF recognizes sensitivity to internal and external expectations as separate trait dimensions on which one can vary (i.e., one is more or less receptive to the self *and* more or less receptive to others). The latter model thus allows for a more nuanced characterization of this factor of personality and motivation.

FTF and The Big-Five. The Big-Five (B5), or the Five-Factor Model, is arguably the most prominent and well-studied structural framework in personality psychology (Widiger, 2017; Digman, 1990; McCrae & Costa, 1996; Goldberg, 1993). It proposes five factors of personality, each of which are themselves a cluster of correlated specific traits. The five factors include openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism (or emotional instability). Openness refers to one's intellectual curiosity, appreciation for art and experiences, and unconventionality. Conscientiousness involves one's sense of responsibility, degree of control, motivation, and discipline. Extraversion indicates one's preferred degree and intensity of interaction

with others. Agreeableness refers to one's proclivity for compassion and empathy towards others. Lastly, neuroticism characterizes one's emotional stability and converse lability of mood.

As was evident when examining the FTF in relation to Millon's personality theory, correlations between certain factors proposed by the FTF and the B5 are also conceivably likely. Again, however, the FTF does not appear completely subsumed under the B5 and maintains unique theoretical aspects that may prove independently useful in application. It can be hypothesized that Upholders, those who meet internal and external expectations, would likely score highly on conscientiousness. Obligers, those who willingly meet the expectations of others but struggle to meet their own, would likely score highly on agreeableness and extroversion, as they are sensitive to and prioritize the needs of others. However, conscientiousness is not necessarily unique or exclusive to Upholders, and Obligers' empathy towards others can certainly be common among those identifying with one of the three tendencies (i.e., an agreeable Questioner). Additionally, there are no clear theoretical associations between any of the tendencies and the B5 factors of openness or neuroticism.

In summary, while I have noted hypothesized correlations between aspects of the FTF and already well-established theories of motivation and personality, no prominent framework currently exists in the literature that so clearly characterizes an individual's response to internal and external expectations. Rather than serving as an expansive measure of character, the FTF aims to capture a very specific and nuanced aspect of one's behavioral nature. Although only one component of many that may influence treatment adherence and behavior change, the specificity of the scale's target factors may allow for

pointed recommendations to optimize the efficacy of interventions by addressing individual differences and traits that were not previously considered.

FTF: Current Limitations

Despite its potential to fill a prominent gap in the literature on motivation and behavior change, the FTF has yet to be studied or validated scientifically. Rubin (2019), the creator of the FTF, also published a freely available online self-assessment tool for identifying one's tendency. The Four Tendencies Quiz (FTQ) is composed of six scenarios in which the individual makes a forced choice between four options of responses that is most representative of herself, and each choice corresponds to one of the four tendencies. There are also seven individual statements describing a characteristic emblematic of one of the tendencies, and the examinee indicates on a three-point Likert scale their degree of agreement with the statement. There are several issues with the format and construction of this original scale that make it difficult to examine and validate statistically. First, the scale includes only 13 items and an unequal number of items for each of the four different tendencies. Given the scope of the constructs of interest, a larger and more balanced scale would allow for superior statistical analysis (Boateng et al., 2018). Secondly, the scoring and framework themselves are typological; the individual is considered as "having" the one tendency with which they endorsed the most frequently. Consequently, someone who endorsed the Upholder category seven times and Questioner six times is considered more like the Upholder who endorsed that tendency all 13 times as opposed to the Questioner who endorsed the Questioner tendency seven times and the Upholder six times. While Rubin does suggest that tendency "blends" are possible based on close scores, the overall strict categorization

may hide important nuances that would be apparent if the framework considered the traits instead as continuous dimensions. Generally, the field of personality psychology has increasingly come to view the dimensional trait approach as superior to type theory given the inherent limitations of the latter (Asendorpf, 2003). Thirdly, and relatedly, the scale includes items separately representing these four hypothesized types, but this makes it difficult to explore statistically whether there are more than four ways of relating to expectations. Just as the Big-Five can become the Big-Seven when items are added to assess positive and negative valence, there may be more or less than four tendencies if the scale were written more broadly to assess underlying factors (Simms, 2007). Lastly, the FTF assumes that one's tendency is a static personality trait. However, one's responsiveness or resistance to internal and external expectations may conceivably vary across the lifespan or situations. Other studies of scale construction have found that the contextual content of survey items can be as significant as the cognitive processes themselves (DiGiuseppe et al., 2021). This prior research highlighted the clinical importance of assessing the circumstances in which one experiences distress instead of prioritizing the identification of trans-situational unhealthy cognitive styles. Likewise, it remains unclear whether an individual's pattern of responsiveness to internal and external expectations changes based on the context.

CHAPTER II:

THE PRESENT RESEARCH

Study Rationale

As discussed above, maintaining recommended and healthy lifestyle behaviors is consistently linked to improved physical and mental health. Key habits include maintaining a healthy diet, physical activity level, body weight, low alcohol intake, being smoke-free, and following one's prescribed medication regime and therapy homework assignments (Wickham et al., 2020; Li et al., 2018; Mausbach et al., 2010; Kazantzis et al., 2016). These same behaviors are also associated with a significantly lower prevalence of reported mental distress and rates of depression (Buttery et al., 2014; Sidhu et al., 2009; Walsh, 2011; Velten et al., 2018). While the benefits of adhering to recommended healthy habits are widely recognized, many struggle to consistently implement these lifestyle behaviors indicating that many want to be acting otherwise (YouGov, 2020). Studies on the efficacy of interventions to increase adherence to healthy lifestyle habits are inconsistent and inconclusive, with no outstanding common element identified among the most successful interventions differentiating them from those with less potency. Consequently, there is a need for more robust evidence-based public health programs and approaches to designing individual treatment plans that successfully encourage adherence and healthy habits for a wide range of people (Hagger et al., 2020; Michie et al., 2018; Nieuwlaat et al., 2014).

One potential reason for the variation in treatment program outcomes, and the subsequent lack of cohesive guidelines, may be the significant variation in individual personality related to certain key determinants in behavior change, namely motivation,

self-efficacy, social influences, and attitudes or outcome expectancies (Conner & Norman, 2017; Fishbein & Ajzen, 2010). The present dissertation attempts to create a psychometrically sound assessment of an individual's response patterns to internal and external expectations. A hypothesized personality factor was first articulated by writer Gretchen Rubin in her book "The Four Tendencies" (2015), but the framework has yet to be tested scientifically. If valid, it may prove useful in tailoring strategy recommendations to improve health behavior change.

Study Overview

The present dissertation aimed to begin the process of subjecting the Four Tendencies Framework (FTF) to the three-step experimental medicine method championed by the NIH Science of Behavior Change (SOBC) Common Fund Program (Nielsen et al., 2018). The first step is to identify a hypothesized mechanism to study, which in this case would be to assess the existence and strength of the FTF hypothesized trait patterns of individual variation in sensitivity or resistance to internal and external expectations. The second step is to develop tools that accurately and reliably capture the mechanism in question. This was the undertaking of the present project- to create and test a more comprehensive and statistically rigorous scale, the Internal and External Expectancies Scale (IEES), that addresses the limitations of the currently available Four Tendency Quiz and effectively captures how one responds to internal and external expectations in different scenarios with varied subject content. The scale will also use a Likert response format instead of a forced-categorical-choice system to better capture nuances in response patterns and allow for a more robust assessment of the hypothesized traits. Factor analysis will be used to explore and compare the fit of different potential

models and to examine whether patterns reflective of the four tendencies emerge from the data. The new scale will also be compared with a modified version of the original Four Tendencies Quiz available online and measures of the Big-Five personality factors and wellbeing to examine the validity and potential interactions between the hypothesized factors and established constructs.

The results of this project may pave the way for the third step of the experimental medicine approach, exploring the clinical utility of an intervention involving the hypothesized mechanism assessed. Potentially what could follow may be a randomized trial examining whether suggestions for behavior change strategies matched to an individual's response patterns to internal and external expectations would lead to greater goal behavior completion than generic or non-tailored behavior change strategies.

CHAPTER III: THE IEES SCALE AND ANALYSIS

The Internal and External Expectancies Scale (IEES) was created by the author for the present dissertation. It aims to quantify individual sensitivity and resistance to internal and external expectations in a variety of contexts. The items were generated by considering a four-by-four matrix, which is reflected in Figure 2 with the items themselves. Each item is worded to reflect one of the following: sensitivity to internal expectations (SI), sensitivity to external expectations (SE), resistance to internal expectations (RI), or resistance to external expectations (RE). Additionally, each item also falls into one of four situational contexts: general, occupational (which includes both school and career), health, and social. The result is a 16-cell grid with two items per cell, yielding 32 items total. The items are scored using a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5) and were randomly distributed to create the completed measure that can be found in Appendix A.

The present dissertation sought to factor analyze the IEES AND explore its relationship to other constructs and preexisting scales, namely measures of the Big-Five personality model, overall wellbeing, and Rubin's original Four Tendencies model.

CHAPTER IV: METHODS

Participants

Participants were adults over age 18 recruited from online sources, namely Facebook groups and a student participant pool linked to a private university in New York City. Five hundred twenty-eight respondents began the series of questionnaires, but 113 of these individuals did not complete measures beyond the demographics form and eight failed to complete one to three of the measures beyond the IEES. Therefore, the final sample used in each analysis included 407 participants.

Participants ranged in age from 18 to 77 years, with a mean age of 27.3 (SD = 13.6) and data skewing to the right (Skewness = 1.77). Most participants identified as female (n = 346, 85%) and 12.3% identified as male (n = 50). Seven individuals identified as nonbinary (1.7%), two as gender-fluid (0.005%), and two as gender nonconforming (0.005%). Additionally, two individuals also identified as transgender (0.005%). Most participants identified as White (n = 259, 63.6%), 16.5% as Hispanic, Latino, or of Spanish origin (n = 66), 11.3% as Black or African American (n = 46), 9.8% as Asian (n = 40), 2% as Middle Eastern or North African (n = 8), 1% as American Indian or Alaska Native (n = 4), 0.7% as Native Hawaiian or Other Pacific Islander (n = 3), and 3.4% as Other. In terms of the highest level of school completed, 25.1% of participants had completed up to high school, and 28.7% (n = 117) reported having finished some college but not or not yet finishing their degree. Another 3.2% (n = 13) reported having completed their associates degree, 12.5% (n = 51) their bachelor's degree, and 30% (n = 123) completed or were actively pursuing a graduate or professional degree. When asked to estimating household income from the previous year

before taxes, 24.1% reported earnings below $50,000, 23.1% between $50,000 and $100,000, and 36.6% above $100,000, while 16.2% opted not to answer.

Measures

The Internal and External Expectancies Scale (IEES)

The IEES is a measure, developed as part of the present dissertation, of sensitivity and resistance to internal and external expectations. It is comprised of 32 items that vary based on, and are equally distributed among, sensitivity versus resistance, source of expectation for a behavior (i.e., internal or external), and context (i.e., general tasks, occupational, health, and social). Information on reliability and validity is unavailable, being part of the present study's objective.

The Four Tendencies Quiz-Short Form (FTQ-SF)

The original Four Tendencies Quiz is an online self-assessment developed by writer Gretchen Rubin as a way for individuals to categorize themselves into one of her four hypothesized personality tendencies (2019). The tendencies are thought to differ by sensitivity or resistance to internal and external expectations. The original measure includes 13 total items. There are six scenarios in which the individual selects between four responses that which is most representative of herself, with each choice corresponding to one of the four tendencies. There are also seven individual statements describing a characteristic emblematic of one of the tendencies, and the participant indicates on a three-point Likert scale their degree of agreement with the statement. The present study used a revised version of the assessment, The Four Tendencies Quiz-Short Form (FTQ-Short Form), which appears in Appendix B. It provides the one-sentence description considered emblematic of each of the four tendencies and asks the individual

to rate her level of agreement with the descriptor as of herself on a five-point Likert scale. The participant is then asked to select which of the four statements describes her best. Neither the original nor the revised version of the scale have been evaluated and reviewed in the academic literature, and therefore information on reliability and validity are unavailable.

The 20-item IPIP Inventory of The Big-Five Factor Markers (20-IPIP-B5)

The 20-IPIP-B5 is a self-administered measure of the Big-Five personality traits that is publicly available on the International Personality Item Pool website (www.ipip.ori.org) (Goldberg, 1992; 1999). It includes four items for each of the five factors (specifically Extraversion, Agreeableness, Conscientiousness, Emotional Stability (also known as low Neuroticism), and Openness). The participant rates the degree to which each statement accurately describes herself along a five-point Likert scale. Five subscales are generated, with each representing one of the Big-Five personality factors. This measure has been widely used and demonstrates good internal consistency (Cronbach's α for factors ranging from 0.79 to 0.87), reliability, and validity across different cultures (Zheng et al., 2008; Gow et al., 2005; Ypofanti et al., 2015).

PROMIS Scale v1.2 – Global Health (PROMIS-GH)

The PROMIS-GH is a self-rated assessment of one's overall perceived health and wellbeing (Hays et al., 2009). It includes 9 items that each ask one's physical, emotional, or social health, and the participant responds using a five-point Likert scale. The subscales generated likewise include a total global health score and separate ones for physical, emotional, and social heath. The scale has demonstrated good construct validity and internal reliability (Katzan & Lapin, 2018; Cook et al., 2016).

Procedure

After providing informed consent, participants electronically completed the series of measures at one timepoint, specifically a standard demographic information form, the IEES, FTQ-SF, 20-IPIP-B5, and the PROMIS-GH, in that order.

