

FLOW AND THE FIVE-FACTOR MODEL (FFM) OF  
PERSONALITY CHARACTERISTICS

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ABSTRACT

Flow is an area that has had a flourish of research emerge within the past couple of decades originating in the sport psychology literature (Jackson & Eklund, 2006; Hefferon & Ollis, 2006; Kee & Wang, 2008) and in a multitude of other areas of study since such as academics, creativity, motivation, and gaming (Cermakova, Moneta, & Spada, 2010; Fritz & Avsec, 2007; Fullagar & Mills, 2008; Jin, 2011; Lee, 2005). Presently, the study of flow has arisen in the area of personality and the individual characteristics that contribute to one's personality (Ullén, et al., 2012). The purpose of the current study was to provide the beginning investigation into flow and personality characteristics (as represented by the Five-Factor Model of Personality) to offer insight into dispositional flow and the autotelic personality. Additionally, the purpose of this study was to improve on the limitations that were presented in Ullén and colleagues' (2012) and Ross and Keiser's (2014) studies. The sample consisted of 409 English-speaking adults who completed the study measures online. Results of exploratory and confirmatory factor analyses indicated relationships between dispositional flow and four of the five personality factor. Specifically, results revealed

positive relationships between dispositional flow and the following personality factors: extraversion, openness to experience, and conscientiousness. These relationships suggest that individuals higher in these personality traits may have a greater disposition to experience flow. Results revealed an inverse relationship between dispositional flow and neuroticism suggesting that neurotic tendencies may possibly hinder an individual's disposition to experience flow. Furthermore, the present study improved upon the limitations of the current studies by providing a larger, more heterogeneous sample that aligned more closely with the normative sample of the measurements and utilized valid and reliable measurements for dispositional flow and personality. The present findings highlight the complex and multi-dimensional relationships that exist between dispositional flow and personality characteristics; as well as providing a foundation for future research to continue to explore these relationships. Limitations, future areas of research, and implications are discussed.

## APPROVAL PAGE

The faculty listed below, appointed by the Dean of the School of Education, have examined a dissertation titled “Flow and the Five-Factor Model (FFM) of Personality Characteristic,” presented by Patricia Lee Hager, candidate for the Doctor of Philosophy degree, and certify that in their opinion it is worthy of acceptance.

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## CHAPTER I

### INTRODCUTION

Flow is an area that has had a flourish of research emerge within the past couple of decades. Coming out of the sport psychology literature, flow has continued to have a strong presence in that field into the 2000s (Jackson & Eklund, 2006; Hefferon & Ollis, 2006; Kee & Wang, 2008). Flow has also seen an emergence in research in many other areas aside from sport psychology over the past decade, including academics, creativity, motivation, video gaming, and online Internet use to simply name a few (Cermakova, Moneta, & Spada, 2010; Fritz & Avsec, 2007; Fullagar & Mills, 2008; Jin, 2011; Lee, 2005). Currently, flow is again seeing an emergence into a new area of study – personality and the individual characteristics that contribute to one’s personality (Ross & Keiser, 2014; Ullén et al., 2012). This area of research attempts to provide more information about the flow experience and why certain individuals may be more likely (or less likely) to possess a disposition to experience flow.

Flow is a motivational state that occurs when there is a balance between an individual’s perceived challenges and the individual’s skill level during an activity that results in an optimal mental state and profound enjoyment (Csikszentmihalyi, 1990). It has been defined as both a dispositional trait characteristic and a situational state characteristic. Individuals who engage more frequently in experiencing flow are said to possess an autotelic personality, or a greater propensity to engage in activities that allow for an

experience of flow (Jackson & Eklund, 2002). Flow is described to have nine dimensions: challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on task, sense of control, loss of self-consciousness, time transformation, and autotelic experience (Csikszentmihalyi, 1990). A detailed discussion of each dimension can be found in Chapter 2.

The term flow has also been utilized by individuals to describe their state of mind when their consciousness is harmoniously ordered, and they pursue whatever they wish simply for the sake of doing it rather than other external rewards. Often times this can lead to greater happiness and satisfaction in life. This can easily be seen when looking at some of the activities that consistently produce a flow experience, such as sports, games, art, and hobbies. People who engage in these types of activities often report happier, more satisfied, and fulfilled lives (Csikszentmihalyi, 1990).

As flow is seen to be a beneficial aspect in an individual's life, it is advantageous for individuals to learn how to engage in flow in multiple areas in their lives, such as during work, leisure activities, and interacting with others. When individuals can learn to derive moment-by-moment enjoyment from such activities, their quality of life improves and happiness often ensues (Csikszentmihalyi, 1990). This is considered to be an optimal level of performance or functioning. The field of positive psychology has an interest in studying how individuals achieve an optimal level of performance or functioning (Gable & Haidt, 2005), and thus flow may provide insight into how this can occur.

In order to best understand how individuals can achieve an optimal level of performance or functioning, it is best to understand the autotelic personality or disposition to experience flow. The autotelic personality is combination of receptive and active qualities.

Receptive in that individuals are open and interested in new challenges they may discover and active in that they engage and are persistent through the challenges (Baumann, 2012). Autotelic derives from the Greek words of *auto* and *telos* – *auto* meaning self and *telos* meaning goal. Autotelic refers to a self-contained activity; an activity that is done because doing it is the reward in and of itself rather than engaging in the activity with the expectation of receiving benefits from an external source (Csikszentmihalyi, 1990). The simultaneous presence of these two qualities fosters a dynamic and dialectical tension for individuals leading to “optimal” personality development and evolvment of these individuals. Thus, these individuals may have a benefit or advantage in developing their talents and skills to their fullest extent (Baumann, 2012).

Because possessing an autotelic personality or disposition to experience flow is a desirable characteristic, researchers have sought to determine what may distinguish individuals that possess an autotelic personality from those who do not (Csikszentmihalyi, 1990). Individuals who possess an autotelic personality are those who can easily take opportunities, even potential threats, and turn them into enjoyable challenges. These individuals are often engaged, and thus not bored, with activities in their lives; possess decreased levels of anxiety, are aware of their environments, and frequently engage in the experience of flow. They are able to self-derive their goals rather than relying on external forces to guide them. These individuals become immersed in activities in which they engage and grow deeply involved. They are able to allow their action and awareness to merge, sometimes leading to a loss of self-consciousness intensifying the deep involvement they experience. These individuals are those who are able to find enjoyment in almost any



circumstance or situation that may arise, because they are in control of their minds and experiences (Csikszentmihalyi, 1990).

In addition to the above characteristics outlined by Csikszentmihalyi, research has found other traits or attributes that those possessing an autotelic personality may also hold. Flow has been found to be related to subjective well-being, and more specifically, the emotional aspects of well-being (Fritz & Avsec, 2007). Thus, these individuals likely have a greater sense of well-being than those who do not possess an autotelic personality.

Mindfulness has also been linked to flow, in that the more mindful an individual is, the greater the likelihood of engaging in a flow experience (Kee & Wang, 2008). Individuals possessing an autotelic personality are likely to be able to more easily engage in mindfulness practices, and thus allow them to be more open to flow experiences. Possessing confidence and intrinsic motivation have also been linked to greater experiences of flow (Fullagar & Mills, 2008; Hefferon & Ollis, 2006). Those with an autotelic personality are motivated internally to set and achieve their goals and often are perceived to be confident individuals.

Individuals possessing an autotelic personality and those who engage in flow experiences are highly motivated and often considered to be well-adjusted individuals. These individuals strive to perform well in all areas of their life including academically, professionally, and socially. They are productive individuals who help contribute the greater societal welfare (Csikszentmihalyi, 1990). Not only do these individuals help to promote the overall well-being of society, they are also motivated to produce positive outcomes for their fellow members of society. They attempt to help make society a better place for themselves to live and engage in, as well as, their fellow members. These individuals are able to perform their work with efficiency and precision. Engaging in a flow

experience helps to facilitate these positive outcomes and well-being. Individuals who are able to engage in any flow experience are likely to be more productive societal members. These experiences can range from infrequent to consistent; however, despite the varying degrees that individuals may experience flow, any flow experience assists in creating well-adjusted, contributing individuals.

One area of society in which this could be illustrated is through those whose work affects the well-being and development of other individuals, particularly those working in the service industry. These individuals include those working in education, healthcare, protective services, social services, and the like. As these individuals are able to engage in a flow experience, they are able to provide better services to other individuals. For example, surgeons who can enter into flow while performing a life-saving surgery are more likely to perform at an optimal level of functioning and thus provide a better service to their patients increasing the patients' survival rate and rate of recovery (Fave & Massimini, 2003; Csikszentmihalyi, 1990). The same can also be seen in education. When educators are able to enter into a state of flow, they are performing optimally and thus providing the best level of education to their students and increasing the students' desire to learn and become productive members of society themselves (Fave & Massimini, 2003). These examples help to illustrate the importance those who are able to engage in flow play in society and the benefits that they provide. Assisting in identifying those who possess an autotelic personality and those who are likely to experience flow at varying degrees is not only a benefit to these individuals, but also to society as a whole (Csikszentmihalyi, 1990).

Additionally, insight into the autotelic personality and individuals' disposition to experience flow may be of benefit to the field of counseling psychology. Counseling

psychologists strive to learn about their clients and their ability to cope with the demands of their environments. Insight into clients' disposition to experience flow (or lack of disposition) can provide counseling psychologists with information to better promote growth and change in their clients.

Although research has begun to decipher the autotelic personality and the characteristics that individuals possessing an autotelic personality may hold, much is still unknown about how or why certain individuals may develop an autotelic personality rather than other individuals. An area of study that may lend some insight into this investigation is that of personality and the different characteristics that go into making up an individual's personality (Baumann, 2012). The Five-Factor Model of Personality (FFM) has long been a widely studied and supported model of personality (McCrae & John, 1990). This model consists of the Big Five factors: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. A detailed discussion of each factor can be found in Chapter 2. Exploring the relationship each of these factors has with flow may lend further insight into the autotelic personality and individuals' disposition to experience flow.

Neurotic individuals may likely possess characteristics that are found to be opposite of those who hold an autotelic personality. Often neurotic individuals are described as possessing a negative affect leading to anxiety, depression, and self-consciousness (McCrae & Costa, 1987; McCrae & John, 1990); traits that may impede individuals from engaging in flow experiences. The other traits of the FFM may more positively relate to those who hold an autotelic personality. Individuals possessing extraversion are often described as sociable, fun-loving, sensation-seeking, friendly, and assertive (McCrae & Costa, 1987). Many of these characteristics may also be seen in individuals who possess an autotelic personality.

Open individuals are those who are creative, imaginative, daring, and original (McCrae & Costa, 1987), while conscientious individuals are those who are able to problem solve, possess positive affect, and have a desire to achieve (McCrae & Costa, 1987; McCrae & John, 1990). Traits of both of these factors may also be seen in individuals who possess an autotelic personality and align with many of the traits outlined by Csikszentmihalyi (1990). Individuals possessing agreeableness are described as having altruism, being warm and trusting, cooperative, compliant, caring, and emotional supportive (McCrae & John, 1990). Although these traits may not align as precisely as the traits of some of the other personality factors, they may embody similar principles of many of the traits that those possessing an autotelic personality hold.

Overall, the investigation of the FFM and the characteristics associated with these traits may provide more insight into the autotelic personality and what individuals may or may not be likely to have a disposition to experience flow. Because this is an area of exploration that is needed in the current research, the present study will attempt to investigate the possible relationships between an individual's disposition or propensity to experience flow and the FFM. Currently, only a few studies have been found that examined the potential relationship between flow and personality characteristics (Ullén et al., 2012; Ross & Keiser, 2014). These studies provide insight into which personality characteristics may be more likely to have an association with individuals' disposition (or the lack of disposition) to experience flow. Specifically, each of these studies found relationships with the FFM characteristics of neuroticism and conscientiousness with dispositional flow. Additionally, Ross and Keiser found relationships between dispositional flow and extraversion and agreeableness. Although these studies provide some evidence to support

relationships between the FFM and an individual's disposition (or lack of disposition) to experience flow, limitations also arise from the studies. Thus, in addition to the explorative purpose of the present study, the present study will also attempt to improve upon the limitations of the previous research and provide a stronger foundation to assist in guiding future research in the field. Continued research into the potential relationships between dispositional flow and personality will offer more insight into the characteristics of the autotelic personality and assist in providing information to fill this void in the current literature.

## CHAPTER II

### LITERATURE REVIEW

Flow has emerged as popular area of interest in the field of psychology and related fields of study. Flow is a motivational state that occurs when there is a balance between the challenge of a given task and the individual's skill level, resulting in an optimal mental state and profound enjoyment (Csikszentmihalyi, 1990). An area in which flow has been of particular interest is that of positive psychology. Positive psychology is "the study of conditions and processes that contribute to the flourishing or optimal functioning of people, groups, and institutions" (Gable & Haidt, 2005, p. 104). Positive psychology has urged the field of psychology to move beyond simply investigating the negative or neutral aspects of individuals and institutions towards an investigation of the positive aspects. In many ways positive psychology attempts to understand the "other side of the coin" and provide a full range of human experience (Gable & Haidt, 2005).

Flow also attempts to understand a full range of experience and provides research into positive aspects of performance. It is an optimal mental state and thus contributes to an individual's optimal functioning. Three pillars of positive psychology have emerged: positive subjective experience, positive individual characteristics, and positive institutions and communities (Seligman, 2002). The study of flow assists in providing evidence for many of these pillars. Flow is a positive subjective experience that is enjoyable and sought by many individuals. Dispositional flow is a positive characteristic for individuals to

possess and allows individuals to engage more frequently in positive subjective experience and optimal functioning. Overall, the study of flow embodies the characteristics and pillars of positive psychology and provides insight into the positive aspect of the human experience.