Analysis Plan

Data analysis began with cleaning the data by eliminating missing and incomplete cases. Person correlations were run on the IEES to examine its candidacy for factor analysis. Then exploratory factor analysis (EFA) was performed on the scale in SPSS Version 27.0 (IBM Corp, 2020) to examine the ways in which its items may best load and to find simple structures maximizing explained variance while minimizing over-extraction. Specifically, principal axis factoring (PAF) was employed because of its assumption that total variance includes both common and unique variance as well as its assumption that there are latent constructs defining the relationships among items (Grimm & Yarnold, 2010). Given the hypothesized four tendencies and the ways in which the variables are expected to interact and correlate, oblique rotation was used, specifically direct oblimin (Tabachnick & Fidell, 2007). Different factors and factor structures were identified using scree plots, eigenvalues greater than 1 (Kaiser, 1960), and by fixing the number of factors to four as informed by the theory underlying Rubin's four tendency framework (FTF).

Before doing a confirmatory factor analysis (CFA), Mardia's coefficient was calculated to determine the appropriate extraction method, and the CFA was performed on the JASP open-source statistics program (Version 0.16.1; JASP Team, 2022) to examine construct validity and compare the models emerging from the EFA with null and

hypothesized models (i.e., based on the FTF). The JASP platform uses the LAVAAN program (Rosseel, 2012) for CFA. Ultimately, the nonnormality of the data lead to using diagonally-weighted least squares (DWLS) with robust estimation. Cronbach's α and McDonald's ω coefficients were calculated to assess the internal consistency of the factors that emerged in the best-fitting model. Correlations were run between the CFA-determined subscales of the IEES with those of the 20-IPIP-B5, PROMIS-GH, and FTQ-SF for further examination of scale validity and relevance. Correlations were also run for the FTQ-SF with the 20-IPIP-B5 and PROMIS-GH, and these correlations were compared to those resulting from examining the IEES.

Hypotheses

Hypothesis 1. The IEES Factor Structure

The IEES will yield two factors, specifically sensitivity to internal and external expectations creating its strongest factor structure. A four-factor model representing the trait patterns of Rubin's (2015) four tendencies will also adequately fit the data. Additionally, a model with factors corresponding to the different situational contexts will also fit the data, but the fit would not be significantly superior to that of the two-factor model or four-factor FT model, given that the FTF assumes that the traits are stable across contexts.

Hypothesis 2. Correlations Between the IEES and The Big-Five

The IEES measures of sensitivity to both internal and external expectations, generally and across domains, will positively correlate with conscientiousness as measured by the 20-IPIP-B5. High sensitivity to external expectations and high sensitivity to both internal and external social expectations will correlate positively with agreeableness and extraversion.

Hypothesis 3. Correlations Between the IEES and Wellbeing

Sensitivity to internal expectations on the IEES will positively correlate with all aspects of wellbeing as measured by the PROMIS-GH. Physical wellbeing will correlate positively with both sensitivity to external and internal expectations in the context of exercise, but most strongly with the latter. Higher sensitivity to both internal and external expectations in the context of social situations will correlate positively with interpersonal wellbeing.

Hypothesis 4. The IEES Versus the FTQ-SF

The IEES subscales will have stronger correlations with those of the 20-IPIP-B5 and the PROMIS-GH compared to the correlations of those scales with the FTQ-SF subscales.

CHAPTER V: ANALYSES & RESULTS

Exploratory Factor Analysis

As an initial check for suitability for factor analysis, several issues were investigated. First, there was no missing data, as the data used was of individuals who fully completed all measures (n = 407). While recommendations vary, the sample size is considered adequate based on many suggested thresholds (Tabachnik & Fidell, 2007; Kline, 1994; Comrey & Lee, 2006). The correlation matrix was inspected in SPSS for multicollinearity and for factorability. Multicollinearity did not appear present, as there were no coefficients greater than or equal to 0.90 (Tabachnick & Fidell, 2007). Factorability was assessed by the presence of correlation coefficients greater than 0.30 (Tabachnick & Fidell, 2007). Several coefficients met this criterion, suggesting that the scale and data were appropriate for factor analysis. Furthermore, the Kaiser-Meyer-Olkin (KMO) Measure of Sample Adequacy and Bartlett's Test of Sphericity were performed and reported below.

A total of three EFAs were conducted using SPSS. All were done using principal axis factoring (PAF) as the extraction method rather than the default principal component analysis (PCA). This is because PCA assumes that there is no unique or error variance underlying factors while PAF assumes the existence of underlying constructs and allows for common and unique variance, better accounting for the realistic limitations inherent in any scale (Grimm & Yarnold, 2010). Additionally, each EFA was performed using oblique rotation, specifically direct oblimin, instead of orthogonal. This is because the former allows for factors to be correlated, which is preferred given the expected relationships between the factors hypothesized by the model informing the IEES

(Osborne, 2015). The three EFAs differed by factor extraction criteria, as it is recommended that multiple methods are used (Williams et al., 2010), as well as by the specific variables included in the analyses.

The first EFA on the IEES was run using PAF, direct oblimin rotation, all 32 items, and extracting based on Kaiser's criteria of eigenvalue greater than one (Kaiser, 1960). The KMO measure of 0.821 was above the recommended cutoff of 0.5 (Kaiser 1970; Kaiser & Rice, 1974), and Bartlett's Test of Sphericity was significant (χ^2 (496) = 3965.9, $p < .000$) (Bartlett, 1950). This provided further support for the suitability of factor analysis. Using Kaiser's criteria, eight factors emerged, cumulatively explaining 58.0% of the variance (Table 1), and this was also reflected in the shape of the scree plot (Figure 3). The first factor explained 19.2% of the variance while the other seven explained 9.8, 6.6, 6.1, 5.0, 4.4, 3.5, and 3.5%, respectively. The pattern matrix was then inspected to interpret the emergent factors and appears in Table 2. A total of three items had cross-loadings over 0.3, and three items did not have a primary loading over 0.3. The factors were not all neat or clearly interpretable and contained items that varied across internal and external expectations and sensitivity and resistance. They also each contained between two and nine items. The context of the items seemed to be more consistent within the factors that emerged. Factor 1 appeared to capture high resistance and low sensitivity to both internal and external expectations in general and occupational contexts. Factor 2 included items with high sensitivity to external expectations in general and occupational contexts. Factor 3 included items with high sensitivity and low resistance to internal expectations in health contexts. Factor 4 included items with high sensitivity to both internal and external expectations in social contexts. Factor 5 included

items with high sensitivity to external, low resistance to external, and low sensitivity to internal expectations in occupational contexts. Factor 6 included items with high resistance and low sensitivity to external expectations in health and general contexts. Factor 7 included items with high resistance and low sensitivity to internal expectations in general contexts. Factor 8 included items with high resistance to both internal and external expectations in social contexts. Ultimately the factors were neither clean nor all-encompassing, but the findings that emerged suggest that there was more overlap in the source of the expectation (specifically, internal or external) while more delineation by context and directionality of resistance and sensitivity along a single continuum. It was also noted that items in the general and occupational contexts often loaded together and thus may be capturing the same or overlapping situations.

The second EFA on the IEES was run using PAF, direct oblimin rotation, all 32 items, and extracting using a fixed number of factors, specifically four as suggested by Rubin's FTF. The KMO measure of 0.821 was above the recommended cutoff of 0.5 (Kaiser 1970; Kaiser & Rice, 1974), and Bartlett's Test of Sphericity was significant (χ^2 (496) = 3965.9, $p < .000$) (Bartlett, 1950), providing further support for the suitability of factor analysis. The factors that emerged when fixed to four cumulatively explained 41.6% of the variance (Table 3). As described in the first EFA, however, the shape of the scree plot suggested closer to eight factors before leveling off (Figure 4). The first factor explained 19.2% of the variance while the other three explained 9.8, 6.6, and 6.1%, respectively. The pattern matrix was then inspected to allow for interpretation of the emergent factors and appear in Table 4. A total of three items had cross-loadings over 0.3, and five items did not have a primary loading over 0.3. The factors were less neat

and interpretable than those in the first EFA, containing a greater blending of items not only across internal and external expectations and sensitivity and resistance but also across contexts. They also each contained between five and twelve items. Factor 1 appeared to capture high resistance and low sensitivity to both internal and external expectations across the four different contexts. Factor 2 included items with high sensitivity and low resistance to external expectations across contexts other than social settings. Factor 3 included items with high sensitivity and low resistance to internal and external expectations in health contexts. Factor 4 included items with high sensitivity to both internal and external expectations across contexts other than health but largely items involving other individuals. Again, it was observed that there was generally less differentiation by the source of the expectation than item context and directionality of resistance and sensitivity along a single continuum.

The third EFA on the IEES was run using PAF, direct oblimin rotation, and extracting based on Kaiser's criteria of eigenvalue greater than one. However, the items that fell under the general context were not included, given the findings of the first EFA suggesting the redundancy of the general and occupational contexts. Therefore, the total number of items analyzed was 24. The KMO measure of 0.756 was above the recommended cutoff of 0.5 (Kaiser 1970; Kaiser & Rice, 1974), and Bartlett's Test of Sphericity was significant (χ^2 (276) = 2448.886, $p < .000$) (Bartlett, 1950). This provided further support for the suitability of factor analysis. Using Kaiser's criteria, seven factors emerged, cumulatively explaining 59.0% of the variance (Table 5), and this was also reflected in the shape of the scree plot (Figure 5). The first factor explained 18.9% of the variance, while the other six explained 10.0, 7.8, 7.0, 5.6, 5.4, and 4.4%, respectively.

The pattern matrix was then inspected to allow for interpretation of the emergent factors and is presented in Table 3.

A total of two items had cross-loadings over 0.3, and five items did not have a primary loading over 0.3. The factors were not all neat or clearly interpretable and contained items that varied across internal and external expectations as well as sensitivity and resistance. They also each contained between one and six items. The context of the items was almost entirely consistent within the factors that emerged. Factor 1 appeared to capture high sensitivity to both internal and external expectations in social contexts. Factor 2 included items with high resistance and low sensitivity to internal expectations in occupational contexts. Factor 3 included items with low resistance to both internal and external expectations in social contexts. Factor 4 included items with high resistance to external expectations in occupational contexts and included an item that also loaded with almost equal strength on factor 2 (high sensitivity to internal expectations in occupational contexts). Factor 5 included items with high resistance and low sensitivity to external expectations in health contexts. Factor 6 only included one item, which captured low sensitivity to external expectations in occupational contexts. Factor 7 included items with high resistance and low sensitivity to internal expectations in health contexts.

Generally, the factor structures uncovered through EFA appeared to provide evidence for the difference between sensitivity to internal versus external expectations proposed by Rubin's FTF, but items did not appear to group based on the four tendencies themselves. Specifically, it seems that items assembled more strongly by context, source of the expectations, and along a single continuum of resistance to sensitivity towards expectations.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) was conducted on the IEES using JASP. The data was first evaluated for multivariate nonnormality using Mardia's test of multivariate skewness and kurtosis (1970) through the WebPower tool by Zhan & Yuan (2018). The data were found to violate the normality assumption (Mardia's skewness coefficient= 65.258; $p < 0.000$; Mardia's kurtosis coefficient= 714.160; $p < 0.000$). Therefore, diagonally-weighted least squares (DWLS) was used to test all models, as this method was designed for data failing to meet the normality and other assumptions of the usual maximum likelihood and maximum likelihood robust estimation methods (DiStefano & Morgan, 2014; DiGiuseppe et al., 2021). DWLS does not make assumptions about data distribution and has been shown to be less biased and more accurate in estimating factor loadings in such situations (DiStefano & Morgan, 2014; Li, 2016).

The fit indices generated by JASP using DWLS and the recommended values for adequate fit used in the present dissertation, while variation exists in the literature, are as follows (Schumacker & Lomax, 2016; Finney & DiStefano, 2013; Awang, 2012): χ^2/df with lower values suggesting better fit, a value of 3 indicating good fit, and values less than 2 as being overfit (Loehlin, 2004; Kline, 1994; Byrne, 2012); Root Mean Square Error of Approximation (RMSEA) < 0.08, Standardized Root Mean Square Residual (SRMR) < 0.05, Cumulative Fit Index (CFI) > 0.90, Tucker–Lewis Index (TLI) > 0.90, Normed Fit Index (NFI) > 0.90, Relative Fit Index (RFI) > 0.90; and the Incremental Fit Index (IFI) > 0.90. DWLS estimation does not produce the AIC or BIC indices, but the RMSEA, SRMR, TLI, and CFI are most strongly recommended when evaluating model fit with this method (Finney & DiStefano, 2013).

Several models were tested with CFA and can be found in Table 7 and Table 8. Informed by the EFA results, models involving context were considered. Model 1 was a one-factor model where all 32 items loaded onto a single factor. Model 2 was a two-factor model in which items loaded on either an internal expectation or external expectation factor. Model 3 was a four-factor model where items loaded on either sensitivity to internal expectations, resistance to internal expectations, sensitivity to external expectations, or resistance to external expectations. Model 4 was a four-factor model in which items loaded on two of four factors matching Rubin's FTF conceptualization: upholder (sensitivity to internal and external expectations), obliger (resistance to internal expectations and sensitivity to external expectations), questioner (sensitivity to internal expectations and resistance to external expectations), or rebel (resistance to internal and external expectations). Model 5 was a four-factor model where items loaded on one of the four contexts (i.e., general, occupational, health, and social). Model 2b was a bifactor model in which items loaded on one of the four contexts and on either an internal expectation or external expectations factor. Model 3b was a bifactor model in which items loaded on one of the four contexts and on a factor for either sensitivity to internal expectations, resistance to internal expectations, sensitivity to external expectations, or resistance to external expectations. Model 4b was a bifactor model where items loaded on one of the four contexts and on factors matching Rubin's FTF conceptualization.