Positive psychology also has a strong connection to counseling psychology as each of these fields attempt to study ways in which individuals can perform optimally and operate utilizing a strengths-based approach. Counseling psychology utilizes strengths to help individuals better themselves and focus on the positive aspects of their experiences. Counseling psychology also emphasizes the interaction between individuals and their environments, and how individuals can utilize this interaction to help better themselves and increase positive experiences. (Gelso & Fretz, 2001). The theory of flow also embodies these characteristics. Flow is a positive experience that leads to optimal functioning, and the interaction between individuals and their environments can enhance or inhibit individuals' ability to enter into flow. As with positive psychology, flow may also provide insight that may be utilized by those in the field of counseling psychology.

Recently, much literature has been devoted in attempting to understand the concept of flow and how individuals enter into the flow experience. One area that the current literature may continue to expand upon is the investigation of the autotelic personality and an individual's ability or propensity to experience flow. Research into personality characteristics may provide information that gives insight into which individuals may be more or less likely to experience flow. To date, limited research has been found that has examined the potential relationship between flow and personality characteristics (Ross &

Keiser, 2014; Ullén et al., 2012); thus the purpose of the current research is to examine that relationship and evaluate the validity of measuring the constructs utilized in the study.

### **Flow**

Flow, as defined by Csikszentmihalyi (1990), is a motivational state that occurs when an individual's perceived challenge and skill level during an activity are balanced, and the individual experiences optimal performance and profound enjoyment in the activity. Flow has also been described as “a state of consciousness where people become totally immersed in an activity” (Bakker, 2005, p. 26), and as a subjective experience in which an individual is deeply engaged in an activity or task (Keller & Bless, 2008). Thus, flow can be categorized as a positive and intrinsically rewarding motivational state for an individual.

Flow has been defined as both a dispositional trait characteristic and a situational state characteristic, and thus measurements have been developed to assess flow as both; the Dispositional Flow Scale-2 (DFS-2) measures flow as a trait characteristic, while the Flow State Scale-2 (FSS-2) measures flow as a state characteristic. Those who are dispositionally inclined to experience flow are considered to possess an *autotelic personality*, meaning they have a greater propensity to engage in activities for their own sake and to experience state flow (Jackson & Eklund, 2002). Those possessing an autotelic personality are focused on engaging in activities because they enjoy the activities for the sake of the activities themselves rather than focusing on the external consequences of those activities (Csikszentmihalyi, 1990).



## Nine Dimensions of Flow

Csikszentmihalyi (1990) defined nine dimensions of flow: challenge-skill balance, action-awareness merging, clear goals, unambiguous feedback, concentration on task, sense of control, loss of self-consciousness, time transformation, and autotelic experience.

1. *Challenge-skill balance* describes the process of matching both challenge and skill to one another. If the appropriate balance is not met, an individual may experience boredom, worry, or apathy rather than flow. Thus an activity should represent a challenge to an individual, but only to the extent that he/she is able to realize it.
2. *Action-awareness merging* occurs when individuals feel they are completely immersed or enmeshed in the current task, and thus lose track of everything outside of the activity. This is one of the most typical elements of flow that is described by individuals after a flow experience. For example, athletes will often report being “in the zone.”
3. *Clear goals* is another necessary element of the flow experience, and simply means that the demands for action are apparent and rational. Individuals often state they know what they are exactly supposed to do. This clarity occurs during all aspects of the performance and keeps the individual connected.
4. *Unambiguous feedback* is similar to clear goals, but instead of focusing on the demands for action, it states that the feedback from those demands should be explicit and not lacking in clarity. By being able to pay attention to feedback, the individual is able to determine if he/she is on track. Feedback can come from the individual and/or external sources.

5. *Concentration on task* ensures that individuals maintain focus on the current task at hand, and thus keep other stimuli to a minimum. An individual does not experience extraneous thoughts or distractibility as often is experienced during other thoughts or tasks. Simply stated, the individual is focused solely on the here and now.
6. *Sense of control* refers to individuals' ability to control themselves rather than those around them, and to not feel threatened by control of others.
7. *Loss of self-consciousness* is often described as self-forgetfulness, and is considered to be a lack of self-awareness. In order to experience flow, an individual must be able to let go of his/her "inner voice" that ensures expectations are being fulfilled, behavior satisfies the accepted rules, etc.
8. *Time transformation* is said to be experienced by many during flow, and refers to the alteration of the concept of time during the experience. The experience of time may differ from individual to individual, with some reporting that time stops, others that time is significantly slowed down, and still others stating that time speeds up.
9. *Autotelic experience* is the final component to the flow experience, and describes the nature of the experience as being the reward in itself; no extrinsic reward is needed. Flow is an enjoyable experience and thus an individual is motivated to return to its state. This experience is also what drives individuals towards greater challenges to continue their flow experiences. These feelings occur after the flow experience (performance) as during the performance an individual's energy is directed toward the task.

## **Flow in Different Contexts**

In order to understand flow and the dimensions of flow, research has been conducted in a number of different contexts and settings. These different contexts and settings allowed for a broad understanding of the general concept of flow, as well as each of the nine dimensions. These contexts have included educational and classroom experiences, music and composition, sports and athletics, and online and video gaming to name a few. The following is a brief overview of how flow and its dimensions have been studied in these contexts.

**Academics.** Shernoff, Csikszentmihalyi, Schneider, and Shernoff (2003) utilized a longitudinal sample of high school students ( $N = 526$ ) across the United States to examine how these students spent their time in the academic setting, and the conditions in which they reported being engaged. Participants reported experiencing increased engagement when the perceived challenge of the task and their own skill level were high and in balance with one another, the instruction was believed to be relevant, and the learning environment was under the participants' control. Participants also reported to be more engaged in individual and group work rather than listening to classroom lectures, watching videos, or taking exams (Shernoff et al., 2003).

Results revealed that students reported the highest level of engagement under a condition set-up to facilitate state flow, rather than settings set-up to induce apathy, relaxation, or anxiety. When looking at levels of attention in the classroom, students also reported attending to instruction more often during the state flow setting than the other three settings. Finally, quality of experience—including mood, esteem, intensity, and

motivation—was also found to be greatest during the state flow setting (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003).

Cermakova, Moneta, and Spada (2010) sought to determine if dispositional flow partially mediated the relationship between attentional control and approaches to studying (e.g., deep approach to studying, strategic approach to studying, and surface approach to studying). *Attentional control* is the ability to inhibit the automatic fight-or-flight response and to foster the exploration of more elaborate and adaptive responses to a perceived threat or challenge. The authors hypothesized that attentional control would serve as a precursor of dispositional flow; thus, a part of the influence that attentional control has on the approaches to studying is carried over by dispositional flow. They sampled undergraduate students ( $N = 237$ ) from a university in London. The majority of the participants was from the United Kingdom, male, and identified as White. Participants completed measures one week prior to examinations (Cermakova et al., 2010).

Their results supported the hypothesis that dispositional flow partially mediates the relationship between attentional control and the three approaches to studying. Dispositional flow was found to have a significant and positive relationship with deep approach and strategic approach to studying, and a significant and negative relationship with surface approach to studying. Dispositional flow was found to mediate 42% of the total effect of attentional control on deep approach to studying, 47% of the total effect of attentional control on strategic approach to studying, and 42% of the total effect of attentional control on strategic approach to studying. These findings suggest that flow is a consistent mediator of the effects of attentional control on the three approaches to studying (p. 506) and explains

a substantial portion of attentional control's influence on the approaches to studying (Cermakova, Moneta, & Spada, 2010).

Flow has long been a studied concept in the field of academics. Current research supports a positive relationship between flow, both as a state and disposition, and various aspects of academics. Particularly state flow has been shown to have a positive association with students' level of engagement in academics and their ability to attend to instruction within the academic environment. State flow has also been shown to be positively related with overall quality of academic experience including components such as students' esteem, mood, and motivation surrounding their academic endeavors (Shernoff, Csikszentmihalyi, Schneider, & Shernoff, 2003). Dispositional flow has also been found to be related to academics through various approaches to studying. A positive association has been found between proactive studying approaches such as deep studying and strategic approaches, while a negative association with less successful methods of studying such as surface level studying (Cermakova, Moneta, & Spada, 2010). Overall, the quality of these results support the notion that flow is related to various components of academics.

**Procrastination and motivation.** Procrastination has been a common area of research in academics and increasing in flow. Seo (2011) sought to expand on this area by looking at the relationships between procrastination, academic achievement, and flow level in the learning environment. He gathered data from 172 Korean undergraduate students enrolled in educational psychology courses at two universities in South Korea. The sample was primarily women in their sophomore year of college (Seo, 2011).

His findings suggested that procrastination may enable students to achieve a state of flow. More specifically he found that the later students began to prepare for their

examinations, the more likely they were to experience a state of flow. He suggested that procrastination may increase the task challenge, and often these students immerse themselves in studying so that they lose an awareness of time, themselves, and all other matters except for their studying during this period of “cramming.” Despite the finding that “cramming” tends to lead to an increased experience of flow, these students were not likely to perform as well on the examination. Further, the study found that academic achievement was not associated with any of the nine dimensions of flow (Seo, 2011).

Lee (2005) also investigated the relationship of state flow and procrastination. Specifically, he investigated the relationship of motivation and state flow to academic procrastination. He utilized a sample of 262 Korean undergraduate students enrolled in an educational psychology course. The majority of students were male and in their sophomore year (Lee, 2005).

Lee (2005) found that students who are more likely to procrastinate on their academic work are also less likely to experience flow in the learning process and possess a lack of self-determined motivation. More specifically, he found that students who were not in balance with their perceived skills and the perceived challenge of the task were more likely to procrastinate. In addition, students who did not have clear goals, were not able to concentrate on the task at hand, and had high self-consciousness experienced more procrastination on academics. Finally, the impact of motivation on procrastination was examined and found that flow experience was a better predictor of students’ academic procrastination than motivation. These results indicate the importance that flow may play in student’s academic procrastination and motivation (Lee, 2005).

Thatcher, Wretschko, and Fridjhon (2008) explored the relationships between online procrastination, problematic internet use, and flow experiences on the internet. They sought to investigate these relationships due to the interrelatedness of the concepts (e.g., flow being a total absorption of work while procrastination is the complete avoidance of work) and their use as descriptors for online states (e.g., flow is a desirable state while procrastination and problematic Internet use are undesirable states). Their study utilized a sample of 1399 internet users from South Africa recruited through advertisements in an online information technology magazine. Results of their study revealed strong positive relationships between all variables. More specifically, the authors found that procrastination may be a moderator between the relationship of problematic internet use and flow experience, and problematic internet use may be a connector between the relationship of procrastination and flow experience. The authors, however, found flow experience did not impact the relationship between problematic internet use and procrastination (Thatcher, Wretschko, & Fridjhon, 2008).

The strong positive relationship between flow and problematic internet use is opposite previous findings, and the authors suggest that prolonged experiences of flow may lead to more problematic internet use (e.g., individuals spend more time on the internet to experience flow). The relationship between problematic internet use and procrastination was independent of flow; thus one who is high in problematic use will also likely be engaging in procrastination. The relationship between problematic internet use and flow was affected when procrastination was removed, thus their relationship is stronger when someone was utilizing the internet for procrastination. The relationship between procrastination and flow was also affected when problematic internet use was removed, thus

their relationship is weaker in individuals not displaying problematic internet use. Overall the results of Thatcher and colleagues (2008) study provide evidence for the interconnectedness of the three components and the need for further study of procrastination, problematic internet use, and flow.

Similar to procrastination, motivation and flow has become an increasing popular area of study in flow research. Flow is described to be an intrinsically rewarding experience, and thus, exploring its relation to different aspects of motivation may provide insight. Fullagar and Mills (2008) explored the relationship between state flow and different levels of motivation, including intrinsic, extrinsic, and amotivation. Intrinsic motivation refers to behaviors that are driven by internal rewards and satisfaction, extrinsic motivation to behaviors that are driven by external rewards or to avoid punishment, and amotivation to an absence of motivation and a feeling that individuals do not have control over their actions. To further explore this relationship, they evaluated the possible moderation by the need for autonomy of the relationship between flow experience in academics and intrinsic motivation. The authors recruited 327 architecture students to participate in an online survey. The sample was evenly divided between genders (51.8% male) with the majority of participants being in their third year of a five-year program (30.4%). The authors chose to focus on architecture students due to the creative nature of their work, which can lead to high motivation potential and the possibility for flow experience (Fullagar & Mills, 2008).

Results of their study revealed that more intense experiences of flow were associated with more self-determined forms of intrinsic motivation, as well as greater engagement. State flow was negatively related to amotivation; such students were the least likely to experience flow. These findings support flow theory because intrinsic motivation (self-



determined) is positively related to experiencing flow, while non-self-determined forms of motivation, such as amotivation, may be disadvantageous for those wishing to engage in the flow experience. Further, their results indicated that the need for autonomy moderated the relationship between flow experiences and intrinsic motivation. As the relationship between intrinsic motivation and state flow increased, the need for autonomy also increased, suggesting that the strength of the relationship between intrinsic motivation and flow depends on the need for autonomy. Overall, the results of this study support the theory of flow and provide insight into what components may assist in increasing an individual's ability to experience flow (Fullagar & Mills, 2008).

The current research provides sound evidence for the relationship of flow experiences to procrastination and motivation. Research has shown that procrastination can lead to heightened experiences of state flow; however, these experiences do not necessarily lead to better performance (Seo, 2011; Thatcher, Wretschko, & Fridjhon, 2008). These results are further expanded upon by findings that suggest the more likely individuals' are to procrastinate, the less likely they are to experience flow during the learning process (Lee, 2005). Research also supports the positive association between flow experiences and intrinsic motivation (Fullagar & Mills, 2008) supporting flow theory and the autotelic personality. Taken together, the research on procrastination and motivation provide insight in when individuals may likely engage in flow experiences and who may be more likely to engage in these experiences.

**Creativity.** Creativity has been found to be associated with flow with many studies stating that increases in creativity also lead to increases in flow experience. MacDonald, Byrne, and Carlton (2006) sought to study the relationship of state flow, creativity, and

quality of group compositions. They had first-year university students ( $N = 45$ ) work together on group compositions in groups of three individuals. Flow was measured individually for each participant through experience sampling form (ESF), and individual scores were then used to create a group mean or group flow score for each group of three individuals. The majority of these students were male and all were enrolled at a university in central Scotland. Their results found that increased levels of state flow were associated with increased levels of creativity in music students, and more specifically, higher levels of flow were related to compositional creativity. In regards to group flow, as group flow increased, the levels of creativity also increased (MacDonald, Byrne, & Carlton, 2006).

Fritz and Avsec (2007) examined dispositional flow and the subjective well-being of music students during different musical activities (e.g, rehearsals, solo performances, orchestra performances). They recruited 84 students at The Music Academy of Ljubljana in Slovenia to participate in their study. The majority of participants was female and played the piano (Fritz & Avsec, 2007). Their results revealed that dispositional flow was experienced during many different musical activities, and that playing in an orchestra or singing in a chorus appeared to offer the best opportunities to experience flow, because responsibility is dispersed among multiple individuals. Individuals did report experiencing flow during individual performances; however, anxiety was also present when performing in front of an audience, and thus, may have decreased an individual's ability to experience flow. Their results confirmed that several aspects or dimensions of dispositional flow were positively correlated with measures of subjective well-being, including the dimensions of clear goals, challenge-skill balance, concentration on task, and autotelic experience. They also concluded that the experience of flow was more closely related to the emotional aspects

of subjective well-being, rather than the cognitive aspects; and thus dispositional flow emerged as an important predictor of subjective well-being (Fritz & Avsec, 2007).

Manzano, Harmat, Theorell, and Ullén (2010) investigated the possible relationship between psychophysiological measures and state flow experiences. Because flow has been found to have a positive correlation with performance, it is suggested that flow may function as a reward signal that promotes practice in individuals. Thus the authors sought to examine this by exploring the possible psychophysiological aspects of state flow. The authors utilized piano playing as the flow-inducing experiencing. They asked professional classical pianists ( $N = 21$ ) from the Stockholm area to play a musical piece and then rate their flow experience. Professional pianists were utilized as expertise has been shown to increase flow experiences. Individuals repeated their pieces five times to allow for variation of flow to be introduced while maintaining all other factors constant. During the individuals' performances, the authors measured the following psychophysiological responses: pulse pressure waveform, respiration, head movements, and activity from the corrugator supercili and zygomaticus facial muscles, which are involved in making one smile (Manzano, Harmat, Theorell, & Ullén, 2010).

The results of their study revealed a significant relationship between state flow and the following psychophysiological responses: heart period, blood pressure, heart rate variability, activity of the zygomaticus facial muscles, and respiratory depth. More specifically the results revealed decreased heart period, decreased cardiac output, increased activity of the zygomaticus facial muscles, and increased respiratory depth. These findings may suggest that during a physically and cognitively demanding task, an individual may experience increased activation in the sympathetic branch of the autonomic nervous system.

This activation, in combination with deep breathing and activation of the zygomaticus muscles may be used as an indicator of effortless attention and flow. These activations are also seen in conjunction with their emotional responses, which in turn may impact the flow experience. For example, deep breathing and smiling are signs of relaxation and positive affect. Relaxation is an attribute of several dimensions of flow, such as action-awareness merging, sense of control, and loss of self-consciousness (Manzano, Harmat, Theorell, & Ullén, 2010).

The research on creativity and flow provides valuable insight into many different aspects of individuals' and their experiences of flow. Overall the current research provides firm evidence for a positive relationship between individuals' experiences and ability to experience flow and their level of creativity (Fritz & Avsec, 2007; MacDonald, Byrne, & Carlton, 2006). In addition to providing evidence for the relationship between flow and creativity, the research also provides insight into other areas such as subjective well-being and psychophysiological responses. More specifically, the research provides support for the positive relationship between subjective well-being, particularly the emotional aspects, and the experience of flow which also provides support for the theory of flow and autotelic personality (Fritz & Avsec, 2007). The research also provides some beginning investigation into psychophysiological responses during flow experiences providing support for the activation of the sympathetic branch of the autonomic nervous system (Manzano, Harmat, Theorell, & Ullén, 2010). Thus the research into flow and creativity reaffirms the already established relationships between these two constructs while also providing insight into other areas for continued research.

**Sports.** Sports and athletes have long been a field of research to which the concept of flow has greatly been applied. It is very common for athletes to report “being in the zone,” which corresponds to the experiences of flow. Kee and Wang (2008) examined the relationship between the concepts of mindfulness, flow disposition, and mental skills adoption. They sampled 182 university athletes from Singapore. The majority of the sample was female and was drawn from 23 different sports. Ninety athletes were from team sports (e.g., soccer, rugby, dragon boating), while 92 were from individual sports (e.g., Taekwondo, Malay martial arts, tenpin bowling, archery) (Kee & Wang, 2008).

Their results revealed four distinctive mindfulness clusters: 1 – novelty seeking, “average mindfulness;” 2 – novelty producing, “low mindfulness;” 3 – flexibility, “high novelty, high flexibility, low engagement;” 4 – high engagement, “high mindfulness.” Analyses showed that those with high mindfulness (Cluster 4) were more likely to experience flow, and scored higher on the flow dispositions than the other clusters, while those low in mindfulness scored lower on the measures of flow disposition. Their results also revealed that those of average mindfulness were more from team sports (Cluster 1), and those with high novelty, high flexibility, and low engagement were more from individual sports (Cluster 3). Clusters 2 and 4 had a more even distribution of individuals from both individual and team sports. The nine dimensions of flow were also examined for differences across the clusters. Clusters 1 and 2 were found to have significantly lower challenge-skill balance, clear goals, concentration on task, and sense of control as compared to the individuals in Cluster 4. Cluster 2 also had significantly lower loss of self-consciousness than Cluster 4. Overall, the analysis revealed those who were more likely to be mindful

were also more likely to experience flow states, and tended to adopt mental skills, such as attentional and emotional control, goal setting, and self-talk strategies (Kee & Wang, 2008).

Russell (2001) studied both the qualitative and quantitative aspects of state flow within college athletes examining both gender and type of sport. He interviewed 42 athletes, the majority of whom were male. Twenty-eight individuals were from team sports (e.g., football, baseball, volleyball, softball, basketball) and 14 from individual sports (e.g., swimming, track, wrestling, triathlon). Each of these individuals was interviewed about factors they felt helped, prevented, and disrupted their experiences of flow (Russell, 2001).

Results indicated that college students experienced state flow factors similarly, regardless of gender or type of sport (e.g., team sports such as football, baseball, basketball, etc. and individual sports such as swimming, track, wrestling, etc.). Evidence was reported in the form of nonsignificant statistical tests and analyses of the athlete interviews. The only difference found among the nine dimensions of flow occurred for the dimension of action-awareness merging, in which team sport athletes reported much higher levels than those athletes from individual sports. Russell also discovered that the majority of the athletes perceived flow as controllable (64%; Russell, 2001). However, this finding is less than the finding by Jackson (1995), who reported that 79% of the athletes surveyed perceived state flow as controllable.

Hefferon and Ollis (2006) investigated the experiences of flow in dancers as they believed this an area to be lacking in the sport psychology literature. Nine professional dancers (five female) participated in their study specializing in the following: ballet, contemporary jazz, and Irish and Canadian dance (Hefferon & Ollis, 2006). The results of their study revealed that dance has its own unique facilitators and inhibitors of state flow.

Three dimensions of flow emerged as dominant in the dancers' experiences of flow: autotelic experience, challenge vs. skill, and absorption in task. The most prevalent theme to arise from the data was the enjoyment that the dancers experienced during the state of flow. The dancers equated this to the autotelic experience. Dancers reported their flow experiences to occur when their abilities equaled the challenge presented to them. In this state, the dancers reported that they had a pure belief in themselves that was free from doubts and criticisms. The dancers reported that when a piece become too familiar or repetitive, it become more difficult to enter a flow state as the skill was high but the challenge was low. Finally, all of the dancers reported they felt a loss of self-consciousness when they experienced state flow. Many described this as being in their own "bubble" in which the dance took over and all else faded into the background, including their sense of self. During this absorption, the dancers reported that time became distorted (e.g., either slowed down, increased, or did not exist), complete concentration, and an intense focus (Hefferon & Ollis, 2006).

The authors also examined the facilitators and inhibitors of the dancers' flow experiences. They found confidence to be the main facilitator of state flow. This was achieved through extensive rehearsals, dedication and commitment, and clear goals that were established before performance. Along with confidence, music and choreography were also found to facilitate flow experiences. When dancers were able to connect with the music and feel comfortable with the choreography, they were more likely to experience flow. Pre-performance routines assisted in enhancing the dancers' ability to experience flow. These routines helped to decrease the dancers' anxiety and thus allow the dancers to focus on the task ahead. Costumes and make-up aided in enhancing flow as they allowed the dancers' to

take on the persona of another individual and thus eliminate fears and vulnerability.

Although beneficial, make-up and costumes may also inhibit the dancers' experiences of flow if they cause distractions for the dancers. Another inhibitor of state flow was traveling and performing in unfamiliar settings. A final factor that impacted flow experiences was the relationship the dancers had with others involved in the dance production including choreographer, artistic director, and the company. When the dancers felt comfortable and confident in these environments, they were more likely to be able to enter into a flow state. Overall, the results of Hefferon and Ollis (2010) provide in-depth insight into the flow experiences of professional dancers.

Kawabata and Mallett (2011) sought to clarify and expand upon the concept of state flow. They utilized an investigation of the interrelationships among the components of flow from a process-related perspective to clarify state flow. They had 1048 participants complete the Japanese Flow State Scale-2; of these 1048 participants, 591 were determined to be in a flow state during the physical activity in which they engaged based on their scores. These individuals were recruited from various courses at a university including physical education, sport, and health science, as well as from university or private sport clubs (Kawabata & Mallett, 2011).

Kawabata and Mallett (2011) utilized a higher-order confirmatory factor model and full structural equation model to test the flow responses and gain an in-depth understanding of the state flow process. These results indicated that the nine factors of flow were indeed empirically classified during the flow state. They discovered that when challenge-skill balance is maintained, individuals are more likely to enter into a state of flow. In line with this finding, the authors concluded that having clear goals is an important component to be



able to focus on the present moment. During the flow state, the results revealed that individuals do not attend to distracting thoughts, they experience time to pass differently, and they find the experience to be intrinsically rewarding. These results support the findings of previous research and nine factors of flow. They also provide a more in-depth view of the flow process and how the individual may experience flow (Kawabata & Mallett, 2011).

Sports have long been a studied area of research in regards to individuals' experiences of flow and their disposition to experience flow. Much of the research in support of the theory of flow has grown out of this research and it continues to be an area that produces solid research into the theory of flow. Currently the research supports that athletics is a common area in which individuals experience flow (Kawabata & Mallett, 2011; Kee & Wang, 2008; Hefferson & Ollis, 2006; Russell, 2001). The current research has sought to expand upon the specifics of the flow experience, both as a disposition and state. Research has shown a strong link between mindfulness and individuals' propensity to experience flow (Kee & Wang, 2008). Current findings also provide strong support for each of the nine dimensions of flow (Kawabata & Mallett, 2011; Hefferson & Ollis, 2006; Russell, 2001) and athletes perceiving flow as a controllable state (Russell, 2001). Overall, the current research into flow and sports provides a continuing solid foundation of flow theory and greater insight into how flow is experienced by those engaging in athletics.

**Online and video gaming.** A more recent area of study to develop is that of online and video game play. Currently this is an area that has seen a surge of interest in the flow literature. Wan and Chiou (2006) examined the psychological motivations of Taiwanese adolescents addicted to online games in regards to the theory of flow. Participants were high school and college adolescents ranging in ages from 16-24 years ( $N = 127$ ). The

authors focused on individuals that were actively involved in playing massive multi-player online role-playing games (MMORPGs). MMORPGs were chosen as the focus due to the main feature of obtaining goals and achievements through game play. MMORPGs create diverse motivations in individuals when they play and also constitute the most popular online gaming for Taiwanese adolescents (Wan & Chiou, 2006).

Results of Wan and Chiou's (2006) study indicated that flow experiences were negatively related to online game addiction; these findings also indicated that individuals' flow state and online game addiction were stable over the half-year time period in which they were studied. It was found that addicts also scored significantly lower on a flow state scale measure than their non-addict counterparts. Results also revealed that flow experience was not a significant predictor for players' subsequent addictive inclination. In addition to exploring state flow and game addiction, the authors also explored the psychological needs of online game players, and discovered these needs were close to the two-factor theory of satisfaction and dissatisfaction. More specially, the authors found that the absence of online game play lead to a sense of dissatisfaction, thus addicted gamers' need for gratification was to relieve their dissatisfaction rather than pursue an activity that provided satisfaction. The opposite was found for non-addict game players in that these individuals utilized online game play to pursue satisfaction rather than relieve dissatisfaction. These findings suggest that the experience of flow is not the main motivator for addicts to engage in online game play. Flow is described as an enjoyable and rewarding experience that brings about satisfaction to engagement in the experience. One possible explanation of the lack of flow experience in the addicted game players in the current study was the motivation that drove them to play online games: the pursuit of relieving dissatisfaction rather than achieving

satisfaction. This motivation would likely not lead to individuals engaging in a flow experience (Wan & Chiou, 2006).