Based on the EFA findings suggesting the redundancy of the general and occupational factors, a second series of models was run without the general items, bringing the total number to 24. The models tested were modified versions of those

described above and were labeled with NG (for "no general"). Model 1NG was a one-factor model where all 24 items loaded onto a single factor. Model 2NG was a two-factor model in which items loaded on either an internal expectation or external expectation factor. Model 3NG was a four-factor model where items loaded on either sensitivity to internal expectations, resistance to internal expectations, sensitivity to external expectations, or resistance to external expectations. Model 4NG was a four-factor model in which items loaded on two of four factors matching Rubin's FTF conceptualization: upholder (sensitivity to internal and external expectations), obliger (resistance to internal expectations and sensitivity to external expectations), questioner (sensitivity to internal expectations and resistance to external expectations), or rebel (resistance to internal and external expectations). Model 5NG was a three-factor model where items loaded on one of the three contexts (i.e., occupational, health, and social). Model 2bNG was a bifactor model in which items loaded on one of the three contexts and on either an internal expectation or external expectations factor. Model 3bNG was a bifactor model in which items loaded on one of the three contexts and on a factor for either sensitivity to internal expectations, resistance to internal expectations, sensitivity to external expectations, or resistance to external expectations. Model 4bNG was a bifactor model where items loaded on one of the three contexts and on factors matching Rubin's FTF conceptualization. The results for both CFAs are reported in Table 7 and Table 8.

In the first round of CFA, which included items in the general context, Models 1 and 2 were inadequate across all the fit indices generated. Models 3, 4, 5, 3b, and 4b did not run; JASP generated an error message indicating that "the covariance matrix of latent variables is not positive definite." This can occur for several reasons such as

overspecification, multicollinearity, or that the model is highly unlikely or not sensible given the data. As multicollinearity was screened for prior to analysis, these models appear to poorly fit the data. However, Model 2b fit the data best and achieved adequate fit on all indices examined except for the SRMR (SRMR= 0.071 while recommended to be < 0.05).

In the second round of CFA, which did not include items in the general context, Models 1NG, 2NG, 4NG, and 5NG were inadequate across all the fit indices generated. Models 3NG, 3bNG, and 4bNG did not run but instead generated the same error message indicating that the covariance matrix of latent variables is not positive definite. However, like Model 2b, Model 2bNG fit the data best and achieved adequate fit on all indices examined except for the SRMR (SRMR= 0.068 while recommended to be < 0.05) and the RFI (RFI= 0.894 while it is recommended to be > 0.90). Models 2b and 2bNG were compared. Ultimately Model 2bNG was selected as the best model because of its superior fit on the χ^2/df, RMSEA, and SRMR, the findings from EFA suggesting the redundancy of the general context items, and because the shortening of a scale reduces the burden on respondents. It is recommended that theory is used to compliment fit statistics when selecting the best model, and it follows from previous research in addition to the EFA that the context of items is integral factors as opposed to confounds in the model (Byrne, 2012; DiGiuseppe et al., 2021).

IEES Subscales

Subscales for the IEES were created based on the CFA by adding the scores of the items contained within the different factors. The 11 subscales created are listed in Table 6 and were as follows: IEES Internal (IEES I; sum of items on sensitivity to and reverse-

scored resistance to internal expectations; 16 items; score range: 16-80), IEES External (IEES E; sum of items on sensitivity to and reverse-scored resistance to external expectations; 16 items; score range: 16-80), IEES Occupational (IEES O; sum of items on sensitivity to and reverse-scored resistance to internal and external expectations in occupational contexts; eight items; score range: 8-40), IEES Health (IEES H; sum of items on sensitivity to and reverse-scored resistance to internal and external expectations in health contexts; eight items; score range: 8-40), IEES Social (IEES S; sum of items on sensitivity to and reverse-scored resistance to internal and external expectations in social contexts; eight items; score range: 8-40), IEES Internal Occupational (IEES IO; sum of items on sensitivity to and reverse-scored resistance to internal expectations in occupational contexts; four items; score range: 4-20), IEES External Occupational (IEES EO; sum of items on sensitivity to and reverse-scored resistance to external expectations in occupational contexts; four items; score range: 4-20), IEES Internal Health (IEES IH; sum of items on sensitivity to and reverse-scored resistance to internal expectations in health contexts; four items; score range: 4-20), IEES External Health (IEES EH; sum of items on sensitivity to and reverse-scored resistance to external expectations in health contexts; four items; score range: 4-20), IEES Internal Social (IEES IS; sum of items on sensitivity to and reverse-scored resistance to internal expectations in social contexts; four items; score range: 4-20), and IEES External Social (IEES ES; sum of items on sensitivity to and reverse-scored resistance to external expectations in social contexts; four items; score range: 4-20).

Internal Consistency

To assess the internal consistency of the IEES subscales, Cronbach's α and McDonald's ω were calculated using SPSS and an SPSS macro by Hayes (2020). Cronbach's α is the most reported measure in this context, but McDonald's ω is being increasingly encouraged as the more robust option as it considers the between-item associations (Hayes & Coutts, 2020). The α and ω coefficients are presented in Table 10. The α coefficients for the 11 subscales ranged from 0.342 to 0.746, and the ω coefficients ranged from 0.367 to 0.748. The ω coefficients were slightly higher across all subscales. The α and ω coefficients were above 0.70 and considered adequate for three subscales, specifically IEES Health, IEES External, and IEES Internal Occupational. The scale with the lowest coefficients was IEES External Social. Upon further inspection, it appears that this may be due to the multiple social situations involved within the subscale itself (i.e., family, friend, romantic partner), further highlighting the importance of considering context when assessing response style.

IEES Relationship to the Big-Five Theory of Personality and to Wellbeing

To assess the interaction between the IEES subscales and pre-examined constructs, namely the Big-Five Theory of Personality and overall wellbeing, correlations were run for the IEES with the 20-IPIP-B5 and the PROMIS-GH. The results appear in Table 11 and Table 12, and correlations significant at the 0.05 and 0.01 level were each demarcated. Correlations between 0.10 and 0.30 were considered small, between 0.30 and 0.50 considered moderate, and above 0.05 considered large (Cohen, 1988; Laerd Statistics, 2020).

When examining the interaction between the IEES and 20-IPIP-B5, 42 of the 55 correlations were statistically significant, and five of those were greater than 0.30. Specifically, conscientiousness from the big-five model appeared to correlate moderately with sensitivity to internal expectations overall, sensitivity to expectation in occupational contexts, sensitivity to internal expectations for occupational contexts (but not for external expectations in occupational settings) and nearly so for health contexts (Correlation= 0.292**). Sensitivity to internal expectations overall was moderately correlated with emotional stability. Additionally, IEES sensitivity to internal, external, and expectations overall in social contexts all moderately correlated with the big five agreeableness factor.

When examining the interaction between the IEES and PROMIS-GH, all 44 correlations were statistically significant, and 24 of those were greater than 0.30. Specifically, total wellbeing and all three other wellbeing subscales were moderately and positively correlated with sensitivity to internal expectations overall, expectations in occupational contexts overall, and internal expectations in occupational, health, and social settings separately. Sensitivity to social expectations overall was moderately correlated with all wellbeing subscales except for the mental health subscale (Correlation= 0.272**). Sensitivity to expectations overall in health contexts was moderately correlated with the overall wellbeing subscale. Of note, the only moderate correlation between a wellbeing subscale and subscale of external expectation sensitivity was between sensitivity to external expectations overall and the overall wellbeing subscale. This suggests that sensitivity to internal expectations is more highly associated with wellbeing as compared to sensitivity to external expectations. It is also noteworthy

that there were no negative correlations, suggesting that higher sensitivity to expectations in performing in different settings are generally associated with greater wellbeing.

Comparing the IEES and the FTQ-SF

The dimensional items of the FTQ-SF were correlated with results of the measure's question in which participants had to select which one of the four items matched them best. The results are in Table 13, and the forced choice responses were statistically significant and all moderately correlated with their respective dimensional items except for the upholder tendency, which was weak but still significant and in the expected direction. However, finding only moderate or weak correlations here suggests that most individuals do not "strongly agree" consistently or exclusively with the tendency they selected as most self-descriptive, suggesting the superiority of a dimensional approach to such characteristics. Therefore, the following correlations were conducted using the dimensional FTQ-SF items.

To compare the new IEES with the FTQ-SF adaptation of Rubin's scale, correlations were run for the FTQ-SF with the 20-IPIP-B5 and PROMIS-GH, and these correlations were compared to those resulting from correlations with the IEES. The FTQ-SF and IEES were also correlated to examine interactions between their subscales.

When examining the interaction between the FTQ-SF and 20-IPIP-B5 (Table 14), 10 of the 20 correlations were statistically significant but only two were greater than 0.30. Specifically, conscientiousness from the big-five model appeared to correlate moderately with greater endorsement of the upholder trait, which is hypothesized to be sensitive to both internal and external expectations. Emotional stability was moderately correlated in

the negative direction with greater endorsement of the obliger trait, which is hypothesized to be sensitive to external expectations but resistant to internal expectations.

When examining the interaction between the FTQ-SF and PROMIS-GH (Table 15), 12 of the 16 correlations were statistically significant, but none of the correlations were moderate in size (above 0.30). However, the obliger and rebel hypothesized personality traits were negatively correlated- although weakly-with all measures of wellbeing while the upholder and questioner traits had weak positive correlations. Given that the obliger and rebel are hypothesized to be resistant to internal expectations and the upholder and questioner to be sensitive, this finding seems to support the results of correlating the IEES subscales with the PROMIS-GH. This is also reflected in the correlations of the upholder tendency with conscientiousness and of the obliger tendency with emotional instability.

When examining the interaction between the FTQ-SF and IEES (Table 16), 28 of the 44 correlations were statistically significant, and six of those were greater than 0.30. Specifically, the FTQ upholder scale was positively and moderately correlated with sensitivity to both internal and external expectations overall, sensitivity to expectations overall in both occupational and social settings, and sensitivity to internal expectations in both occupational and social settings. Generally, the statistically significant coefficients, even if weakly correlated, were in the expected direction based on Rubin's FTF for internal and external expectations across the three contexts. However, a stronger positive correlation between the obliger tendency and sensitivity to external expectations was expected.

CHAPTER VI:

DISCUSSION AND CONCLUSIONS

Reviewing the Hypotheses

Hypothesis 1. The IEES Factor Structure

It was expected that the data would most strongly support a factor structure for the IEES with two factors, specifically sensitivity to internal and external expectations and that a four-factor model representing the trait patterns of Rubin's four tendencies would also adequately fit the data. It was expected that a model with factors corresponding to the different situational contexts would also fit but not be significantly superior to the other two. Using EFA and CFA, the model with the most strength appeared instead to be a bifactor model where items loaded on either an internal or external expectation factor and one of three context factors. This suggests that resistance and sensitivity form a continuum as opposed to being discreet categories. It also suggests that individuals tend to answer more similarly within but not necessarily across contexts, which provides evidence against the existence of sweeping personality tendencies and instead highlights the importance of considering the situation in predicting responses.

Hypothesis 2. Correlations Between the IEES and The Big-Five

The IEES measures of sensitivity to both internal and external expectations, generally and across domains, were expected to positively correlate with conscientiousness as measured by the 20-IPIP-B5. Additionally, high sensitivity to external expectations and high sensitivity to both internal and external social expectations were all expected to correlate positively with agreeableness and extraversion. The results of examining the correlations suggested that conscientiousness was indeed moderately

correlated with higher sensitivity to internal expectations overall, in occupational contexts, and nearly so in health contexts. However, sensitivity to external expectations was moderately associated with conscientiousness only in occupational contexts. Influence from external expectations in other contexts may be related instead to other factors, such as enjoying the company of others socially and in health contexts such as group fitness classes. Relatedly, sensitivity to internal, external, and expectations overall in social contexts all moderately correlated with the big-five agreeableness factor, as hypothesized. While not specifically hypothesized, sensitivity to internal expectations was also moderately correlated with emotional stability, suggesting that individuals who work towards fulfilling their own expectations may be more well-adjusted and resilient psychologically. It is plausible that they may be less likely tossed by the wavering expectations of others and external circumstances, having a strong internal compass to guide their behavior. Extraversion was significantly but not moderately correlated with high sensitivity to external expectations and to both internal and external social expectations. It is possible that factors such as peer pressure or anxiety may be contributing to these response patterns in addition to degrees of extraversion.

Hypothesis 3. Correlations Between the IEES and Wellbeing

As expected, sensitivity to internal expectations on the IEES positively correlated with all aspects of wellbeing as measured by the PROMIS-GH. Physical wellbeing did correlate positively with both sensitivity to external and internal expectations in the context of exercise, but, as predicted, only weakly with the former and moderately with the latter. Not explicitly hypothesized, sensitivity to social expectations overall was moderately correlated with all wellbeing subscales except for mental health (with which

it was still positively but weakly correlated). When analyzed separately, sensitivity to internal expectations in social contexts was more strongly associated with wellbeing than sensitivity to external expectations. These findings together may reflect the large body of literature highlighting the importance of actively engaging in social connection to maintaining overall health (Martino, 2017; Holt-Lunstad et al., 2017), with high scoring individuals on these scales benefiting from the social interactions that their sensitivity to expectations hold them to.

Hypothesis 4. The IEES Versus the FTQ-SF

As predicted, the IEES subscales had more numerous, clear, and strong correlations with those of the 20-IPIP-B5 and the PROMIS-GH as compared to correlating the latter two with the FTQ-SF subscales. This suggests that the IEES has stronger content validity and greater potential for use in situations where predicting behaviors is of interest.

Further Observations

The IEES and the FTQ-SF

The results of the present analyses suggest multiple advantages of the IEES over the FTQ-SF. While it is important to reiterate that the FTQ-SF is not the original measure distributed by Rubin, it encapsulates the main features of the four tendencies she hypothesized (Rubin, 2015). Furthermore, it was used instead for the very reason that the construction and format of the original scale render it unconducive for methodical exploration. It contains groups of items with varied scoring systems and an unequal number of items for each of the four tendencies. The scoring is also ambiguous; one is assigned that tendency receiving the highest total score, and while one can be a “mix” if

two scales are tied but these cutoffs were not clearly delineated or explained. The framework itself, however, appears promising and has not received the rigorous scientific exploration that its popularity had merited. The IEES has the advantage of being more psychometrically sound and conducive to statistical examination. It contains an equal number of items per construct and allows for construct dimensionality. This latter point is especially important, given that only moderate or weak agreement between dimensional versions of the FTQ-SF questions and asking the responder to select the singular tendency most characteristic of herself. This, however, happens to also be one major disadvantage of the IEES compared to the FTQ-SF; people may generally be drawn to the concept of more discreet categorization and discovery of personality "types" and are less excited about hearing that the answer is nuanced.

Assessment of the IEES

While Rubin's original scale may be psychometrically problematic, the constructs of sensitivity to internal and external expectations that she identified and that the IEES attempts to measure appear meaningful and not fully captured by common personality measures at present. The IEES had several significant moderate correlations with measures of wellbeing, especially its subscales related to sensitivity to internal expectations. Additionally, it also had several significant moderate correlations with traits in the big-five model of personality, suggesting that internal and external expectation sensitivity might be constructs separate from currently established frameworks and tap into aspects outside of them rather than being redundant factors.

One of the unexpected outcomes of evaluating the IEES was also arguably one of its most critical takeaways as well. Specifically, the examination of and the resulting

factor structure contributed further evidence presented by others that context is a vital component when considering personality factors and constructing scales to assess for them (DiGiuseppe et al., 2021). This has important ramifications in clinical contexts and in any others involving the goal of healthful behavior change, suggesting that it may be especially important to ask individuals about past successful behavior change in situations as similar as possible to their present difficulty. As an example, a therapist may be less effective asking, "what usually motivates you?" or "do you need other people to hold you accountable or are you self-motivated?" These may be helpful starting points but fail to capture important nuances. That individual may say he is self-motivated but is internally reflecting on his drive to meet the internal expectations he set for himself at work while forgetting that he promised himself that he would jog before his appointment but did not. Thus, asking about more specific situations may lead to more effective behavior change recommendations. The example client may get an internal reward from checking off his workplace to-do list but may benefit more from having regular sessions with a health coach versus tracking his own runs.

Limitations of the Scale and Study

While much can be gleaned from the data thus far, the results also suggest that the IEES will need continued refinement and iteration to improve its strength and quality as an assessment tool. The EFA results helped to elucidate the value of context, but the factor structures suggested were ultimately messier and more disjointed than the underlying theory would suggest. Additionally, the internal consistency of many subscales was poor. This may be due, in part, to the diversity of situations across items in each context scale. For example, the items assessing expectation sensitivity socially ask

about responses to “friends, family, and partners;” an individual may have very different response style expectations depending on which of those three groups of people is involved in each scenario. Some other items describe reporting to a boss and some to a group of friends or colleagues, and these relationships may carry very different weights and valences for respondents. Additionally, some questions refer to motivation to engage in activities while others describe internally or externally prescribed identities (for example, “identifying as “health conscious”” or “having other people consider me their “friend””). These can be tapping into other confounding or complicating factors. Ultimately, these points only further highlight the importance of considering context when assessing any proposed aspect of personality or behavior change mechanisms.

Another area worth further exploration is the relationship between sensitivity to internal and external expectations with the constructs of internal and external motivation. As described earlier in the present dissertation, they are conceptually different factors. Motivations are about where the reward or punishment is coming from while the other is about who is holding the individual accountable. One can use external motivators to meet an internal expectation, like having a favorite snack when completing one’s week of scheduled workouts, working towards his goal of becoming a regular exerciser. Likewise, one can find internal motivation for an external expectation, such as reminding oneself of one’s passion for a chosen field when working through a dissertation or similarly difficult academic task. As the present study did not include a measure of internal and external motivation, future studies may help to further disentangle and examine the relationships between these constructs.

The demographics of the present sample also presents limitations to the generalizability of the findings. While data from over 400 individuals were collected, most respondents were White, female, and northeast-based Americans. This is especially important to consider given the huge variation in expectations imposed on different groups based on factors such as gender, race, ethnicity, and culture. For example, it can be hypothesized that individuals identifying as female may be faced with a greater number of external expectations to meet and may endorse higher levels of sensitivity to external expectations; in reality, this elevation may reflect stronger and compounded external pressures as opposed to a natural sensitivity to such expectations. Furthermore, in this example, having a greater number of external expectations to meet may then be causing a spurious relationship with lower ratings of wellbeing. Therefore, greater sample diversity may allow for more robust between-group analyses, comparisons, and conclusions.

Future Directions and Conclusion

The immense popularity of Rubin's Four Tendency Framework suggests that even individuals outside of the field of psychology are highly motivated to learn about what drives their behavior and are increasingly searching for newfound self-knowledge to enhance their lives. This excitement for self-improvement and learning about human thought, feeling, and behavior is in many ways exciting and positive and may help reduce stigma around seeking mental health services. However, a general audience hungry for self-hacks may not be as discerning or as informed about the rigor needed to adequately investigate approaches and claims. Likewise, authors and thought leaders with potentially promising ideas may not have the expertise required to verify their concepts through the

scientific method, or even the insight to do so before circulation. In a time of ceaseless streams of information and new content, it is increasingly important to scientifically examine the "pop-psychology" constructs that emerge and are embraced by the public, potentially finding kernels of truth that can be systematically verified as helpful (or not) in bringing individuals closer to their goals. The problem of potentially life-changing insights being stuck in the ivory tower has long been present, and ultimately bestsellers are read by more eyes than the most rigorous and prestigious journal articles. Collaborations between psychologists, researchers, and psychologically-minded writers may help to get the right information into the right hands.

FIGURES AND TABLES

Figure 1

The Four Tendencies Framework by Rubin (2015)

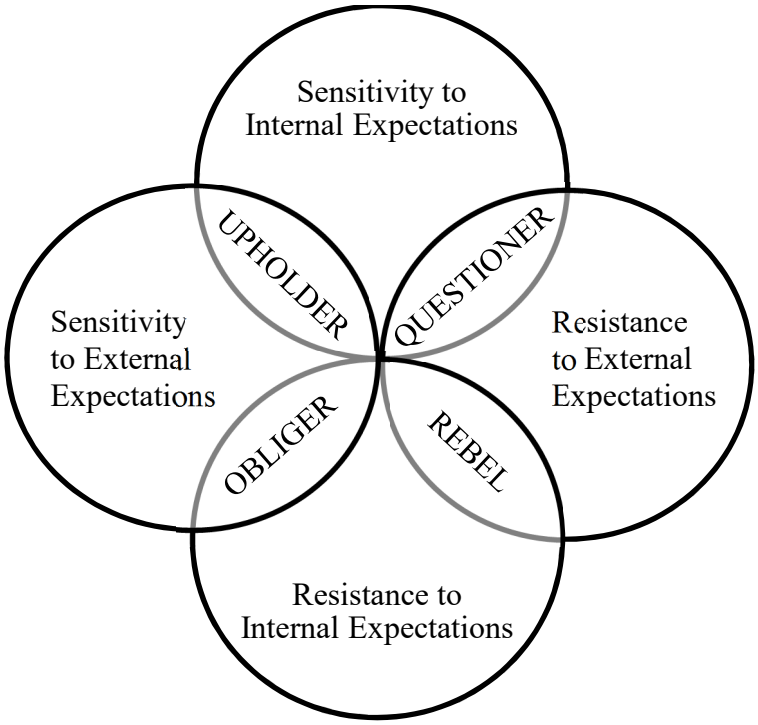

Figure 2

Item Framework for the Internal and External Expectancies Scale (IEES)

	General	Occupational	Health	Social
Sensitivity to Internal Expectations	24) I readily follow through on personal commitments to myself. 27) My performance improves when I track my own progress.	6) I work or study well when I do so independently. 1) I easily motivate myself to complete work or school tasks	11) Identifying as "health conscious" motivates me to engage in healthy behaviors. 5) Committing to personal fitness goals helps me to feel motivated and to act.	9) I easily motivate myself to stay connected to my friends, family, and romantic partners. 17) Self-identifying as a "friend," "relative," or "partner" motivates me to reach out/connect more.
Resistance to Internal Expectations	10) I struggle to follow through on personal goals I set for myself. 18) I find tracking my own progress to be either useless or discouraging to my work/task performance.	28) I struggle to work or study well when I must do so independently. 21) Finding internal motivation to complete work and school tasks is difficult/not helpful.	3) Labeling myself with terms like "health conscious" when pushing a goal is limiting, so I avoid doing so 16) I don't feel particularly motivated or more likely to act if I make a personal commitment to a fitness goal.	31) I struggle to stay connected with friends, family, and partners when I frame it as my personal responsibility to do so. 13) I am not more motivated or more likely to stay connected if I were to self-identify as a "friend," "family member," or "partner."
Sensitivity to External Expectations	15) I readily follow through on goals or tasks that others are expecting me to do. 4) I perform better when I'm held accountable by others.	19) I work or study well when I do so in a group or with a partner. 8) Committing to a deadline from a boss or colleague helps me get things done.	30) Having a coach or accountability partner motivates me to engage in healthy behaviors. 23) If I share my fitness goals with others, I will more likely follow through.	22) Not wanting to disappoint friends, family, or partners motivates me to reach out and stay connected. 7) I reach out to friends, family, and partners more when I know they expect more frequent check-ins.
Resistance to External Expectations	12) I struggle to follow through on goals or tasks that others are expecting me to do. 32) I find others holding me accountable to be either useless or discouraging to my performance.	14) I struggle to work or study well when I must do so in a group 29) I dislike or avoid committing to deadlines set by a boss or colleague.	20) Being bound to a coach or accountability partner is constraining and makes me want to engage in healthy behaviors less. 26) I dislike sharing my fitness goals with others because I find it unmotivating.	25) I struggle to follow through on expectations to stay connected with friends, family, and partners when I know that they expect me to do so. 2) Having others consider me their "friend," "family member," or "partner" has no effect or discourages my reaching out.

Note. Items labeled with placement number within the assessment.