Weibel, Wissmath, Habegger, Steiner, and Groner (2008) examined the effects of computer- vs. human-controlled opponents in online games on presence, enjoyment, and state of flow. They hypothesized that those believing they were playing against a human-controlled opponent would experience higher levels of the three constructs rather than a computer-controlled opponent. The authors recruited a final sample of 70 undergraduate students at a public university. All participants were enrolled in psychology, and the sample was almost evenly divided among males ( $n = 33$ ) and females ( $n = 37$ ). Participants were matched by gender and randomly assigned to one of two conditions: control ( $n = 35$ ; 18 females, 17 males) or experimental ( $n = 35$ ; 19 females, 16 males). To test their hypothesis, the authors employed a one-factorial multivariate design with a factor of opponent manipulated at two levels (computer vs. human opponent). The three constructs of presence, flow, and enjoyment served as the dependent variables (Weibel, Wissmath, Habegger, Steiner, & Groner, 2008).

Results supported the hypothesis: those who believed they were playing against a human opponent experienced more presence, enjoyment, and a state of flow, and all three concepts were positively related with one another. Presence was found to be positively correlated with a state of flow and enjoyment; and flow was found to mediate the relationship between presence and enjoyment. Thus, higher levels of flow state have been reported by online gamers when the gamers perceive themselves to have a presence in or are highly enmeshed in the game, which in turn, increased the enjoyment of the gaming experience (Weibel, Wissmath, Habegger, Steiner, & Groner, 2008).

Jin (2011) sought to examine the state of flow across three genres of video gaming: physical presence in medical simulation games, spatial presence in driving games, and self-presence in avatar-based narrative-driven games. Three Wii video games were utilized to test each type of presence: *Trauma Center*, *Need for Speed*, and *Godfather*. The author recruited 105 undergraduate students from a university on the East Coast of the United States. The majority of participants was female and averaged an age of 20 years. Participants played the games in a lab environment followed by completing all study materials (Jin, 2011).

Jin (2011) employed a 3 (skill: low, medium, high) X 3 (challenge: low, medium, high) between-subjects ANOVA to test the roles of the types of presence in the different games to clarify the theoretical link between the feelings of presence and the flow experience during game play. For the medical simulation games, challenge was the key to engaging in a state of flow, which was mediated by physical presence. For the driving games, skill and challenge were found to be key components for a state of flow. Finally, empathy and self-presence were found to be important for experiencing a state of flow in character-driven games. Generally, this study found that involved and focused attention was important for an individual to experience a state of flow across all gaming genres. Jin implied that the results of the study provide possible implications for game manufactures, stating that creating games that induce a flow experience may increase game replaying by individuals (Jin, 2011).

Online and video gaming has been a new area of research to emerge within the flow literature. Currently the research is providing sound results into the possible relationship these types of games may have with individuals' experiences of flow. These studies indicate

it is important for individuals to feel they have a presence in the game to be able to experience flow and this leads to greater enjoyment and replayability of games (Jin, 2011; Weibel, Wissmath, Habegger, Steiner, & Groner, 2008). Beginning research into online addiction has also found a negative relationship between the addiction and the experience of flow stating that flow does not serve as a motivator for individuals' addiction to online game play (Wan & Chiou, 2006). Overall, the current research into this new area of study provides promising evidence of the role flow may play in the world of online and video gaming.

### **Measurements of Flow**

In order to be able to assess flow, it must be a measureable construct. Several different measures of flow have been established in the current research, including interviews, qualitative/open-ended surveys, observational protocols, and quantitative measures. Two measurements that have been utilized consistently in the literature to measure flow are the Flow State Scale-2 (FSS-2) and the Dispositional Flow Scale-2 (DFS-2) developed by Jackson & Eklund (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002). Each of these measures was adapted from the original Flow State Scale (FSS) and Dispositional Flow Scale (DFS). The FSS was designed to measure an individual's flow experience during a particular activity while the DFS was designed to measure an individual's dispositional tendency to experience flow. Each of these measures and their updated counterparts are grounded in the nine dimensions of flow theory as outlined by Csikszentmihalyi (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

Other measurements of flow have included the Experience Sampling Method (ESM; Csikszentmihalyi, 1975), and surveys developed by researchers, such as the Flow Activities

Assessment (Whalen, 1997), and instruments by Ghani and Deshpande (1994), and Csikszentmihalyi, Rathunde, Whalen, and Wong (1997). The ESM attempts to provide a naturalistic research method in which to investigate the flow experience. Participants are given pagers in which they receive pages at random times to fill out questionnaires about their states and activities. These questionnaires offer ways in which flow can be quantified through correlating participants' perceived ratios of skill and balance (Csikszentmihalyi, 1975). The other surveys that have been developed as stated above attempt to study the experience of flow through its antecedents and consequences, thus measuring flow as an indirect experience rather than directly during the flow experience itself (Webster, Trevino, & Ryan, 1993). The multiple means of attempting to measure flow have led to discrepancies among researchers of flow, including how to define, identify, and measure the construct. Flow can be defined as both a state and a trait, and thus accurate measurements of flow should be able to account for both facets. Some measurements of flow may also disrupt the flow process, and thus it is important to have measurements that allow for the flow process to be measured uninterrupted, but also accurately, in a retrospective manner. Both the FSS-2 and the DFS-2 have attempted to overcome some of the measurement issues present with the construct of flow (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

The FSS-2 attempts to measure flow as a state concept, while the DFS-2 as a trait or disposition. Another benefit that these methods of measurements of flow offer over other measurements is the fact that they are simple and quick to utilize, because each measurement can be completed within a short-time span; these measurements are also quantitative in nature rather than qualitative, thus assisting in quantifying the concept of

flow. A common issue with the measurement of flow is the possible disruption of the flow experience that may occur due to the measurement utilized and its ability to be measured retrospectively. In order to combat this possible issue, the FSS-2 is usually completed right after engaging in the flow experience to ensure no disruption of flow. The immediacy of completion after the experience ensures the experience of engaging in flow remains with the individual. Although not perfect measurements, the FSS-2 and DFS-2 attempt to control for some of the common measurement issues found when conceptualizing the flow experience and provide reliable and valid methods of assessment for research purposes (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

**Flow State Scale-2 (FSS-2).** The FSS-2 was developed to overcome the conceptual and statistical issues that were present with the original FSS. Particularly, new items were developed to overcome the conceptual issues the items designed to measure the dimensions of time transformation and loss of self-consciousness. In order to develop replacement items for the FSS-2, conceptual adequacy of the original measurement was evaluated against the literature and correspondence with Csikszentmihalyi. Further the psychometric properties of the FSS were explored of the overall measure, subscales, and individual items to determine where statistical weaknesses may lie in the in the items or higher-order factor loadings. After a thorough examination, replacement items were designed and tested to develop the FSS-2. Thirteen additional items were added to the original 36-items of the FSS to develop the questionnaire to measure the best items to create the FSS-2. Participants completed the revised questionnaire after engaging in a physical activity (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

Results of the study found 5 of the 13 items to be selected to replace original items. These items replaced the original problematic items found on the following subscales (dimensions): loss of self-consciousness, unambiguous feedback, time transformation, and sense of control. Structural equation modeling revealed a good fit of the measurement model (9 first-order factors):  $\chi^2(558) = 1171.026$ , NNFI = .915, CFI = .925, RMSEA = .053, 90%CI RMSEA = .049-.057. The higher-order factor model (9 first-order factors, 1 second-order factor) also revealed a good fit:  $\chi^2(585) = 1226.189$ , NNFI = .910, CFI = .917, RMSEA = .055, 90%CI RMSEA = .050-.059. The loadings of items on the first-order factors ranged from .51 to .89 (mean = .70), and correlations ranged from .13 to .76 (median  $r = .48$ ). These values indicated that the nine flow factors together showed the common factor of flow, while still each representing the individual dimensions of the flow experience. To further validate the findings of the new FSS-2, the authors performed a cross-validation study (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

As with the first study, participants completed the FSS-2 after engaging in a physical activity. Structural equation modeling again revealed a good fit of the measurement model (9 first-order factors):  $\chi^2(558) = 1177.558$ , NNFI = .931, CFI = .939, RMSEA = .051, 90%CI RMSEA = .047-.055. The higher-order factor model (9 first-order factors, 1 second-order factor) also revealed a good fit:  $\chi^2(585) = 1305.374$ , NNFI = .923, CFI = .929, RMSEA = .054, 90%CI RMSEA = .050-.058. The loadings of items on the first-order factors ranged from .43 to .91 (mean = .80), and correlations ranged from .06 to .74 (median  $r = .40$ ). The reliability estimates of the cross-validation sample ranged from .80 to .92, with a mean  $\alpha$  of .87. Again, these results support the notion that the subscales represent the



overall construct of flow, as well as the nine individual dimensions of flow (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

Overall the development of the FSS-2 showed improvement in the conceptual and statistical issues that were present with the original FSS. The FSS-2 allows flow to be measured as a global assessment, as well as an assessment at each of the individual nine dimensions of flow. Although each of the nine dimensions had adequate factor loadings, lower loadings again were found on the loss of self-consciousness and time transformation subscales. There are several reasons for the possibility of these consistently lower loadings, one that many have speculated is the fact that these two dimensions are not relevant for certain activities while another is that these two dimensions are not fully understood by participants when answering the questionnaire. Despite the limitations to the FSS-2, the new assessment provides a way for researchers to be able to quantify the flow experience and measure the nine individual dimensions of flow (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

**Dispositional Flow Scale-2 (DFS-2).** The DFS-2 was developed to be the counterpart to the FSS-2 and measure the disposition an individual has to experience flow. As with the FSS-2, the DFS-2 was created to overcome the conceptual and statistical issues that were present with the original measure. Again, new items were developed to overcome the conceptual issues the items designed to measure the dimensions of time transformation and loss of self-consciousness. The replacement items for the DFS-2 were developed in the same manner as the FSS-2. Thirteen additional items were added to the original 36-items of the DFS to test the best items to use for the DFS-2. Participants completed the revised

questionnaire after engaging in a physical activity (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

As with the FSS-2, results of the study found five of the thirteen items to be selected to replace original items. These items again replaced the original problematic items found on the following subscales (dimensions): loss of self-consciousness, unambiguous feedback, time transformation, and sense of control. Structural equation modeling revealed a good fit of the measurement model (9 first-order factors):  $\chi^2(558) = 956.859$ , NNFI = .943, CFI = .950, RMSEA = .043, 90%CI RMSEA = .038-.048. The higher-order factor model (9 first-order factors, 1 second-order factor) also revealed a good fit:  $\chi^2(585) = 1063.348$ , NNFI = .935, CFI = .940, RMSEA = .046, 90%CI RMSEA = .042-.050. The loadings of items on the first-order factors ranged from .59 to .86 (mean = .77), and correlations ranged from .24 to .78 (median  $r = .51$ ). These values indicated that the nine flow factors together showed the common factor of flow, while still each representing the individual dimensions of the flow experience. To further validate the findings of the new DFS-2, the authors performed a cross-validation study (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

Results of the cross-validation revealed a good fit of the measurement model (9 first-order factors):  $\chi^2(558) = 1427.219$ , NNFI = .901, CFI = .912, RMSEA = .052, 90%CI RMSEA = .049-.055. The higher-order factor model (9 first-order factors, 1 second-order factor) also revealed a good fit:  $\chi^2(585) = 1606.487$ , NNFI = .889, CFI = .897, RMSEA = .055, 90%CI RMSEA = .052-.058. The loadings of items on the first-order factors ranged from .51 to .83 (mean = .73), and correlations ranged from .16 to .73 (median  $r = .48$ ). The reliability estimates of the cross-validation sample ranged from .78 to .86, with a mean  $\alpha$  of

.82. Again, these results support the notion that the subscales represent the overall construct of flow, as well as the nine individual dimensions of flow (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

Overall the development of the DFS-2 showed improvement in the conceptual and statistical issues that were present with the original DFS. The DFS-2 allows flow to be measured as a global assessment, as well as an assessment at each of the individual nine dimensions of flow. Although each of the nine dimensions had adequate factor loadings, lower loadings again were found on the loss of self-consciousness and time transformation subscales. There are several reasons for the possibility of these consistently lower loadings, one that many have speculated is the fact that these two dimensions are not relevant for certain activities while another is that these two dimensions are not fully understood by participants when answering the questionnaire. Despite the limitations to the DFS-2, the new assessment provides a way for researchers to be able to quantify the flow experience and measure the nine individual dimensions of flow (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

### **Personality Characteristics in Psychological Research and Flow**

Little research has been given to the possible relationship between flow and personality characteristics. An examination of this relationship could provide insight into the autotelic personality, as well as, individuals' disposition (or lack of disposition) to experience flow (e.g., those who are more likely to experience flow versus those who are not as likely to experience flow). Currently, few studies exist in the literature that examine flow and its relationship to personality, and only two studies examine the relationship of flow and

the Five-Factor Model (FFM) personality characteristics (neuroticism, extraversion, openness to experience, agreeableness, conscientiousness).