Figure 3

Scree Plot for Exploratory Factor Analysis 1

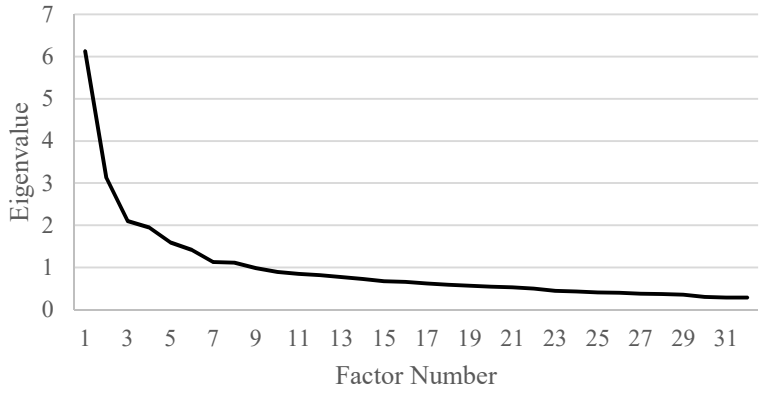

Figure 4

Scree Plot for Exploratory Factor Analysis 2

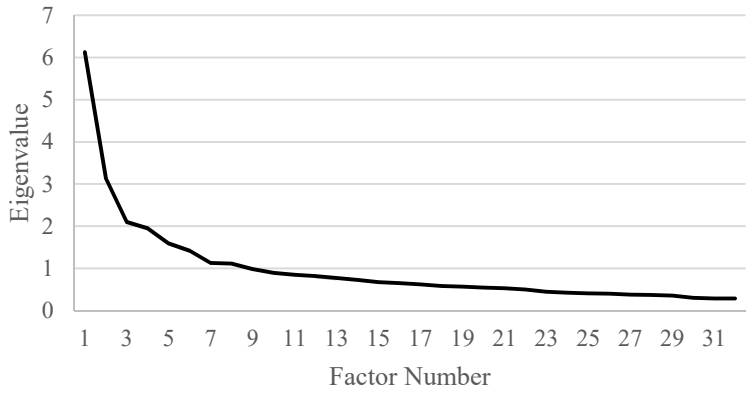

Figure 5

Scree Plot for Exploratory Factor Analysis 3

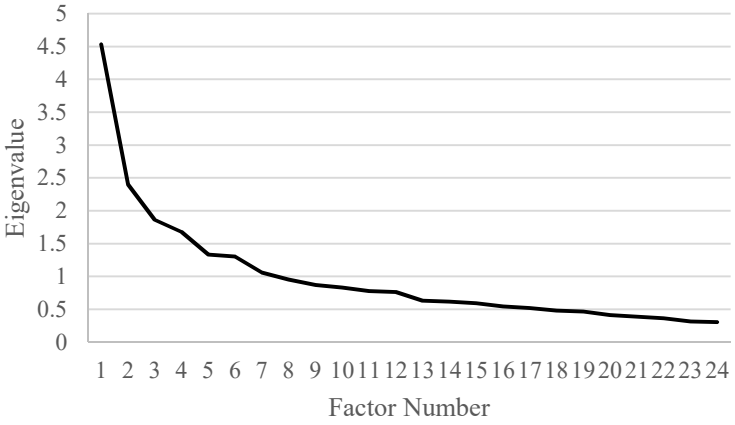

Table 1

Exploratory Factor Analysis 1 on the IEES: Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.128	19.149	19.149	5.601	17.502	17.502	3.947
2	3.130	9.782	28.931	2.603	8.136	25.638	1.855
3	2.102	6.570	35.501	1.557	4.866	30.504	2.577
4	1.952	6.100	41.602	1.382	4.320	34.824	2.482
5	1.592	4.976	46.578	1.057	3.303	38.127	1.692
6	1.420	4.436	51.014	.858	2.682	40.810	2.287
7	1.133	3.542	54.556	.554	1.732	42.541	2.944
8	1.115	3.484	58.040	.535	1.673	44.214	1.321
9	.984	3.076	61.116				
10	.895	2.796	63.912				
11	.849	2.653	66.565				
12	.820	2.563	69.128				
13	.775	2.422	71.550				
14	.729	2.279	73.829				
15	.673	2.102	75.931				
16	.657	2.054	77.984				
17	.623	1.947	79.931				
18	.589	1.839	81.770				
19	.569	1.779	83.550				
20	.547	1.709	85.259				
21	.532	1.661	86.920				
22	.502	1.570	88.489				
23	.450	1.406	89.895				
24	.430	1.342	91.237				
25	.411	1.283	92.521				
26	.402	1.257	93.778				
27	.377	1.178	94.956				
28	.371	1.160	96.116				
29	.358	1.118	97.234				
30	.306	.956	98.190				
31	.290	.907	99.097				
32	.289	.903	100.000				

Note. Using Principal Axis Factoring with direct oblimin rotation, all 32 items, and extracting based on eigenvalue greater than one.

Table 2

Exploratory Factor Analysis 1 on the IEES: Pattern Matrix

	Factor							
	1	2	3	4	5	6	7	8
RI_O 21. Finding internal motivation to complete work and school tasks is difficult/ not helpful.	0.643							
RE_G 12. I struggle to follow through on goals or tasks that others are expecting me to do.	0.640							
SI_O 1. I easily motivate myself to complete work or school tasks.	-0.628							
RI_G 10. I struggle to follow through on personal goals I set for myself.	0.511							
RI_O 28. I struggle to work or study well when I must do so independently.	0.502				0.387			
SE_G 15. I readily follow through on goals or tasks that others are expecting me to do.	-0.462							
RE_O 29. I dislike or avoid committing to deadlines set by a boss or colleague.	0.443							
SI_G 24. I readily follow through on personal commitments to myself.	-0.425							
SE_O 8. Committing to a deadline from a boss or colleague helps me get things done.		0.662						
SE_G 4. I perform better when I am held accountable by others.		0.599						
SE_H 30. Having a coach or accountability partner motivates me to engage in healthy behaviors.								
SI_H 11. Identifying as "health conscious" motivates me to engage in healthy behaviors.			0.685					
SI_H 5. Committing to personal fitness goals helps me to feel motivated and to act.			0.476					
RI_H 3. Labeling myself with terms like "health conscious" when pushing a goal is limiting, so I avoid doing so.			-0.447					
RI_H 16. I don't feel particularly motivated or more likely to act if I make a personal commitment to a fitness goal.			-0.393					
SI_S 9. I easily motivate myself to stay connected to my friends, family, and romantic partners.				0.635				

SI_S 17. Self-identifying as a “friend,” “relative,” or “partner” motivates me to reach out/connect more.		0.529			-0.405
SE_S 22. Not wanting to disappoint friends, family, or partners motivates me to reach out and stay connected.		0.527			
SE_S 7. I reach out to friends, family, and partners more when I know they expect more frequent check-ins .		0.500			
RI_S 31. I struggle to stay connected with friends, family, and partners when I frame it as my personal responsibility to do so.		-0.380			
SE_O 19. I work or study well when I do so in a group or with a partner.			0.679		
RE_O 14. I struggle to work or study well when I must do so in a group			-0.605		
SI_O 6. I work or study well when I do so independently.	-0.362		-0.494		
RE_H 26. I dislike sharing my fitness goals with others because I find it unmotivating.				0.609	
RE_G 32. I find others holding me accountable to be either useless or discouraging to my performance.				0.468	
SE_H 23. If I share my fitness goals with others, I will more likely follow through.				-0.357	
RE_S 25. I struggle to follow through on expectations to stay connected with friends, family, and partners when I know that they expect me to do so.					
RE_H 20. Being bound to a coach or accountability partner is constraining and makes me want to engage in healthy behaviors less.					
SI_G 27. My performance improves when I track my own progress.				-0.682	
RI_G 18. I find tracking my own progress to be either useless or discouraging to my work/task performance.				0.527	
RE_S 2. Having others consider me their “friend,” “family member,” or “partner” has no effect or discourages my reaching out.					0.452
RI_S 13. I am not more motivated or more likely to stay connected if I were to self-identify as a “friend,” “family member,” or “partner.”					0.436

Note. Using Principal Axis Factoring with direct oblimin rotation, all 32 items, and extracting based on eigenvalue greater than one.

Table 3

Exploratory Factor Analysis 2 on the IEES: Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.128	19.149	19.149	5.512	17.224	17.224	4.400
2	3.130	9.782	28.931	2.501	7.815	25.039	2.610
3	2.102	6.570	35.501	1.479	4.622	29.661	2.690
4	1.952	6.100	41.602	1.273	3.977	33.638	2.890
5	1.592	4.976	46.578				
6	1.420	4.436	51.014				
7	1.133	3.542	54.556				
8	1.115	3.484	58.040				
9	.984	3.076	61.116				
10	.895	2.796	63.912				
11	.849	2.653	66.565				
12	.820	2.563	69.128				
13	.775	2.422	71.550				
14	.729	2.279	73.829				
15	.673	2.102	75.931				
16	.657	2.054	77.984				
17	.623	1.947	79.931				
18	.589	1.839	81.770				
19	.569	1.779	83.550				
20	.547	1.709	85.259				
21	.532	1.661	86.920				
22	.502	1.570	88.489				
23	.450	1.406	89.895				
24	.430	1.342	91.237				
25	.411	1.283	92.521				
26	.402	1.257	93.778				
27	.377	1.178	94.956				
28	.371	1.160	96.116				
29	.358	1.118	97.234				
30	.306	.956	98.190				
31	.290	.907	99.097				
32	.289	.903	100.000				

Note. Using Principal Axis Factoring with direct oblimin rotation, all 32 items, and extracting four fixed factors.

Table 4

Exploratory Factor Analysis 2 on the IEES: Pattern Matrix

	Factor			
	1	2	3	4
RI_O 21. Finding internal motivation to complete work and school tasks is difficult/ not helpful.	0.709			
RE_G 12. I struggle to follow through on goals or tasks that others are expecting me to do.	0.677			
RI_G 10. I struggle to follow through on personal goals I set for myself.	0.659			
RI_O 28. I struggle to work or study well when I must do so independently.	0.634			
SI_O 1. I easily motivate myself to complete work or school tasks.	-0.579			
SI_G 24. I readily follow through on personal commitments to myself.	-0.456		0.418	
RE_S 25. I struggle to follow through on expectations to stay connected with friends, family, and partners when I know that they expect me to do so.	0.443			
RI_S 31. I struggle to stay connected with friends, family, and partners when I frame it as my personal responsibility to do so.	0.405			
RE_O 29. I dislike or avoid committing to deadlines set by a boss or colleague.	0.402			
SE_G 15. I readily follow through on goals or tasks that others are expecting me to do.	-0.383			
RI_G 18. I find tracking my own progress to be either useless or discouraging to my work/task performance.				
RI_S 13. I am not more motivated or more likely to stay connected if I were to self-identify as a "friend," "family member," or "partner."				
RE_G 32. I find others holding me accountable to be either useless or discouraging to my performance.		-0.550		
RE_H 20. Being bound to a coach or accountability partner is constraining and makes me want to engage in healthy behaviors less.		-0.489		
RE_O 14. I struggle to work or study well when I must do so in a group		-0.471		
SI_O 6. I work or study well when I do so independently.	-0.393	-0.406		
RE_H 26. I dislike sharing my fitness goals with others because I find it unmotivating.		-0.406		
SE_O 19. I work or study well when I do so in a group or with a partner.		0.392		
SE_H 30. Having a coach or accountability partner motivates me to engage in healthy behaviors.		0.365		
SI_H 5. Committing to personal fitness goals helps me to feel motivated and to act.			0.717	
SI_H 11. Identifying as "health conscious" motivates me to engage in healthy behaviors.			0.529	
RI_H 16. I don't feel particularly motivated or more likely to act if I make a personal commitment to a fitness goal.	0.393		-0.497	
SE_H 23. If I share my fitness goals with others, I will more likely follow through.			0.379	

SI_G 27. My performance improves when I track my own progress.	
RE_S 2. Having others consider me their “friend,” “family member,” or “partner” has no effect or discourages my reaching out.	
RI_H 3. Labeling myself with terms like “health conscious” when pushing a goal is limiting, so I avoid doing so.	
SE_S 22. Not wanting to disappoint friends, family, or partners motivates me to reach out and stay connected.	0.634
SI_S 17. Self-identifying as a “friend,” “relative,” or “partner” motivates me to reach out/connect more.	0.586
SE_S 7. I reach out to friends, family, and partners more when I know they expect more frequent check-ins .	0.506
SE_O 8. Committing to a deadline from a boss or colleague helps me get things done.	0.457
SI_S 9. I easily motivate myself to stay connected to my friends, family, and romantic partners.	0.441
SE_G 4. I perform better when I am held accountable by others.	0.430

Note. Using Principal Axis Factoring with direct oblimin rotation, all 32 items, and extracting four fixed factors.

Table 5

Exploratory Factor Analysis 3 on the IEES: Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	4.532	18.881	18.881	3.989	16.623	16.623	2.235
2	2.399	9.995	28.876	1.873	7.802	24.425	2.582
3	1.862	7.758	36.633	1.306	5.440	29.865	.995
4	1.679	6.997	43.631	1.095	4.563	34.428	1.596
5	1.334	5.559	49.190	.747	3.110	37.538	2.243
6	1.305	5.438	54.627	.727	3.028	40.567	1.062
7	1.059	4.411	59.038	.451	1.878	42.444	2.140
8	.954	3.975	63.013				
9	.868	3.618	66.631				
10	.833	3.473	70.104				
11	.778	3.242	73.346				
12	.761	3.171	76.517				
13	.633	2.638	79.155				
14	.619	2.579	81.733				
15	.592	2.467	84.200				
16	.543	2.263	86.463				
17	.519	2.163	88.626				
18	.478	1.992	90.618				
19	.464	1.933	92.551				
20	.413	1.720	94.271				
21	.388	1.615	95.886				
22	.365	1.521	97.407				
23	.317	1.320	98.727				
24	.305	1.273	100.000				

Note. Using Principal Axis Factoring with direct oblimin rotation, 24 items (no general context items), and extracting based on eigenvalue greater than one.

Table 6

Exploratory Factor Analysis 3 on the IEES: Pattern Matrix

	Factor						
	1	2	3	4	5	6	7
SI_S 9. I easily motivate myself to stay connected to my friends, family, and romantic partners.	0.607						
SI_S 17. Self-identifying as a "friend," "relative," or "partner" motivates me to reach out/connect more.	0.604						
SE_S 22. Not wanting to disappoint friends, family, or partners motivates me to reach out and stay connected.	0.541						
SE_S 7. I reach out to friends, family, and partners more when I know they expect more frequent check-ins .	0.539						
RI_S 31. I struggle to stay connected with friends, family, and partners when I frame it as my personal responsibility to do so.							
RI_O 21. Finding internal motivation to complete work and school tasks is difficult/ not helpful.		0.717					
SI_O 1. I easily motivate myself to complete work or school tasks.		-0.655					
RI_O 28. I struggle to work or study well when I must do so independently.		0.580					
RE_O 29. I dislike or avoid committing to deadlines set by a boss or colleague.		0.403					
RE_S 25. I struggle to follow through on expectations to stay connected with friends, family, and partners when I know that they expect me to do so.							
RE_S 2. Having others consider me their "friend," "family member," or "partner" has no effect or discourages my reaching out.			-0.465				
RI_S 13. I am not more motivated or more likely to stay connected if I were to self-identify as a "friend," "family member," or "partner."			-0.385				
SE_O 19. I work or study well when I do so in a group or with a partner.				-0.672			
RE_O Please rate the degree to which you agree with each statement below: - 14. I struggle to work or study well when I must do so in a group				0.611			
SI_O 6. I work or study well when I do so independently.		-0.424		0.471			
RE_H 26. I dislike sharing my fitness goals with others because I find it unmotivating.					0.733		
SE_H 23. If I share my fitness goals with others, I will more likely follow through.					-0.468		
SE_O 8. Committing to a deadline from a boss or colleague helps me get things done.						-0.579	

SE_H 30. Having a coach or accountability partner motivates me to engage in healthy behaviors.		
RE_H 20. Being bound to a coach or accountability partner is constraining and makes me want to engage in healthy behaviors less.		
SI_H 5. Committing to personal fitness goals helps me to feel motivated and to act.		-0.654
SI_H 11. Identifying as "health conscious" motivates me to engage in healthy behaviors.		-0.600
RI_H 16. I don't feel particularly motivated or more likely to act if I make a personal commitment to a fitness goal.	0.355	0.466
RI_H 3. Labeling myself with terms like "health conscious" when pushing a goal is limiting, so I avoid doing so.		