The first study was conducted by Ullén and colleagues (2012) which examined individuals' proneness to experience flow and the possible relationship to the FFM personality characteristics and intelligence in two samples. They hypothesized a negative relationship would be found between flow proneness and neuroticism as several aspects of neuroticism such as high reactivity to negative stimuli and a proneness to negative affect may interfere with the flow experience. They also hypothesized a positive relationship between flow proneness and intelligence due to the necessity of having sustained attention during a flow experience. The authors investigated the other four FFM characteristics in an exploratory analysis making no predictions on the potential relationships between these characteristics and flow disposition (Ullén et al., 2012).

The first sample consisted of 137 individuals. The majority of these individuals were female ( $n = 87$ ), ranged in age from 19-49 years of age (mean = 25.6), and were students at a university. The second sample consisted of 2593 twin individuals. Again, the majority of these individuals were female ( $n = 1342$ ), ranged in age from 51-68 years of age (mean = 58.6), and were recruited from the Swedish Twin Registry. The twins were broken down as follows: 147 monozygotic pairs, 218 dizygotic pairs, one pair with unknown zygosity, and 1861 individuals from pairs in which only one twin participated. Results revealed construct validity, reliability, and internal validity of all measurements utilized in the study. Descriptive results found flow proneness was lower and intelligence was higher in the first sample as compared with the twins in the second sample. These differences were

found to be significantly different for all dimensions of flow and intelligence (Ullén et al., 2012).

Personality characteristic measurements were only available for the first sample collected. To investigate the hypothesis that flow proneness was negatively related to neuroticism, the authors utilized general linear models with different levels of flow proneness as the dependent variable, neuroticism as the independent variable, and age and sex as covariates. The overall flow proneness model (total score) was found to have a substantial negative effect of neuroticism. Negative relations were also found between each of the subscales of flow proneness (work, leisure, and maintenance) and neuroticism. Further analyses were conducted to determine possible relationships between all the FFM dimensions (openness, conscientiousness, extraversion, agreeableness, and neuroticism), intelligence, and overall flow proneness. These results only revealed significant relations between flow proneness and two FFM dimensions: neuroticism and conscientiousness. Taken together, these two dimensions explained 22% of the total variance in overall flow proneness. The inclusion of all personality dimensions and intelligence only added 3.3% of additional total variance in overall flow proneness (Ullén et al., 2012).

Intelligence measurements were available for both samples. To investigate the relationship between flow proneness and intelligence, the authors utilized general linear models with different levels of flow proneness as the dependent variable, intelligence as the independent variable, and age and sex as covariates. For the first sample, no significant associations were found. These results were attributed to the small sample size and the use of two measures of intelligence. For the second sample, associations between flow proneness and intelligence were weak and inconsistent for all dimensions of flow, although

still significant due to the large sample size. Overall, the authors concluded that intelligence and flow proneness were unrelated traits (Ullén et al., 2012).

Overall Ullén and colleagues' (2012) results reveal that flow proneness was related to two of the FFM dimensions (neuroticism and conscientiousness) while no relation was found with intelligence. Flow proneness was negatively related to neuroticism across all its dimensions suggesting that a high level of neuroticism is detrimental for experiencing flow. The opposite was found to be true for conscientiousness as flow proneness was positively related to conscientiousness suggesting that those high in conscientiousness may be more likely to experience a proneness to flow. These findings suggest that proneness to experience flow is related to an individual's personality characteristics but not cognitive abilities. The study also lays the foundation for the beginning foundation of how flow disposition may be related to personality characteristics and suggests that further investigation is warranted in this area (Ullén et al., 2012).

Although Ullén and colleagues (2012) provide a foundation for the study of dispositional flow and personality characteristics, several limitations arise within the study. One large limitation is the sample size utilized. The authors obtained a sample of 137 individuals for the personality characteristics portion of the research, which is considered by many standards to be an extremely small sample size. This small of sample may not allow for adequate investigation of the possible relationships between flow proneness and the FFM dimensions, but rather may provide skewed or inconclusive results (Ullén et al., 2012).

Another issue that arises with the sample is the makeup of the sample participants. The authors only drew from a collegiate population, which limits the generalizability of their findings. A broader, more heterogeneous sample may allow for great conclusions to be

drawn about the possible relationship between dispositional flow and each of the FFM dimensions. Much of the current research into the FFM dimensions and personality draw from a varied population, and indicate that changes in the FFM are seen across the lifespan. Soto, John, Gosling, and Potter (2011) found changes occurred across the lifespan for both scores on the FFM domains and facets. Specifically they found neuroticism tended to decrease across the lifespan while agreeableness and conscientiousness increased. These findings have also been established through previous research (Soto et al., 2011). Thus the research into these dimensions and dispositional flow should attempt to draw from a similar research population (Ullén et al., 2012).

A final limitation that arises with Ullén and colleagues' (2012) study is the instrumentation utilized to measure both flow proneness and the FFM personality dimensions. The authors utilized the Swedish Flow Proneness Questionnaire as their measurement of flow. This measure is a newly developed measurement, and thus lacks the established standardized reliability and validity that other measurements of flow such as the ESM or DFS-2 provide. This measurement also claims to align with the nine dimensions of flow as outlined by Csikszentmihalyi; however, the authors lump these dimensions into their own measures of professional life (work), maintenance, leisure time, and an overall flow measure rather than following the original nine dimensions (Ullén et al., 2012).

The other measurement issue lies with Ullén and colleagues' (2012) use of the Revised NEO Personality Inventory (NEO-PI-R). The authors utilized the Swedish version of the NEO-PI-R; however, current reviews of the NEO-PI-R in *Tests in Print Mental Measurements Yearbook* suggest that translations of the original NEO-PI-R should be interpreted with caution (Juni, 1995). Although multiple translations are offered in a variety

of languages, no data are presented in the measurement manual describing the translation techniques or the standards that were utilized in the translation process. Along with the lack of information provided on how the translations were conducted, the cultural nature of the FFM dimensions should also be taken into account. The FFM dimensions are based on American cultural values and norms and the English language. The FFM is heavily derived from the use of colloquial language and thus bound by the cultural and language in which it based. It may be likely that different cultures and languages may give rise to different dimensions of personality or factors that may or may not align with those in the FFM. Based on these findings, any results acquired with a translation of the NEO-PI-R should be interpreted with caution (Juni, 1995).

The second study exploring the relationship between dispositional flow and the FFM was conducted by Ross and Keiser (2014). The purpose of Ross and Keiser's study was to advance the current research in this topic due to the limited research available and examine which FFM personality characteristics may be associated with dispositional flow. Additionally, they sought to explore which facets of the NEO-PI-R were related to the nine dimensions of flow and examine at the componential level to determine if specific components characterized the experience of flow (Ross & Keiser, 2014).

Their sample consisted of 316 undergraduate students from a small Midwestern liberal arts college. The majority of participants were Caucasian (74.7%) and female (72.5%). All participants were at least 18 years of age, with the average age being 19.9 years old ( $SD = 1.16$ ). The majority of participants had achieved sophomore standing. Participants completed packets consisting of all the research materials which were completed at home and returned within a week's time. In return for completing the packet,



participants were rewarded with either course of extra credit. The Dispositional Flow Scale-2 (DFS-2) was utilized to measure dispositional flow and the NEO Personality Inventory-Revised (NEO-PI-R) was used to assess the FFM personality characteristics of neuroticism, extraversion, openness, agreeableness, and conscientiousness (Ross & Keiser, 2014).

Ross and Keiser (2014) employed the following statistical procedures to examine the relationships between dispositional flow and FFM personality characteristics. First, zero-order correlations of the overall DFS-2 flow score with the NEO-PI-R domains and facets were examined. Second, they employed a selective use of multiple regression for NEO-PI-R domains and facets to predict overall DFS-2 flow score. Third, they utilized multiple regression using the NEO-PI-R domains to predict each of the nine dimensions of flow. And finally, they used canonical correlational analysis (CCA) of the NEO-PI-R domains and the DFS-2 subscales (Ross & Keiser, 2014).

Zero-order correlations revealed the strongest effects were produced by a negative correlation for neuroticism and a positive correlation for conscientiousness. Moderate effects were found for extraversion, and weak but significant effects for agreeableness. Stepwise multiple regression methods were used to determine which NEO-PI-R facets predicted overall DFS-2 flow score. These results revealed the strong negative effect of neuroticism was primarily driven by the vulnerability, self-consciousness, and anxiety facets. The moderate positive effect of extraversion was driven by assertiveness and activity facets. The strong positive effect of conscientiousness was driven by self-discipline and achievement-seeking facets. And the weak negative effect for agreeableness was driven by compliance and modesty facets (Ross & Keiser, 2014).

Each of the nine dimensions of flow were regressed onto the five NEO-PI-R domains and each equation was found to be significant. Neuroticism, extraversion, agreeableness, and conscientiousness indicated the strongest effects across the equations, while openness was only a moderate effect. Four CCA functions were performed. The first represented a general flow on the DFS-2 side of the covariate, with correlations among the majority of the DFS-2 subscales but only a significant loading of clear goals, in relationship to the NEO-PI-R domains of neuroticism, conscientiousness, and agreeableness. The second function presented conflicting results as compared to the first function as neuroticism, conscientiousness, and agreeableness loaded on the FFM side of the canonical variate in relation to loss of self-consciousness, clear goals, and autotelic experience. The third function revealed significant canonical coefficients for autotelic experience, merging of action and awareness, and concentration on the DFS-2 side, and extraversion and conscientiousness on the NEO-PI-R side. The final function revealed significant canonical coefficients for transformation of time, unambiguous feedback, challenge-skill balance, and autotelic experience on the DFS-2 side, and openness and agreeableness on the NEO-PI-R side (Ross & Keiser, 2014).

Overall the results of Ross and Keiser (2014) supported those of Ullén and colleagues (2012) in finding that neuroticism and conscientiousness are important in individuals' disposition to experience flow; specifically that high neuroticism may hinder a disposition while high conscientiousness may benefit. Additionally, their results revealed extraversion had a positive relationship with a disposition to experience flow, agreeableness had a negative relationship, and a relationship with openness was lacking to be found. Their findings also bring to light the differential role of personality depending upon the dimension

of flow explored. They found clear goals and loss of self-consciousness to be strongly predicted by the FFM characteristics; while time distortion and clear feedback only indicated modest relationships (Ross & Keiser, 2014).

Ross and Keiser (2014) improve upon the measurement limitations presented by Ullén and colleagues (2012) by utilizing the DFS-2 and NEO-PI-R which are both well-established, reliable, and valid measurements for their respective constructs of dispositional flow and FFM personality characteristics. They also improve upon the limitation of sample size presented by Ullén and colleagues by providing a sample slightly larger than 300.

Despite the improvement, a few limitations still arise from Ross and Kesier's (2014) study. First, the makeup of the sample participants is limited. As with Ullén and colleagues (2012), Ross and Keiser only drew from a collegiate population, limiting the ability to general their results. Much of the current research into the FFM personality characteristics involve a broader and more heterogeneous sample across the lifespan (Soto, John, Gosling, & Potter, 2011). As the exploration into dispositional flow and FFM personality characteristics continues to emerge, sample populations of current research should attempt to align with the greater population.

Although Ross and Keiser improved upon the sample size of Ullén and colleagues, their sample size is still limited and may not allow for adequate investigation of all the possible relationships between dispositional flow and the FFM personality characteristics. As the research continues to examine these relationships, sample sizes for the research studies should continue to grow in order to provide more conclusive evidence into the potential relationships between these constructs. Additionally, Ross and Keiser (2014) assumed the DFS subscales and NEO domains and facets were unidimensional and did not

verify this assumption. Verifying this assumption would have strengthened their statistical procedures and results (Ross & Kesier, 2014).

### **The Five-Factor Model of Personality**

Current research suggests that dispositional flow may be related to various personality characteristics. The Five-Factor Model (FFM) or Big Five has long emerged as a widely studied and validated model of personality (Saucier & Goldberg, 1998; McCrae & John, 1990). The FFM utilizes a hierarchical organization of personality into five factors or domains: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The factors represent universal issues for all individuals and highlight the individual differences that exist. It attempts to provide a common framework and language for use in the personality literature and research rather than a complete model of personality. Proponents of the model do not attest that the complete overview of personality, but rather a comprehensive overview that provides a framework for researchers that highlights the most common universal factors of personality (McCrae & John, 1990). The five factor structure has also proven to be a robust model, with the same five factors emerging in research of both self- and peer-ratings (McCrae & Costa, 1987), children and adults (Digman, 1997), and a variety of languages and cultures (Allik, 2005; McCrae & Costa, 1997). All of these studies provide strong evidence for the five factors in each of the populations studied.

In sum, the FFM is an appealing model of use within the personality literature and research. It integrates a wide array of personality constructs providing a common language and framework for personality researchers. It also provides a comprehensive overview of the factors that are made up by individual differences. Finally, it has been described by

many to be an efficient model of personality. It utilizes a global description of personality along with the individual five factors which provides a wealth of information that is not too overwhelming or too brief (McCrae & John, 1990). Based on these reasons and the vast empirical support and validation of the FFM, it emerges a strong model in which to study individuals' personality characteristics.

Despite the extensive research into the FFM, there are also limitations to this model of personality. One limitation some argue is the limited number of factors in the model; stating five factors are not sufficient to capture personality. Those in support of the FFM do not dispute that other factors may play a role in personality, but rather state that the five factors of the model simply represent the highest hierarchical level of the trait description. With the wealth of research into the FFM, the five factors have emerged as the most common factors that represent personality although they do not offer an exhaustive description of personality. Opposite of the first limitation is the argument that the FFM includes too many factors and rather should be simplified to a two or three factor model. Although there are two and three factors models present in the personality literature, these models do not hold the empirical support of the FFM and have inconsistencies across the models (McCrae & John, 1990).