Note. Using Principal Axis Factoring with direct oblimin rotation, 24 items (no general context items), and extracting based on eigenvalue greater than one.

Table 7

Results of Confirmatory Factory Analysis of the IEES with All Items

Models	χ^2	*df*	*# of free parameters*	χ^2/df	RMSEA	SRMR	CFI	TLI	NFI	RFI	IFI
"Baseline model"	15979.35	496		*32.216*							
Model 1: 1 factor- All on one factor	4071.406	464	160	*8.775*	*0.138*	*0.121*	*0.767*	*0.751*	*0.745*	*0.728*	*0.767*
Model 2: 2 factor- Internal and external expectations	3741.973	463	161	*8.082*	*0.132*	*0.117*	*0.788*	*0.773*	*0.766*	*0.749*	*0.789*
Model 3: 4 factor- Sensitivity or resistance to internal or external expectations	The model is not admissible: lavaan WARNING: covariance matrix of latent variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate										
Model 4: 4 factor- Rubin's FT factors	The model is not admissible: lavaan WARNING: covariance matrix of latent variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate										
Model 5: 4 factor- Four contexts	The model is not admissible: lavaan WARNING: covariance matrix of latent variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate										
Model 2b: Bifactor- One of four contexts and internal or external expectations	1284.351	417	207	3.080	0.072	*0.071*	0.944	0.933	0.920	0.904	0.944
Model 3b: Bifactor- One of four contexts and sensitivity or resistance to internal or external expectations	The model is not admissible: lavaan WARNING: covariance matrix of latent variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate										
Model 4b: Bifactor- One of four contexts and one of Rubin's FT factors	The model is not admissible: lavaan WARNING: covariance matrix of latent variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate										

Note. χ^2/df = Chi-Square Test of Model Fit; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; CFI = Cumulative Fit Index; TLI = Tucker- Lewis Index; NFI = Bentler-Bonett Normed Fit Index; RFI = Bollen's Relative Fit Index; IFI = Bollen's Incremental Fit Index. N = 407. Italicized and underlined values failed to meet the recommended values for acceptable fit.

Table 8

Results of Confirmatory Factory Analysis of the IEES without General Context Items.

Models	χ^2	*df*	*# of free parameters*	χ^2/df	RMSEA	SRMR	CFI	TLI	NFI	RFI	IFI
"Baseline model"	7929.764	276		*28.731*							
Model 1NG: 1 factor- All on one factor	2364.977	252	120	*9.385*	*0.144*	*0.119*	*0.724*	*0.698*	*0.702*	*0.673*	*0.725*
Model 2NG: 2 factor- Internal and external expectations	2107.646	228	117	*9.244*	*0.142*	*0.118*	*0.746*	*0.718*	*0.725*	*0.695*	*0.747*
Model 3NG: 4 factor- Sensitivity or resistance to internal or external expectations	The model is not admissible: lavaan WARNING: covariance matrix of latent variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate										
Model 4NG: 4 factor- Rubin's FT factors	1234.463	222	150	*5.561*	*0.106*	*0.087*	*0.868*	*0.836*	*0.844*	*0.806*	*0.869*
Model 5NG: 3 factor- Three contexts	1731.329	249	123	*6.953*	*0.121*	*0.105*	*0.806*	*0.785*	*0.782*	*0.758*	*0.807*
Model 2bNG: Bifactor- One of three contexts and internal or external expectations	666.560	218	154	3.058	0.071	*0.068*	0.941	0.926	0.916	*0.894*	0.942
Model 3bNG: Bifactor- One of four contexts and sensitivity or resistance to internal or external expectations	The model is not admissible: lavaan WARNING: covariance matrix of latent variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate										
Model 4bNG: Bifactor- One of four contexts and one of Rubin's FT factors	The model is not admissible: lavaan WARNING: covariance matrix of latent variables is not positive definite; use lavInspect(fit, "cov.lv") to investigate										

Note. χ^2/df = Chi-Square Test of Model Fit; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; CFI = Cumulative Fit Index; TLI = Tucker- Lewis Index; NFI = Bentler-Bonett Normed Fit Index; RFI = Bollen's Relative Fit Index; IFI = Bollen's Incremental Fit Index. N = 407. Italicized and underlined values failed to meet the recommended values for acceptable fit.

Table 9

IEES Subscales

Subscale	Description	Items	Score Range
IEES Internal (IEES I)	Sensitivity to internal expectations	1, 5, 6, 9, 11, 17, (Reverse scored: 3, 13, 16, 21, 28, 31)	16-80
IEES External (IEES E)	Sensitivity to external expectations	7, 8, 19, 22, 23, 30, (Reverse scored: 2, 14, 20, 25, 26, 29)	16-80
IEES Occupational (IEES O)	Sensitivity to expectations in occupational contexts	1, 6, 8, 19, (Reverse scored: 14, 21, 28, 29)	8-40
IEES Health (IEES H)	Sensitivity to expectations in health contexts	5, 11, 23, 30, (Reverse scored: 3, 16, 20, 26)	8-40
IEES Social (IEES S)	Sensitivity to expectations in social contexts	7, 9, 17, 22, (Reverse scored: 2, 13, 25, 31)	8-40
IEES Internal Occupational (IEES IO)	Sensitivity to expectations in occupational contexts	1, 6, (Reverse scored: 21, 28)	4-20
IEES External Occupational (IEES EO)	Sensitivity to expectations in occupational contexts	8, 19 (Reverse scored: 14, 29)	4-20
IEES Internal Health (IEES IH)	Sensitivity to expectations in health contexts	5, 11, (Reverse scored: 3, 16)	4-20
IEES External Health (IEES EH)	Sensitivity to expectations in health contexts	23, 30, (Reverse scored: 20, 26)	4-20
IEES Internal Social (IEES IS)	Sensitivity to expectations in social contexts	9, 17, (Reverse scored: 13, 31)	4-20
IEES External Social (IEES ES)	Sensitivity to expectations in social contexts	7, 22 (Reverse scored: 2, 25)	4-20

Table 10

Cronbach's α and McDonald's ω Coefficients for the IEES Subscales

Subscale	# of items	α	ω
IEES Internal (IEES I)	16	0.60	0.610
IEES External (IEES E)	16	0.735	0.738
IEES Occupational (IEES O)	8	0.674	0.681
IEES Health (IEES H)	8	0.746	0.748
IEES Social (IEES S)	8	0.663	0.668
IEES Internal Occupational (IEES IO)	4	0.728	0.736
IEES External Occupational (IEES EO)	4	0.516	0.544
IEES Internal Health (IEES IH)	4	0.672	0.687
IEES External Health (IEES EH)	4	0.630	0.643
IEES Internal Social (IEES IS)	4	0.616	0.619
IEES External Social (IEES ES)	4	0.342	0.367

Table 11

Correlations Between the IEES and 20-IPIP-B5

	IEES SUBSCALES										
Correlations	I	E	O	H	S	IO	EO	IH	EH	IS	ES
IPIP E	.120*	.181**	0.084	.129**	.213**	-0.012	.155**	0.066	.152**	.260**	.102*
IPIP O	.153**	0.046	.136**	0.057	0.095	.134**	0.061	0.084	0.013	.130**	0.029
IPIP A	.190**	.360**	.217**	.148**	.375**	0.097	.240**	0.055	.194**	.321**	.337**
IPIP C	.479**	.226**	.426**	.249**	.224**	.471**	.124*	.292**	.131**	.254**	.130**
IPIP S	.335**	.159**	.255**	.226**	.147**	.248**	.116*	.281**	.104*	.179**	0.070

Note. ** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); Underlined values indicate moderate or higher correlations.

Table 12

Correlations Between the IEES and PROMIS-GH

	IEES SUBSCALES										
Correlations	I	E	O	H	S	IO	EO	IH	EH	IS	ES
PROMIS TOTAL	.551**	.304**	.438**	.327**	.344**	.411**	.219**	.405**	.152**	.362**	.232**
PROMIS MH	.473**	.237**	.371**	.272**	.272**	.356**	.176**	.351**	.111*	.304**	.162**
PROMIS PH	.477**	.296**	.403**	.288**	.322**	.359**	.224**	.355**	.135**	.301**	.261**
PROMIS R	.450**	.269**	.391**	.214**	.336**	.362**	.203**	.265**	.098*	.344**	.236**

Note. ** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); Underlined values indicate moderate or higher correlations.

Table 13

Correlations Between the Dimensional and Categorical Forced Choice Items on the FTQ-SF

Correlations	FTQ Upholder Dimensional	FTQ Obliger Dimensional	FTQ Questioner Dimensional	FTQ Rebel Dimensional
FTQ Upholder FC	.239**	-.135**	-.205**	-.284**
FTQ Obliger FC	-0.097	.407**	-.207**	-.132**
FTQ Questioner FC	-0.036	-.263**	.352**	.172**
FTQ Rebel FC	-.144**	-0.031	0.077	.362**

Note: ** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed).
Underlined values indicate moderate or higher correlations.

Table 14

Correlations Between the FTQ-SF and 20-IPIP-B5

Correlations	FTQ Upholder Dimensional	FTQ Obliger Dimensional	FTQ Questioner Dimensional	FTQ Rebel Dimensional
IPIP E	0.032	-0.012	0.003	-0.009
IPIP O	-0.017	-0.011	.112*	.147**
IPIP A	.227**	.120*	0.048	-.101*
IPIP C	.355**	-0.076	0.094	-.108*
IPIP S	.160**	-.320**	.143**	-0.041

Note: ** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); Underlined values indicate moderate or higher correlations.

Table 15

Correlations Between the FTQ-SF and PROMIS-GH.

Correlations	FTQ Upholder Dimensional	FTQ Obliger Dimensional	FTQ Questioner Dimensional	FTQ Rebel Dimensional
PROMIS TOTAL	.285**	-.283**	.102*	-.101*
PROMIS MH	.212**	-.332**	.113*	-0.063
PROMIS PH	.252**	-.161**	0.044	-.150**
PROMIS R	.299**	-.139**	0.059	-0.033

Note. **Correlation is significant at the 0.01 level (2-tailed): *Correlation is significant at the 0.05 level (2-tailed); Underlined values indicate moderate or higher correlations.

Table 16.

Correlations Between the IEES and FTQ-SF.

Correlations	FTQ Upholder Dimensional	FTQ Obliger Dimensional	FTQ Questioner Dimensional	FTQ Rebel Dimensional
IEES I	.461**	-.286**	.187**	-.143**
IEES E	.352**	-0.014	-0.015	-.203**
IEES O	.416**	-.195**	0.076	-.169**
IEES H	.226**	-.136**	0.075	-0.074
IEES S	.345**	-0.040	0.047	-.128*
IEES IO	.397**	-.253**	.130**	-.143**
IEES EO	.199**	-0.010	-0.036	-.104*
IEES IH	.188**	-.212**	.114*	-0.020
IEES EH	.196**	-0.019	0.014	-.106*
IEES IS	.353**	-0.067	.115*	-0.070
IEES ES	.244**	0.002	-0.044	-.160**

Note: ** Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed); Underlined values indicate moderate or higher correlations.

Appendix A: THE IEES SCALE

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	I easily motivate myself to complete work or school tasks.					
2	Having others consider me their "friend," "family member," or "partner" has no effect or discourages my reaching out.					
3	Labeling myself with terms like "health conscious" when pushing a goal is limiting, so I avoid doing so.					
4	I perform better when I am held accountable by others.					
5	Committing to personal fitness goals helps me to feel motivated and to act.					
6	I work or study well when I do so independently.					
7	I reach out to friends, family, and partners more when I know they expect more frequent check-ins.					
8	Committing to a deadline from a boss or colleague helps me get things done.					
9	I easily motivate myself to stay connected to my friends, family, and romantic partners.					
10	I struggle to follow through on personal goals I set for myself.					
11	Identifying as "health conscious" motivates me to engage in healthy behaviors.					
12	I struggle to follow through on goals or tasks that others are expecting me to do.					
13	I am not more motivated or more likely to stay connected if I were to self-identify as a "friend," "family member," or "partner."					
14	I struggle to work or study well when I must do so in a group					
15	I readily follow through on goals or tasks that others are expecting me to do.					
16	I don't feel particularly motivated or more likely to act if I make a personal commitment to a fitness goal.					