In addition to these limitations, two other basic weaknesses have emerged with the model. The first is the model's inability to offer insight or reasons for the causality of personality. Due to the descriptive nature of the FFM, the model cannot provide rationale as to why certain personality traits may develop or how individuals develop their personalities. Thus, the FFM only provides information on a limited area of personality – descriptive traits. The second weakness is based on the model's reliance of typical behavior. As it is

based solely on typical behavior of individuals, it cannot account for exceptions to these general traits that may arise from situations that depart from the usual or in the prediction of specific behaviors. Instead, the FFM provides information that may be useful in only predicting general trends (McAdams, 1992).

Despite the limitations to the FFM, the model provides a solid framework for the study of personality traits as has been demonstrated by the empirical support and validation it has received from the research (Saucier & Goldberg, 1995; McCrae & John, 1990). As dispositional flow has been thought to be related to personality traits, the FFM provides an acceptable framework to further explore this possible relationship. As these relationships are further explored, the potential relationships that may exist between each of these characteristics and dispositional flow are hypothesized.

### **Neuroticism**

Neuroticism is the least contested factor of the FFM. Neuroticism is characterized by a tendency to experience emotional distress and the cognitive and behavioral styles that come from this distress (McCrae & John, 1990). Often times it is defined as an experience of negative emotionality or tendency to experience a selection of negative affect, with negative affect being central to the construct of neuroticism (McCrae & Costa, 1987). Neurotic individual may experience nervous tension, anxiety, depression, self-consciousness, or guilt that can be associated with irrational thinking, lowered self-esteem, ineffective or inability to cope, poor ability to control impulsive behaviors, and/or somatic complaints. Individuals lower in neuroticism may be described as calm, relaxed, or even-tempered (McCrae & Costa, 1987; McCrae & John, 1990).

As neuroticism is often defined by the experience of negative affect, it may interfere with an individual's ability to experience flow and the affective state that one corresponds with an individual's subjective experience of flow. Often negative affect such as anxiety, self-consciousness, and depression impede an individual's ability to experience flow; all affects that have been found to correspond with neurotic individuals (Ullén et al., 2012). As the emotional component to neuroticism may impact the flow experience, so may the cognitive and physical components. The cognitive and behavioral components may impact an individual's performance and thus his/her ability to enter a flow state. Neurotic individuals often have poor ability to control their behaviors and thus this lack of control may lead to reduced ability to perform at an optimal level. This may also prevent an individual from entering into a state of flow. The lack of ability to control one's behaviors may make it difficult for one to achieve certain dimensions of flow, such as challenge-skill balance, concentration on task, and sense of control. If an individual cannot control his/her behaviors, it may be difficult for that individual to achieve the balance that is necessary between his/her skills and the challenge presented. It may also be difficult for an individual to achieve proper concentration on task at hand, because the lack of control may lead to a lack of focus on the task; without an ability to focus, concentration cannot be achieved. Finally, a lack of ability to control one's behavior leads to an individual not having a sense of control over their actions, and thus impedes his/her ability to engage in the experience of flow (Ross & Keiser 2014; Ullén et al., 2012; McCrae & John, 1990; McCrae & Costa, 1987).

The potential relationship between neuroticism and an individual's ability to experience flow may also be influenced by other factors that either propitiate or inhibit an

individual's disposition to experience flow. It has been shown that flow is negatively related to amotivation, and thus, amotivation may prevent an individual from experiencing flow (Fullagar & Mills, 2008). Kommaraju and colleagues (2009) found a positive relationship between neuroticism and amotivation. Thus it may be hypothesized that neuroticism may inhibit the flow experience through amotivation. Intrinsic motivation has also been shown to have a positive relationship with flow (Fullagar & Mills, 2008); being in flow is a positive and rewarding experience. Clarke (2004) found neuroticism to be negatively related to intrinsic motivation. As neuroticism is negatively related to intrinsic motivation, it may also be found to hinder an individual's disposition to experience flow or enter into a flow state.

### **Extraversion**

Extraversion has long been a factor in models of personality. Many times individuals high in extraversion are described as “sociable, fun-loving, affectionate, friendly, and talkative” (McCrae & Costa, 1987, p. 87). Although these are commonly used variables to describe extraversion, some controversy still remains about which variables are central to the construct. Generally, it has been agreed that “sociability, cheerfulness, activity level, assertiveness, and sensation seeking” are all important components to extraversion (McCrae & Costa, 1987, p. 87). Some individuals argue that extraversion should be further divided into two separate components – sociability and assertiveness – rather than the single component. Others state that additional variables such as warmth, ambition, dominant, venturesome, positive affectivity, and energy should be included as core components of extraversion (McCrae & John, 1990). Despite some of the disagreement that may surround the factor of extraversion, sociability appears to be at the core of the factor (McCrae & Costa, 1987) as well as positive emotionality (McCrae & John, 1990).



As extraversion is sometimes described as the opposite of neuroticism due to its association with positive affect and neuroticisms association with negative affect (McCrae & Joh, 1990), it may be inferred that extraversion may have a positive relationship with the experience of flow. Flow is often described as a positive emotional experience, which corresponds to the positive emotionality of extraversion (Fritz & Avsec, 2007; McCrae & John, 1990). Marrero Quevedo & Carballeira Abella (2011) provided further evidence of extraversion having a positive association with positive affect and happiness. Positive affect and happiness are often traits that are associated with the autotelic experience, as well as, characteristics of enjoyment. Both the autotelic experience and enjoyment are factors that increase an individual's ability to engage in a flow experience. Thus, the research by Marrero and colleagues assists in reaffirming the potential relationship between positive affect, extraversion, and flow. Flow has also been found to have a positive association with confidence in that individuals exhibiting more confidence in themselves and their abilities are more likely to engage in flow experiences (Hefferon & Ollis, 2006). Confidence is also an attribute of extraversion, and thus a common characteristic shared by those who experience both extraversion and flow.

Several of the above attributes of extraversion may also align with attributes of flow and its dimensions. Particularly the attributes of activity level, assertiveness, and sensation seeking (McCrae & Costa, 1987) may also be seen in flow. Activity level may most clearly be seen in the dimensions of challenge-skill balance, action-awareness merging, and concentration on task. Each of these dimensions requires the individual to be actively engaged, and thus experience a high level of activity during the flow experience. Assertiveness may also be seen in many of the same dimensions as activity level, including

action-awareness merging, concentration on task, and sense of control. In each of these dimensions, an individual must have some sense of assertiveness to be able to achieve the dimension and perform well. Finally, sensation seeking may also align with dimensions of the flow experience, particularly those of loss of self-consciousness and the autotelic experience. Each of these dimensions are often described as being pleasurable for individuals to experience. Sensation seeking is also considered to be a pleasurable experience, and thus individuals who seek sensation would likely also seek to enter into a loss of self-consciousness and/or autotelic experience. Along with the above research, these attributes of extraversion suggest that dispositional flow will have a positive association with extraversion.

### **Openness to Experience**

Openness to experience is often characterized as “original, imaginative, broad interests, and daring” (McCrae & Costa, 1987, p. 87). Often openness is not necessarily easily represented by a single adjective such as openness to feelings or sensitive to art and beauty. Openness is often evident in several ways including fantasy, aesthetics, feelings, actions, ideas, and values. Although openness can be evident in multiple ways, ideas and values are typically the easiest to represent with a single adjective (McCrae & Costa, 1987). Others have defined openness as a broader factor that may include “creativity and intellectual interests, differentiated emotions, aesthetic sensitivity, need for variety, and unconventional values” (McCrae & John, 1990, p. 197). Open individuals tend to view themselves and others as more intelligent, and correlations have been found between the two constructs. Despite the relationship, studies also demonstrate that openness and intelligence are two separate constructs, and the exact nature of this relationship is unknown (e.g.,

intelligence may allow for a predisposition toward openness or openness may assist in developing intelligence) (McCrae & Costa, 1987). It is important to remember that openness is a dimension of personality rather than intellectual ability, and individuals can be high in openness without scoring high on a measure of intelligence (McCrae & John, 1990).

Openness may also display a positive association with individuals' disposition to experience flow. Many of the traits described that open individuals possess may also be traits displayed by those with a greater disposition to experience flow. One of these traits in particular may be that of creativity. Creativity has been shown to have a positive association with an individual's ability to experience flow (Manzano, Harmat, Theorell, & Ullén, 2010; Fritz & Avsec, 2007; MacDonald, Byrne, & Carlton, 2006) and with openness (McCrae & John, 1990). Openness has also been shown to have a positive relationship with intrinsic motivation (Komarraju, Karau, & Schmeck, 2009). Research has traditionally demonstrated a positive association between flow and motivation, particularly that of intrinsic motivation; as such, individuals who display an ability to engage in intrinsic motivation are more likely to engage in flow experiences (Fullagar & Mills, 2008). D'Zurilla, Maydeu-Olivares, and Gallardo-Pujol (2011) found openness to have a positive relationship with rational and constructive problem solving. In order to engage in this type of problem solving, individuals must have clear goals and be able to concentrate on the task at hand, both of which are dimensions of the flow experience (Lee, 2005; Csikszentmihalyi, 1990). In addition to being related to these dimensions of flow, openness may also be related to dimensions of action-awareness merging and loss of self-consciousness. Each of these dimensions requires that an individual be open to the experience in order to allow the dimensions to be met. For example, if an individual is closed-off rather than being open, it

can be difficult for him/her to become immersed in the experience or lose self-consciousness. Based on these findings, it may be inferred that the necessary traits to experience flow may also align with the traits open individuals possess.

### **Agreeableness**

Agreeableness can be described as the factor that incorporates aspects of humanity, and is often viewed as a continuum as understanding one end of the dimension allows for greater understanding of the other. It incorporates characteristics such as “altruism, nurturance, caring, and emotional support at one end of the dimension, and hostility, indifference to others, self-centeredness, spitefulness, and jealousy at the other” (McCrae & John, 1990, p. 196-197). Others have also included characteristics such as love, warmth, trust, cooperative, trust, modesty, and compliance (McCrae & John, 1990). Many describe the disagreeableness pole as antagonism, and describe these individuals as mistrustful, skeptical, unsympathetic, callous, uncooperative, stubborn, or rude. Although generally individuals view the disagreeableness pole as maladaptive and the agreeableness pole as including positive characteristics that are adaptive, some state that extreme scores on the agreeableness pole may also be maladaptive. These individuals may be dependent, fawning, and lower in self-efficacy (due to the strong dependence upon others) (McCrae & Costa, 1987).

Agreeableness may also display a positive association with flow experiences, although this association may not be as great as some of the other FFM traits. Komarraju, Karau, and Schmeck (2009) found agreeableness to be negatively related to amotivation. This same relationship has been found between flow and amotivation, with those individuals lacking in motivation or displaying amotivation to be less likely to experience flow

(Fullagar & Mills, 2008). Agreeableness may also align with some of the dimensions of flow. Many of the traits that have been found to be associated with agreeableness—such as caring, emotional support, cooperation, compliance, and altruism (McCrae & John, 1990; McCrae & Costa, 1987)—may also assist in achieving dimensions of flow such as unambiguous feedback and loss of self-consciousness. Based on these limited findings, it is suggested that agreeableness may not have a relationship with flow or an individual's disposition to experience flow.

### **Conscientiousness**

Conscientiousness has been a factor that has had many different conceptions offered through the research. It is often defined as a dimension that holds individuals' impulsive behavior(s) in check and one that organizes and directs individuals' behavior(s) (McCrae & Joh, 1990). Other research has defined conscientiousness as dutiful, scrupulous, and moralistic. In addition, it is often described as a proactive dimension embodying hard work, ambition, energy, and perseverance. In sum, it can be described as a “will to achieve” (McCrae & Costa, 1987, p. 88). Many label the opposite pole of conscientiousness as undirectedness. These individuals lack a direction or purpose, as well as, organization and self-discipline (McCrae & Costa, 1987).

Conscientiousness is positively related to variables that have also show a positive association with an individual's disposition to experience flow. D'Zurilla, Maydeu-Olivares, and Gallardo-Pujol (2011) found conscientious to be positively related to active problem solving which has also been found to be important for an individual to be able to experience flow. Marrero Quevedo & Carballeira Abella (2011) discovered a positive association between conscientious and life satisfaction, subjective happiness, and positive

affect. Positive affect in particular has been found to assist an individual in entering into a flow experience (Fritz & Avsec, 2007). Komarraju, Karau, & Schmeck (2009) found conscientiousness to be related to both intrinsic and extrinsic motivation, which have also been factors found to positively related with an individual's ability to experience flow and enter into a state of flow (Fullagar & Mills, 2008).

In addition to being found to be positively related to many factors that share positive associations with the disposition to experience flow, conscientious has also been found to share negative associations with similar factors. D'Zurilla, Maydeu-Olivares, and Gallardo-Pujol (2011) also found conscientious to be negatively related to the use of avoidance strategies when attempting to engage in problem solving. Often individuals employing avoidance strategies also find it difficult to enter into a state of flow (Lee, 2005). Marrero Quevedo and Carballeira Abella (2011) revealed a negative relationship between conscientiousness and negative affect. Again, those experiencing negative affect often experience difficulty with flow. Komarraju, Karau, and Schmeck (2009) found conscientiousness to be negatively related to amotivation. Amotivation has also been shown to have a negative association with an individual's ability to enter into a state of flow (Fullagar & Mills, 2008).

Based on these findings, it appears that high conscientiousness involves both emotional and motivation factors. These factors have also been found to important for individuals wishing to experience flow. Flow also requires that an individual achieve a balance between the difficulty of the task to be performed and the skill required to perform that task (Csikszentmihalyi, 1990). It seems likely that high conscientiousness involves emotional and motivational mechanisms that make an individual engage in flow-promoting

activities. Furthermore, flow requires not only a balance between task difficulty and skills, but also that the challenge of the task is sufficient (Csikszentmihalyi, 1990). Kappe and van der Flier (2010) found that highly conscientious individuals were more likely to spend time on deliberate practice to master challenging tasks and thus these individuals may be more likely to experience flow and have a disposition that allows them to enter into a state of flow easier than their counterparts who do not engage in deliberate practice. Based on this research, it may be inferred that conscientious individuals may also be more likely to experience a disposition to experience flow.

### **Purpose of Present Study**

The theory of flow is also of great importance to a multitude of fields, and thus continued investigation into the concept can be of a great benefit to many. One area of further exploration in the study of flow is that of personality characteristics and flow. Few studies have been conducted to look at the possible relationships between different personality characteristics and flow. An examination of this relationship could lead to insight into the autotelic personality and what individuals may or may not be likely to experience flow. Thus the purpose of the current study is to provide the beginning investigation into flow and personality characteristics to provide possible insight into dispositional flow and the autotelic personality.

Additionally, this study will also examine the nine dimensions of flow and their possible relation to FFM personality characteristics and their facets. This examination will add further credence into factors that may influence the autotelic personality. This examination will also provide insight into how the different dimensions of flow may be related to the different facets of personality. This information may help to identify unique

patterns of the dimensions of flow that maybe most amenable to a particular personality, which in turn can help to identify specific ways to help coach or teach those individuals to achieve flow.

Finally, the purpose of this study is to improve on the limitations that were presented in Ullén and colleagues' (2012) and Ross and Keiser's (2014) studies. The present study will attempt to provide a more adequate sample size than these two studies in order to investigate the relationships between dispositional flow and the FFM. The present study will also attempt to gather a more heterogeneous sample that aligns with the validated sample population of the NEO-PI-R rather than focusing on a different population, such as the collegiate sample utilized by both studies. Finally, the present study will also attempt to address the measurement issues present in the Ullén et al. study. This will be accomplished through the use of the DFS-2, which is a measure of dispositional flow that has been found to be reliable and valid in the current research. The NEO-PI-R will also be utilized with an English-speaking population in its original form. Both of these improvements were utilized by Ross and Keiser's study. By utilizing these improvements, it is estimated that the current study will improve on the limitations of the previous literature and provide more insight into the relationships between dispositional flow and the FFM personality characteristics.

### **Research Hypotheses and Questions**

One purpose of the current study is to test the following hypotheses:

1. Dispositional flow will have a negative or inverse relationship with neuroticism, so that individuals lower in neuroticism will have a greater tendency to experience flow.



2. Dispositional flow will have a positive relationship with conscientiousness, so that individuals higher in conscientiousness will have a greater tendency to experience flow.
3. Dispositional flow will have a positive relationship with openness to experience, so that individuals higher in openness will have a greater tendency to experience flow.

Another purpose of the current study is to explore the following research questions:

1. How does dispositional flow relate to extraversion?
2. How does dispositional flow relate to agreeableness?
3. How do the NEO-PI-R facets of each of the five factors relate to the nine dimensions of flow?

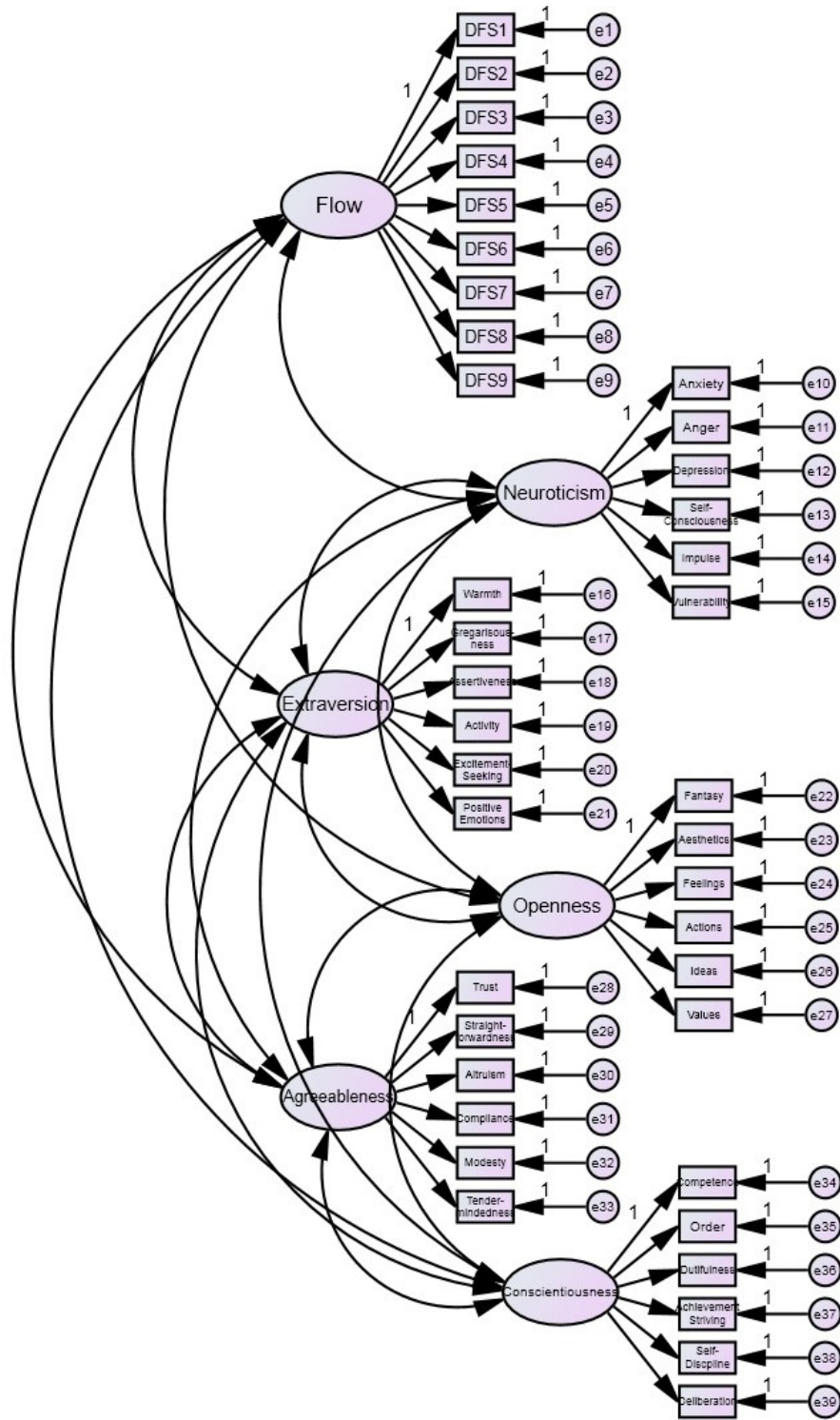


Figure 1. Heuristic diagram of the proposed CFA model relating the latent constructs of dispositional flow and FFM factors.

CHAPTER III  
METHODOLOGY

**Participants**

Participants were recruited through the use of convenience sampling by utilizing communication via multiple counseling and educational psychology listservs, the University of Missouri – Kansas City Department of Psychology’s research pool and online research system—PsychPool, and Amazon’s Mechanical Turk online labor market (Mturk). The only inclusion criteria for the study was participants must be at least 18 years of age and English-speaking.

Due to the proposed statistical analysis of factor analysis on each measure, a large sample size (preferably greater than 200) was required; many recommend a minimum of ten cases per observed variable (Field, 2005). Observed variables can be defined as the exact items of a measure or a parcel created from a subscale of multiple items of a measure. The current study consisted of a total of 276 items between the two measures. Using items as observed variables for this study would have given a cases to variable ratio of 10 to 276 leading to a recommendation of a minimum sample size of 2760. Due to this ratio, parcels were created from the measures’ subscales rather than individual items in the analysis; employing a recommendation of ten individuals per parcel. Each of the nine dimensions of flow served as an individual parcel or subscale. Each of the five domains of the FFM also had six facets which served as individual parcels or subscales, giving a total of 30 parcels or

subscales for the personality measure. This gave a total of 39 parcels or subscales for the entire study, resulting in a minimum recommended sample size of 390 participants.

A total of 409 individuals completed the study's measures. The survey was created to force participants to answer all questions of the measurements; however, did not force participants to provide a response to demographic information. Because this was the case, all 409 individuals provided complete responses to the measurements and no missing values were found; however, some participants chose not to disclose demographic information. As previously stated, participants were recruited through three methods. The majority of the participants were recruited through Mturk ( $n = 259$ ), comprising 63.3% of the sample. Additionally, 110 participants were recruited through communication via multiple counseling and educational psychology listservs and 40 were recruited through PsychPool.

The majority of the participants were female ( $n = 239$ ) comprising 58.4% of the sample. The remaining participants were male ( $n = 169$ ), with 1 participant not disclosing and no participants identifying as transgender. The participants ranged in age from 18 – 80 years, with the majority of participants ranging in age from 18 – 40 ( $M = 33.69$ ,  $SD = 11.78$ ). The majority of the participants identified as Asian ( $n = 193$ ), comprising 47.2% of the sample, with the majority of these participants being recruited through Mturk ( $n = 191$ ). Other participants identified as White/Caucasian ( $n = 155$ , 37.9%), Black/African American ( $n = 18$ , 4.4%), Other ( $n = 16$ , 3.9%), American Indian/Alaskan Native ( $n = 10$ , 2.4%), Hispanic/Latino/a ( $n = 8$ , 2.0%), Multi-racial ( $n = 5$ , 1.2%), with 3 participants not disclosing.

More participants reported an income under \$14,999 ( $n = 116$ ), comprising 28.4% of the sample than any other income range. Other participants identified their income to range

from \$15,000 - \$24,999 ( $n = 83$ , 20.3%), \$25,000 - \$34,999 ( $n = 41$ , 10.0%), \$35,000 - \$49,999 ( $n = 52$ , 12.7%), \$50,000 - \$74,999 ( $n = 51$ , 12.5%), \$75,000 - \$99,999 ( $n = 27$ , 6.6%), and over \$100,000 ( $n = 35$ , 8.6%), with 4 not disclosing. The most common highest level of education obtained by the participants was a bachelor's degree ( $n = 162$ ), composing 39.6% of the sample; while others identified their highest level of education obtained as a master's degree ( $n = 136$ , 33.3%), a high school diploma or GED ( $n = 56$ , 13.7%), an associate's degree ( $n = 28$ , 6.8%), a doctoral degree ( $n = 17$ , 4.2%), a specialist certificate ( $n = 5$ , 1.2%), and other ( $n = 4$ , 1%), with 1 participant not disclosing.

The current sample aimed to align more with the heterogeneous sample of the NEO-PI-R and improve on the samples of Ullén and colleagues (2012) and Ross and Keiser (2014) which both consisted of small, collegiate student populations. The current sample compared in several ways to the normative sample of the NEO-PI-R (Costa & McCrae, 1992). Both samples utilized convenience sampling methods to obtain participants. Each sample consisted of primarily educated individuals, most holding at least a bachelor's degree. The age span of the NEO-PI-R sample was wider than that of the current sample; however, the samples compared more similarly than the Ullén et al. and Ross and Keiser sample with participants being older and working in their career fields. Although there were several similarities with the NEO-PI-R sample, differences also were found. The current sample was predominantly female and Asian, whereas the NEO-PI-R sample was predominantly male and White (Costa & McCrae, 1992). In comparison, the Ullén et al. sample was predominantly Swedish female university students with an average age in their mid-twenties; while the Ross and Keiser sample was predominantly Caucasian female university students with an average age of 20. Although the current sample did not fully

align with the NEO-PI-R sample, it succeeded in improving upon the sample provide by Ullén and colleagues and Ross and Keiser.

The current sample was also similar to the normative sample of the DFS-2 (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002). Again, both samples utilized convenience sampling methods to obtain their participants. The two samples were also similar in age with the majority of participants being considered young adults ranging in age from 25 – 35. Although these similarities were found, a few differences existed between the two samples. The normative sample of the DFS-2 was equally split between genders, while the current sample was predominantly female. Also, normative sample of the DFS-2 assessed for involvement in physical activity as a requirement for participation, while the current sample did not utilize this as inclusion criteria (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

### **Procedure**

Approval from the Institutional Review Board (IRB) at the University of Missouri—Kansas City was obtained prior to the study being conducted. All participants were provided with a consent form prior to their participation in the study outlining the purpose of the study, the risks and benefits of participation, and contact information for the researcher and the researcher’s supervisor. The form was provided prior to beginning the research materials. Participants agreed to participate in the study by clicking into the study materials. No identifying information was collected. There were no penalties for those participants who opted not to participate in the study.

Participants completed all study materials online through SurveyMonkey. Materials included a short demographic questionnaire which aided in identifying the sample.