17	Self-identifying as a “friend,” “relative,” or “partner” motivates me to reach out/connect more.					
18	I find tracking my own progress to be either useless or discouraging to my work/task performance.					
19	I work or study well when I do so in a group or with a partner.					
20	Being bound to a coach or accountability partner is constraining and makes me want to engage in healthy behaviors less.					
21	Finding internal motivation to complete work and school tasks is difficult/ not helpful.					
22	Not wanting to disappoint friends, family, or partners motivates me to reach out and stay connected.					
23	If I share my fitness goals with others, I will more likely follow through.					
24	I readily follow through on personal commitments to myself.					
25	I struggle to follow through on expectations to stay connected with friends, family, and partners when I know that they expect me to do so.					
26	I dislike sharing my fitness goals with others because I find it unmotivating.					
27	My performance improves when I track my own progress.					
28	I struggle to work or study well when I must do so independently.					
29	I dislike or avoid committing to deadlines set by a boss or colleague.					
30	Having a coach or accountability partner motivates me to engage in healthy behaviors.					
31	I struggle to stay connected with friends, family, and partners when I frame it as my personal responsibility to do so.					
32	I find others holding me accountable to be either useless or discouraging to my performance.					

Appendix B: THE FTQ-SF SCALE

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1 I do what others expect from me- and what I expect from myself.					
2 I do what I have to do. I don't want to let others down, but I may let myself down.					
3 I do what I think is best, according to my judgment. If it doesn't make sense to me, I won't do it.					
4 I do what I want, in my own way. If you try to make me do something- even if I try to make myself do something- I'm less likely to do it.					

5 Of the four statements above, I most strongly identify with:

1. I do what others expect from me- and what I expect from myself.
2. I do what I have to do. I don't want to let others down, but I may let myself down.
3. I do what I think is best, according to my judgment. If it doesn't make sense to me, I won't do it.
4. I do what I want, in my own way. If you try to make me do something- even if I try to make myself do something- I'm less likely to do it.

REFERENCES

Allen, K., & Morey, M. C. (2010). Physical Activity and Adherence. In H. B. Bosworth (Author), *Improving patient treatment adherence: A clinician's guide* (pp. 9-38). Springer.

American Psychological Association. (2013). Online Assessment Measures. https://www.psychiatry.org/psychiatrists/practice/dsm/educational-resources/assessment-measures.

Asendorpf, J. B. (2003). Head-to-head comparison of the predictive validity of personality types and dimensions. *European Journal of Personality*, *17*, 327–346.

Awang, Z. (2012). *A Handbook on SEM Structural Equation Modelling: SEM Using AMOS Graphic* (5th ed.). Kota Baru: Universiti Teknologi Mara Kelantan.

Bartlett, M. S. (1950). Test of significance in factor analysis. *British Journal of Statistical Psychology, 3*(2), 77–85. https://doi.org/10.1111/j.2044-8317.1950.tb00285.x

Berardelli, I., Corigliano, V., Hawkins, M., Comparelli, A., Erbuto, D., & Pompili, M. (2018). Lifestyle Interventions and Prevention of Suicide. *Frontiers in Psychiatry*, *9*, 567. https://doi.org/10.3389/fpsyt.2018.00567

Berk, M., Sarris, J., Coulson, C. E., & Jacka, F. N. (2013). Lifestyle management of unipolar depression. *Acta Psychiatrica Scandinavica*, *127*, 38–54. https://doi.org/10.1111/acps.12124

Boateng, G. O., Neilands, T. B., Frongillo, E. A., Melgar-Quiñonez, H. R., & Young, S. L. (2018). Best practices for developing and validating scales for health, social, and behavioral research: A primer. *Frontiers in public health*, *6*, 149. https://doi.org/10.3389/fpubh.2018.00149

Bosworth, H. B., Granger, B. B., Mendys, P., Brindis, R., Burkholder, R., Czajkowski, S. M., Daniel, J. G., Ekman, I., Ho, M., Johnson, M., Kimmel, S. E., Liu, L. Z., Musaus, J., Shrank, W. H., Buono, E. W., Weiss, K., & Granger, C. B. (2011). Medication adherence: A call for action. *American Heart Journal, 162*(3), 412–424. https://doi.org/10.1016/j.ahj.2011.06.007

Bravo, A. J., Villarosa-Hurlocker, M. C., & Pearson, M. R. (2018). College student mental health: An evaluation of the DSM–5 self-rated level 1 cross-cutting symptom measure. *Psychological Assessment, 30*(10), 1382–1389. https://doi.org/10.1037/pas0000628

Brown, M.T., & Bussell, J.K. (2011). Medication adherence: WHO cares? *Mayo Clinic proceedings, 86(4)*, 304-314. doi: 10.4065/mcp.2010.0575

Buttery, A. K., Mensink, G. B., & Busch, M. A. (2014). Healthy behaviours and mental health: Findings from the German Health Update (GEDA). *European Journal of Public Health, 25*(2), 219-225. doi:10.1093/eurpub/cku094

Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications, and programming.* New York: Rutledge

Carlson, S. A., Fulton, J. E., Pratt, M., Yang, Z., & Adams, E. K. (2015). Inadequate Physical Activity and Health Care Expenditures in the United States. *Progress in Cardiovascular Diseases*, *57*(4), 315–323. https://doi.org/10.1016/j.pcad.2014.08.002

Cella, D., Riley, W., Stone, A., Rothrock, N., Reeve, B., Yount, S., … Hays, R. (2010). The Patient-Reported Outcomes Measurement Information System (PROMIS) developed and tested its first wave of adult self-reported health outcome item

banks: 2005–2008. *Journal of Clinical Epidemiology, 63*(11), 1179–1194. https://doi.org/10.1016/j.jclinepi.2010.04.011

Centers for Disease Control and Prevention [CDC]. (2020). *Physical Activity Prevents Chronic Disease*. National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). https://www.cdc.gov/chronicdisease/resources/infographic/physical-activity.htm

Chisholm, D., Sweeny, K., Sheehan, P., Rasmussen, B., Smit, F., Cuijpers, P., & Saxena, S. (2016). Scaling-up treatment of depression and anxiety: a global return on investment analysis. *The Lancet Psychiatry*, *3*(5), 415–424. https://doi.org/10.1016/s2215-0366(16)30024-4

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Comrey, A. L., & Lee, H. B. (2016). *A first course in factor analysis*. Psychology Press.

Conner, M., & Norman, P. (2017). Health behaviour: Current issues and challenges. *Psychology & Health*, *32*(8), 895–906. https://doi.org/10.1080/08870446.2017.1336240

Cook, K. F., Jensen, S. E., Schalet, B. D., Beaumont, J. L., Amtmann, D., Czajkowski, S., Dewalt, D. A., Fries, J. F., Pilkonis, P. A., Reeve, B. B., Stone, A. A., Weinfurt, K. P., & Cella, D. (2016). PROMIS measures of pain, fatigue, negative affect, physical function, and social function demonstrated clinical validity across a range of chronic conditions. *Journal of Clinical Epidemiology*, *73*, 89–102. https://doi.org/10.1016/j.jclinepi.2015.08.038

Cutler, R. L., Fernandez-Llimos, F., Frommer, M., Benrimoj, C., & Garcia-Cardenas, V. (2018). Economic impact of medication non-adherence by disease groups: A systematic review. *BMJ Open, 8*(1), e016982. https://doi.org/10.1136/bmjopen-2017-016982

DiGiuseppe, R., Gorman, B., & Raptis, J. (2020). The factor structure of the Attitudes and Beliefs Scale 2: Implications for rational emotive behavior therapy. *Journal of Rational-Emotive & Cognitive-Behavior Therapy. 38*(2), 111–142.

DiGiuseppe, R., Gorman, B., Raptis, J., Agiurgioaei-Boie, A., Agiurgioaei, F., Leaf, R., & Robin, M. W. (2021). The Development of a Short Form of an Irrational/Rational Beliefs Scale. *Journal of Rational-Emotive & Cognitive-Behavior Therapy, 39*(3), 456–490. https://doi.org/10.1007/s10942-021-00386-3

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology, 41,* 417-440.

DiStefano, C., & Morgan, G. B. (2014). A comparison of diagonal weighted least squares robust estimation techniques for ordinal data. *Structural Equation Modeling, 21*(3), 425–438. https://doi. org/10.1080/10705511.2014.915373.

Finney, S. J., & DiStefano, C. (2013). Non-normal and categorical data in structural equation modeling. In G.R. Hancock & R.O. Mueller (Eds.), *Structural equation modeling: A second course* (2nd ed.) (pp. 439–492). Charlotte, NC: Information Age Publishing.

Firth, J., Marx, W., Dash, S., Carney, R., Teasdale, S. B., Solmi, M., Stubbs, B., Schuch, F. B., Carvalho, A. F., Jacka, F., & Sarris, J. (2019). The Effects of Dietary Improvement on Symptoms of Depression and Anxiety: A Meta-Analysis of

Randomized Controlled Trials. *Psychosomatic Medicine*, *81*(3), 265–280. https://doi.org/10.1097/PSY.0000000000000673

Fishbein, M., & Ajzen, I. (2010). *Predicting and changing behavior: The reasoned action approach*. Psychology Press.

Gaynor, S. T., Lawrence, P. S., & Nelson-Gray, R. O. (2006). Measuring homework compliance in cognitive-behavioral therapy for adolescent depression: review, preliminary findings, and implications for theory and practice. *Behavior Modification*, *30*(5), 647–672.

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment*, *4*, 26-42.

Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist*, *48*(1), 26.

Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. De Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe,* Vol. 7 (pp. 7-28). Tilburg, The Netherlands: Tilburg University Press.

Gow, A.J., Whiteman, M.C., Pattie, A. & Deary, I.J. (2005). Goldberg's "IPIP" Big-Five factor markers: Internal consistency and concurrent validation in Scotland. *Personality and Individual Differences,* 39, 317–329

Grimm, L. G., & Yarnold, P. R. (2010). *Reading and understanding multivariate statistics*. American Psychological Association.

Hagger, M. S., Moyers, S., McAnally, K., & McKinley, L. E. (2020). Known knowns and known unknowns on behavior change interventions and mechanisms of action.

Health Psychology Review, 14(1), 199–212. https://doi.org/10.1080/17437199.2020.1719184

Hales, C. M., Carroll, M. D., Fryar, C. D., & Ogden, C. L. (2020). Prevalence of Obesity and Severe Obesity Among Adults: United States, 2017-2018. *NCHS Data Brief*, (360), 1–8.

Hayes, A. F. (2020). Omega [Computer software]. https://afhayes.com/spss-sas-and-r-macros-and-code.html#omega

Hayes, A. F., & Coutts, J. J. (2020). Use omega rather than Cronbach's alpha for estimating reliability. But... *Communication Methods and Measures, 14*(1), 1–24. https://doi.org/10.1080/19312458.2020.1718629

Hays, R. D., Bjorner, J. B., Revicki, D. A., Spritzer, K. L., & Cella, D. (2009). Development of physical and mental health summary scores from the patient-reported outcomes measurement information system (PROMIS) global items. Quality of Life Research, 18(7), 873–880. https://doi.org/10.1007/s11136-009-9496-9

Holt-Lunstad, J., Robles, T. F., & Sbarra, D. A. (2017). Advancing social connection as a public health priority in the United States. *American Psychologist, 72*(6), 517–530. https://doi.org/10.1037/amp0000103

IBM Corp. (2020). IBM SPSS Statistics for Macintosh, Version 27.0. Armonk, NY: IBM Corp. [Computer software].

Institute for Health Metrics and Evaluation. (2021). *The Global Burden of Diseases, Injuries, and Risk Factors Study (GBD).* https://vizhub.healthdata.org/gbd-compare/

International Personality Item Pool. IPIP Home. https://ipip.ori.org/.

JASP Team (2022). JASP (Version 0.16.1) [Computer software].

Jha, P., Ramasundarahettige, C., & Landsman, V. (2013). 21st-Century hazards of smoking and benefits of cessation in the United States. *Journal of Vascular Surgery, 57*(5), 1448. doi:10.1016/j.jvs.2013.03.031

Juwono, I. D., & Szabo, A. (2020). The efficacy of Self Determination Theory-based interventions in increasing students' physical activity: A systematic review. *Physical Activity Review, 8*(1), 74–86. https://doi.org/10.16926/par.2020.08.09

Kabat-Zinn, J., Massion, A. O., Kristeller, J., Peterson, L. G., Fletcher, K. E., Pbert, L., Lenderking, W. R., & Santorelli, S. F. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *The American Journal of Psychiatry*, *149*(7), 936–943. https://doi.org/10.1176/ajp.149.7.936

Kaiser, H. F. (1960*).* The application of electronic computers to factor analysis. *Educational and psychological measurement, 20*(1), 141–151. https://doi.org/10.1177/001316446002000116

Kaiser, H. F. (1970). A second generation little jiffy. *Psychometrika, 35*(4), 401–415. https://doi.org/10.1007/bf02291817

Kaiser, H. F., & Rice, J. (1974). Little Jiffy, Mark Iv. *Educational and Psychological Measurement, 34*(1), 111–117. https://doi.org/10.1177/001316447403400115

Katzan, I. L., & Lapin, B. (2018). PROMIS GH (Patient-Reported Outcomes Measurement Information System Global Health) Scale in Stroke. *Stroke*, *49*(1), 147–154. https://doi.org/10.1161/strokeaha.117.018766

Kazantzis, N., Whittington, C., Zelencich, L., Kyrios, M., Norton, P. J., & Hofmann, S. G. (2016). Quantity and quality of homework compliance: A meta-analysis of relations with outcome in cognitive behavior therapy. *Behavior Therapy, 47*(5), 755-772. doi:10.1016/j.beth.2016.05.002

Kline, P. (1994). *An easy guide to factor analysis*. New York, NY: Routledge

Kunst, A. (2019, November 28). *New Year's resolutions in the U.S. 2019*. https://www.statista.com/statistics/1076508/most-popular-new-year-s-resolutions-in-the-united-states/.

Laerd Statistics (2020). *Pearson's product moment correlation. Statistical tutorials and software guides.* Retrieved March 09, 2022, from https://statistics.laerd.com/statistical-guides/pearson-correlation-coefficient-statistical-guide.php

Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods, 48*(3), 936–949.

Li, Y., Pan, A., Wang, D. D., Liu, X., Dhana, K., Franco, O. H., Kaptoge, S., Di Angelantonio, E., Stampfer, M., Willett, W. C., & Hu, F. B. (2018). Impact of Healthy Lifestyle Factors on Life Expectancies in the US Population. *Circulation*, *138*(4), 345–355.

Loehlin, J. C. (2004). *Latent variable models: An introduction to factor, path, and structural equation analysis.* Routledge: Psychology Press.

Mahoney, M. R., Farmer, C., Sinclair, S., Sung, S., Dehaut, K., & Chung, J. Y. (2020). Utilization of the DSM-5 Self-Rated Level 1 Cross-Cutting Symptom Measure-

Adult to Screen Healthy Volunteers for Research Studies. *Psychiatry Research,* 286. https://doi.org/10.1016/j.psychres.2020.112822

Malhi, G. S., Bassett, D., Boyce, P., Bryant, R., Fitzgerald, P. B., Fritz, K., Hopwood, M., Lyndon, B., Mulder, R., Murray, G., Porter, R., & Singh, A. B. (2015). Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for mood disorders. Australian & New Zealand Journal of Psychiatry, 49(12), 1087–1206. https://doi.org/10.1177/0004867415617657

Manger, S. (2019). Lifestyle interventions for mental health. *Australian Journal of General Practice*, *48*(10), 670–673. https://doi.org/10.31128/AJGP-06-19-4964

Marchand W. R. (2013). Mindfulness meditation practices as adjunctive treatments for psychiatric disorders. *The Psychiatric clinics of North America*, *36*(1), 141–152. https://doi.org/10.1016/j.psc.2013.01.002

Mardia, K. V. (1970). Measures of multivariate skewness and kurtosis with applications. *Biometrika, 57*, 519-530.

Martino, J., Pegg, J., & Frates, E. P. (2017). The Connection Prescription: Using the Power of Social Interactions and the Deep Desire for Connectedness to Empower Health and Wellness. *American Journal of Lifestyle Medicine, 11*(6), 466–475. https://doi.org/10.1177/1559827615608788

Masters, R. K., Reither, E. N., Powers, D. A., Yang, Y. C., Burger, A. E., & Link, B. G. (2013). The impact of obesity on us mortality levels: The importance of age and cohort factors in population estimates. *American Journal of Public Health, 103*(10), 1895-1901. doi:10.2105/ajph.2013.301379

Mausbach, B. T., Moore, R., Roesch, S., Cardenas, V., & Patterson, T. L. (2010). The relationship between homework compliance and therapy outcomes: An updated meta-analysis. *Cognitive Therapy and Research*, 34(5), 429-438. doi:10.1007/s10608-010-9297-z

McCrae, R. R., & Costa, P. T., Jr. (1996). Toward a new generation of personality theories: Theoretical contexts for the five-factor model. In J. S. Wiggins (Ed.), *The five-factor model of personality: Theoretical perspectives* (pp. 51-87). Guilford.

Michie, S., West, R., Sheals, K., & Godinho, C. A. (2018). Evaluating the effectiveness of behavior change techniques in health-related behavior: a scoping review of methods used. *Translational Behavioral Medicine, 8*(2), 212–224. https://doi.org/10.1093/tbm/ibx019

Millon, T. (1990). *Toward a new personology: An evolutionary model* (1st ed.). Wiley.

Narrow, W. E., Clarke, D. E., Kuramoto, S. J., Kraemer, H. C., Kupfer, D. J., Greiner, L., & Regier, D. A. (2013). DSM-5 Field Trials in the United States and Canada, Part III: Development and Reliability Testing of a Cross-Cutting Symptom Assessment for DSM-5. *American Journal of Psychiatry, 170*(1), 71–82. https://doi.org/10.1176/appi.ajp.2012.12071000

Nielsen, L., Riddle, M., King, J. W., Aklin, W. M., Chen, W., Clark, D., Collier, E., Czajkowski, S., Esposito, L., Ferrer, R., Green, P., Hunter, C., Kehl, K., King, R., Onken, L., Simmons, J. M., Stoeckel, L., Stoney, C., Tully, L., & Weber, W. (2018). The NIH Science of Behavior Change Program: Transforming the science

through a focus on mechanisms of change. *Behaviour Research and Therapy*, 101, 3–11. https://doi.org/10.1016/j.brat.2017.07.002

Nieuwlaat, R., Wilczynski, N., Navarro, T., Hobson, N., Jeffery, R., Keepanasseril, A., Agoritsas, T., Mistry, N., Iorio, A., Jack, S., Sivaramalingam, B., Iserman, E., Mustafa, R. A., Jedraszewski, D., Cotoi, C., & Haynes, R. B. (2014). Interventions for enhancing medication adherence. *The Cochrane Database of Systematic Reviews*, *2014*(11), CD000011. https://doi.org/10.1002/14651858.CD000011.pub4

Osborne, J. W. (2015). What is rotating in exploratory factor analysis? *Practical Assessment, Research, and Evaluation. 20*(2).

Pelletier, L. G., Tuson, K. M., Fortier, M. S., Vallerand, R. J., Briere, N. M., & Blais, M. R. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The sport motivation scale (SMS). *Journal of Sport and Exercise Psychology, 17*(1), 35-53.

Reitsma, M. B., Flor, L. S., Mullany, E. C., Gupta, V., Hay, S. I., & Gakidou, E. (2021). Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and initiation among young people in 204 countries and territories, 1990–2019. *The Lancet Public Health*. https://doi.org/10.1016/s2468-2667(21)00102-x

Rosseel, Y. (2012). lavaan: AnRPackage for Structural Equation Modeling. Journal of Statistical Software, 48(2). https://doi.org/10.18637/jss.v048.i02

Rubin, G. (2015). *Better than before: What I learned about making and breaking habits-To sleep more, quit sugar, procrastinate less, and generally build a happier life* (Reprint ed.). Broadway Books.

Rubin, G. (2019, July 18). *The Four Tendencies Quiz.* Retrieved September 12, 2020, from https://quiz.gretchenrubin.com/

Rubin, G. (n.d.). *Take the Quiz. The Four Tendencies.* Retrieved March 11, 2022, from https://gretchenrubin.com/books/the-four-tendencies/take-the-quiz/

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*, 68-78.

Schuch, F. B., Vancampfort, D., Richards, J., Rosenbaum, S., Ward, P. B., & Stubbs, B. (2016). Exercise as a treatment for depression: A meta-analysis adjusting for publication bias. *Journal of Psychiatric Research*, *77*, 42–51. https://doi.org/10.1016/j.jpsychires.2016.02.023

Schumacker, R. E., & Lomax, R. G. (2016). *A Beginner's Guide to Structural Equation Modeling* (4th Ed.). New York: Routledge.

Sidhu, K. S., Vandana, P., & Balon, R. (2009). Exercise prescription: A practical effective therapy for depression. *Current Psychiatry, 8*(6), 39 –51.

Simms, L. J. (2007). The Big Seven Model of Personality and Its Relevance to Personality Pathology. *Journal of Personality, 75*(1), 65-94. doi:10.1111/j.1467-6494.2006.00433.x

Substance Abuse and Mental Health Services Administration. (2019). *Key substance use and mental health indicators in the United States: Results from the 2018 National Survey on Drug Use and Health.* https://www.samhsa.gov/data/sites/default/files/cbhsq-

reports/NSDUHNationalFindingsReport2018/NSDUHNationalFindingsReport2018.pdf

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics.* Boston: Pearson Education Inc.

Tang, W., & Kreindler, D. (2017). Supporting Homework Compliance in Cognitive Behavioural Therapy: Essential Features of Mobile Apps. *JMIR Mental Health*, *4*(2), e20. https://doi.org/10.2196/mental.5283

Taylor, K. L., Simpson, S., Jelinek, G. A., Neate, S. L., De Livera, A. M., Brown, C. R., O'Kearney, E., Marck, C. H., & Weiland, T. J. (2018). Longitudinal Associations of Modifiable Lifestyle Factors With Positive Depression-Screen Over 2.5-Years in an International Cohort of People Living With Multiple Sclerosis. *Frontiers in Psychiatry*, *9*, 526. https://doi.org/10.3389/fpsyt.2018.00526

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity, 9*(1), 78. https://doi.org/10.1186/1479-5868-9-78

U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2020). *Dietary Guidelines for Americans, 2020-2025. 9th Edition*. Retrieved from http://www.dietaryguidelines.gov.

U.S. Department of Health and Human Services. (2018). *Physical Activity Guidelines for Americans, 2nd edition.* Washington, DC: U.S.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Briere, N. M., Senecal, C., & Vallieres, E. F. (1992). The academic motivation scale: A measure of intrinsic, extrinsic, and

amotivation in education. *Educational and Psychological Measurement, 52*(4), 1003-1017.

Van Leeuwen, K., De Fruyt, F., & Mervielde, I. (2004). A longitudinal study of the utility of the resilient, overcontrolled, and undercontrolled personality types as predictors of children's and adolescents' problem behaviour. *International Journal of Behavioural Development*, 28, 210–220.

Vaughan, B., Mulcahy, J., & Fitzgerald, K. (2020). PROMIS® General Life Satisfaction scale: construct validity in musculoskeletal pain patients. *Chiropractic & Manual Therapies*, 28(1). https://doi.org/10.1186/s12998-020-00320-x

Velten, J., Bieda, A., Scholten, S., Wannemüller, A., & Margraf, J. (2018). Lifestyle choices and mental health: a longitudinal survey with German and Chinese students. *BMC Public Health*, *18*(1), 632. https://doi.org/10.1186/s12889-018-5526-2

Viswanathan, M., Golin, C. E., Jones, C. D., Ashok, M., Blalock, S. J., Wines, R. C., Coker-Schwimmer, E. J., Rosen, D. L., Sista, P., & Lohr, K. N. (2012). Interventions to improve adherence to self-administered medications for chronic diseases in the United States: a systematic review. *Annals of Internal Medicine*, *157*(11), 785–795. https://doi.org/10.7326/0003-4819-157-11-201212040-00538

Walsh, R. (2011). Lifestyle and mental health. *American Psychologist, 66*(7), 579-592. https://doi.org/10.1037/a0021769

Wickham, S. R., Amarasekara, N. A., Bartonicek, A., & Conner, T. S. (2020). The Big Three Health Behaviors and Mental Health and Well-Being Among Young

Adults: A Cross-Sectional Investigation of Sleep, Exercise, and Diet. *Frontiers in Psychology*, 11. https://doi.org/10.3389/fpsyg.2020.579205

Widiger, T. A. (2017). *The Oxford Handbook of the Five Factor Model* (Oxford Library of Psychology). Oxford University Press.

Williams, B., Onsman, A., & Brown, T. (2010). Exploratory factor analysis: A five-step guide for novices. *Australasian Journal of Paramedicine, 8*(3). https://doi.org/10.33151/ajp.8.3.93

World Health Organization. (2011). *WHO Report on the Global Tobacco Epidemic, 2011.* https://www.who.int/tobacco/global_report/2011/en/

World Health Organization. (2018). *Global Status Report on Alcohol and Health* 2018. https://apps.who.int/iris/bitstream/handle/10665/274603/9789241565639-eng.pdf?ua=1

World Health Organization. (2021, September 12). *Depression.* Retrieved from https://www.who.int/news-room/fact-sheets/detail/depression

YouGov. (2017). *The most* common new year's resolutions for 2018 [Infographic]. https://www.statista.com/chart/12386/the-most-common-new-years-resolutions-for-2018/

YouGov. (2018). *NYRs2019 Fieldwork Dates: 6th - 7th December 2018.* [Data set]. https://www.statista.com/chart/12386/the-most-common-new-years-resolutions-for-2018/

YouGov. (2020). *New Year's Resolutions Fieldwork Dates: 18th - 19th December 2019.* [Data set]. https://d25d2506sfb94s.cloudfront.net/cumulus_uploads/document/0k4kb2wehk/

Results%20for%20YouGov%20RealTime%20(New%20Year_s%20Resolutions)%20327%2012.19.xlsx%20%20[Group].pdf

Ypofanti, M., Zisi, V., Zourbanos, N., Mouchtouri, B., Tzanne, P., Theodorakis, Y., & Lyrakos, G. (2015). Psychometric properties of the International Personality Item Pool Big-Five personality questionnaire for the Greek population. *Health Psychology Research*, *3*(2). https://doi.org/10.4081/hpr.2015.2206

Zhang, Z., & Yuan, K.-H. (2018). *Practical Statistical Power Analysis Using Webpower and R* (Eds). Granger, IN: ISDSA Press. [https://webpower.psychstat.org]

Zheng, L., Goldberg, L. R., Zheng, Y., Zhao, Y., Tang, Y., & Liu, L. (2008). Reliability and Concurrent Validation of the IPIP Big-Five Factor Markers in China: Consistencies in Factor Structure between Internet-Obtained Heterosexual and Homosexual Samples. *Personality and Individual Differences, 45*(7), 649–654.

Vita

Name	*Joanne Raptis*
Baccalaureate Degree	*Bachelor of Arts*, *Barnard College of Columbia University, New York* *Major: Psychology*
Date Graduated	*May, 2016*
Other Degrees and Certificates	*Master of Arts, St. John's University, Jamaica: Clinical Psychology*
Date Graduated	*May, 2020*