Participants also completed the Dispositional Flow Scale-2 (DFS-2; Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002) and the NEO Personality Inventory – Revised (NEO-PI-R; Costa & McCrae, 1992). In order to ensure anonymity, no identifying information was included on any of the survey forms. The survey was created to force participants to answer all questions of the measurements and not leave any missing values; however, participants were able to not disclose demographic information. Although the researcher was not physically present to answer any questions during the administration of the measures, the participants were given the researcher’s email address and phone number should any questions arise and result in the need for contact. None of the online participants contacted the researcher in regards to any questions or concerns over the questionnaire.

Multiple methods of recruitment were utilized and participants were compensated for their time depending upon the method used. Participants who completed the measures through listserv recruitment methods were given the option to enter into a raffle drawing for a \$25 gift card to Amazon.com as compensation for their time. Participants were directed to a separate survey to enter their name and email address for the raffle drawing. The raffle data were kept separate from the original data collection. The raffle drawing was held upon completion of all data collection, and the winners were notified via email. Upon verification of receipt of the email, Amazon.com gift cards were emailed to the winners. After the raffle was held, all of the raffle drawing data were destroyed.

Participants who completed the measures through PsychPool were compensated for their participation through extra credit. After completion of the survey in SurveyMonkey, participants copied the unique survey completion code given at the completion of the survey into the PsychPool system so credit could be awarded. This credit was awarded in lieu of

participation in the raffle drawing. Participants who completed the measures through Mturk were compensated for their participation through a small monetary reward of \$0.40. After completion of the survey in SurveyMonkey, participants copied the unique survey completion code given at the completion of the survey into the Mturk system so payment could be approved. Again, this small payment was awarded in lieu of participation in the raffle drawing.

## **Measures**

### **Demographics**

Participants completed a measure of demographic variables that included gender, age, ethnicity, socioeconomic status, education level, and occupation. No identifying information was collected through the demographic information in order to ensure anonymity of all participants.

### **Dispositional Flow Scale – 2 (DFS - 2)**

The DFS-2 was a modification of the original DFS and was examined in a study that assessed both the DFS-2 and the Flow State Scale-2 (FSS-2) through two studies (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002). Study 1 utilized the original DFS and FFS with additional items to be included or replaced in the new measures, DFS-2 and FFS-2. Study 1 consisted of 597 participants, 386 provided data on the DFS and 391 for the FFS; of the sample, 180 provided data for both measures. After removal of missing data for Study 2, 574 respondents provided data on the DFS-2 and 422 for the FSS-2 for a total sample size of 996; of the sample, 99 participants provided data for both measures. For both studies, participants ranged in age from 16-82 years, with an average age of 26.3 years ( $SD = 11.1$ ). The DFS-2 was developed as a written instrument to measure and quantify a



person's disposition to experience flow utilizing the nine dimensions of flow. The scale consists of 36 items on a 5-point Likert scale ranging from *never* (1) to *always* (5) (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

Jackson and Eklund (2002) utilized non-normed fit index (NNFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA) to evaluate the goodness of fit for the DFS-2. NNFI and CFI values exceeding 0.90 and 0.95 were taken to reflect an acceptable and excellent fit of the data, respectively, and RMSEA values of less than 0.05 and 0.08 were taken to reflect a close fit and a reasonable fit, respectively. The first order and highest order models of the DFS-2 revealed NNFI and CFI well above 0.90, indicating a good fit. The RMSEA confidence intervals indicated both a close and reasonable fit with values nearing 0.05 and 0.08. Results of first-order factor loadings indicated the DFS-2 exhibited acceptable factorial validity for assessing dispositional flow and measuring unique constructs of flow. Reliability for the DFS-2 was assessed utilizing Cronbach's alpha coefficients. For Study 1, the Cronbach's alpha coefficients ranged from 0.81 to 0.90, with a mean of 0.85. For Study 2, the Cronbach's alpha coefficients ranged from 0.78 to 0.86, with a mean of 0.82. (Jackson, Eklund, & Martin, 2010; Jackson & Eklund, 2002).

### **NEO Personality Inventory – Revised (NEO-PI-R)**

NEO-PI-R (Costa & McCrae, 1992) is a measurement designed to assess normal adult personality utilizing the FFM. It assesses the five domains of personality: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The NEO-PI-R provides a total score for each domain and six facet lower-level scores for each domain: neuroticism: anxiety, angry/hostility, depression, self-consciousness,

impulsiveness, vulnerability; extraversion: warmth, gregariousness, assertiveness, activity, excitement-seeking, positive emotions; openness: fantasy, aesthetics, feelings, actions, ideas, values; agreeableness: trust, straightforwardness, altruism, compliance, modesty, tender-mindedness; conscientiousness: competence, order, dutifulness, achievement striving, self-discipline, deliberation (Botwin, 1995; Costa & McCrae, 1992).

The NEO-PI-R domain level reliabilities from the original sample are excellent ranging from .86 to .95. The facet level reliabilities ranged from .56 to .90, indicating unacceptable to good reliability of the facets. The authors have found short-term test-retest reliability for the NEO-PI-R and long-term test-retest reliability for the neuroticism, extraversion, and openness domains for the previous version of the instrument. Costa and McCrae (1992) based the norms for the NEO-PI-R on a sample of 1,000 participants. The sample consisted of 500 males and 500 females from three large scale studies of the NEO-PI-R. The normative sample was stratified to match the United States 1995 Census projections for age, gender, and race, and provided an improvement over the previous NEO-PI norms by providing a sample the better represented the general population (Botwin, 1995).

The validity of the NEO-PI-R has been demonstrated in multiple ways. Strong consensual validity has been established between self, peer, and spouse reports of the NEO-PI-R. Costa, McCrae, and colleagues have also demonstrated construct, convergent, and divergent validity of each of the scales through multiple studies. The NEO-PI-R scales correlated with analogous scales from other instruments representing a variety of theoretical perspectives including: career interests (Self-Directed Search), Jungian types (Myers-Briggs Type Indicator), needs and motives (Personality Research Form), psychopathology

(Minnesota Multiphasic Personality Inventory), and multidimensional personality instruments (revised California Psychological Inventory, Guilford-Zimmerman Temperament Survey, Adjective Check List, and the Interpersonal Adjective Scale Revised). The authors have also found associations between the five factors and psychological well-being; individuals scoring high on well-being scales correspond to high scores on extraversion, agreeableness, conscientiousness, and low scores on neuroticism). Associations have also been found between the five factors and coping styles; positive coping styles related to high extraversion and openness scores whereas negative coping styles related to high N scores (Botwin, 1995, Costa & McCrae, 1992).

The NEO-PI-R provides improvements from the previous NEO-PI measurement. The current revision added six facet scales for the domains of agreeableness and conscientiousness rather than the unidimensional constructs of the NEO-PI. The NEO-PI-R also allows for a variety of response biases to be assessed including random responding, acquiescence, and nay saying. The measurement provides a three-item validity check that is intended to assess honesty and accuracy in the completion of the instrument. The measurement does not provide a check for social desirability as it has been suggested controlling for social desirability may hinder scale validity, but rather assumes that individuals will respond honestly to each of the items under most conditions (Botwin, 1995).

## CHAPTER IV

### ANALYSIS

#### **Data Preparation**

Preliminary analyses were run in order to determine whether assumptions for factor analysis were met, including linearity, multivariate normality, appropriate sample size, and degree of multicollinearity between variables. Descriptive analyses, including skewness and kurtosis, were conducted to determine if the data met the assumptions. Additional descriptive analyses such as means, standard deviations, and frequencies were performed to gain demographic data for the sample. Data were screened for any missing information and/or outliers.

The sample size was appropriate for the analysis as the minimum sample of 390 participants was achieved. To assess for normality and linearity, histograms and scatterplots were reviewed. Further measures were taken by reviewing the skewness and kurtosis statistics of each item for the measures, but no item was found to be severely skewed or kurtotic (i.e., outside the bounds of  $\pm 3.00$  for skewness or  $\pm 8.00$  for kurtosis; Kline, 2011). Data for the measurements were screened for missing information and found to contain no missing values. Assessment for outliers was conducted by utilizing a standard score for each participant's response on every item and comparing these scores to the standard value of 3.29 (two-tailed alpha of .001). This assessment revealed a possible 50 cases that violated this criterion; however, these cases were left in the analysis as the results

(models) were not significantly impacted by their inclusion and to maintain the necessary sample size.

Analysis of data was completed in SPSS version 22.0 (IBM SPSS Statistic, 2013) and Mplus Version 7.31 (Muthen & Muthen, 2015). The design of the study is descriptive and quantitative. Scores were calculated for overall, subscale, domain, and facet scores by adding the total sum of items associated with corresponding score. The overall DFS-2 and NEO-PI-R scores were calculated by adding the total items on each measurement, 36-items for the DFS-2 and 240 items for the NEO-PI-R. The DFS-2 subscale scores were calculated by adding the four items corresponding with each subscale for a total of nine subscales. The NEO-PI-R facet scores were calculated by adding the eight items corresponding with each facet for a total of 30 facets. The NEO-PI-R domain scores were calculated by adding the six facet scores for each domain for a total of six domains.

The mean value for the DFS-2 was 129.399 ( $SD = 17.483$ ). Means and standard deviations were calculated for each individual item and subscales; these scores are presented in Table 1. The mean values for the domains (with standard deviations in parentheses) of the NEO-PI-R were: neuroticism 92.9 (18.13), extraversion 107.35 (16.86), openness to experience 106.75 (17.59), agreeableness 109.94 (16.63), and conscientiousness 113.95 (17.72). Means and standard deviations were also calculated for all individual items and facets; these scores are presented in Table 2. Overall, these results for both the DFS-2 and NEO-PI-R are comparable to the means and standard deviations of the normative samples of the measures provided in Table 3. Correlational analyses were conducted to analyze the item-total correlations and inter-item correlation matrix for variables. Significant correlations were found between all of the DFS-2 subscales. The correlations between the

time and consciousness subscales and the remaining seven subscales, although significant, were only weak to moderate; whereas the correlations among the remaining seven subscales were moderate to strong. The NEO-PI-R revealed similar results with significant correlations between the five domain factors, as well as many of the facet scores. A complete breakdown of correlational analyses are presented in Tables 4 – 7.

Table 1

*Distributional Statistics of the DFS-2, N = 409*

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Overall											
DFS	83	171	129.40	17.483	305.662	.104	.121	-.299	.241	127.973	130.824
Individual Scale Items											
1	1	5	3.79	.863	.745	-.753	.121	.812	.241	3.719	3.860
2	1	5	3.48	.894	.799	-.317	.121	-.024	.241	3.409	3.555
3	1	5	3.74	.851	.724	-.425	.121	-.110	.241	3.667	3.805
4	1	5	3.78	.841	.708	-.553	.121	.231	.241	3.709	3.846
5	1	5	3.76	.908	.825	-.416	.121	-.296	.241	3.686	3.834
6	1	5	3.88	.805	.649	-.590	.121	.405	.241	3.810	3.941
7	1	5	3.37	.967	.935	-.197	.121	-.310	.241	3.293	3.450
8	1	5	3.34	1.008	1.016	-.357	.121	-.287	.241	3.263	3.427
9	1	5	3.81	.874	.764	-.654	.121	.504	.241	3.736	3.878
10	1	5	3.79	.827	.683	-.596	.121	.263	.241	3.727	3.862
11	1	5	3.31	.914	.835	-.197	.121	-.344	.241	3.231	3.380
12	1	5	3.83	.862	.744	-.567	.121	.142	.241	3.761	3.902
13	1	5	3.83	.831	.691	-.596	.121	.251	.241	3.761	3.897

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
14	1	5	3.54	.987	.974	-.381	.121	-.332	.241	3.462	3.623
15	1	5	3.82	.832	.693	-.548	.121	.416	.241	3.751	3.887
16	1	5	3.29	1.010	1.019	-.143	.121	-.446	.241	3.206	3.371
17	1	5	3.15	1.082	1.170	-.193	.121	-.580	.241	3.066	3.242
18	1	5	3.70	.922	.851	-.471	.121	-.234	.241	3.629	3.779
19	1	5	3.80	.829	.687	-.737	.121	.843	.241	3.737	3.872
20	1	5	3.52	.866	.750	-.352	.121	.114	.241	3.448	3.589
21	1	5	3.88	.874	.764	-.667	.121	.338	.241	3.806	3.949
22	1	5	3.81	.798	.637	-.584	.121	.424	.241	3.749	3.879
23	1	5	3.59	.935	.875	-.404	.121	-.038	.241	3.515	3.668
24	1	5	3.56	.922	.851	-.304	.121	-.273	.241	3.480	3.630
25	1	5	3.04	1.145	1.312	.022	.121	-.855	.241	2.951	3.137
26	1	5	3.49	.875	.765	-.198	.121	.019	.241	3.418	3.560
27	1	5	3.67	.856	.733	-.381	.121	-.095	.241	3.595	3.735
28	1	5	3.65	.834	.695	-.481	.121	.078	.241	3.713	3.670
29	1	5	3.38	.926	.858	-.332	.121	-.347	.241	3.301	3.452
30	1	5	3.72	.900	.809	-.457	.121	-.216	.241	3.648	3.795
31	1	5	3.74	.856	.733	-.671	.121	.698	.241	3.669	3.808

(table continues)



Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
<b>Individual Scale Items</b>											
32	1	5	3.65	.904	.818	-.400	.121	-.058	.241	3.572	3.719
33	1	5	3.74	.893	.798	-.535	.121	.091	.241	3.663	3.809
34	1	5	3.27	1.039	1.079	-.187	.121	-.596	.241	3.184	3.354
35	1	5	2.93	1.066	1.137	-.024	.121	-.636	.241	2.840	3.014
36	1	5	3.77	.812	.659	-.490	.121	.320	.241	3.702	3.834
<b>Subscales</b>											
1 – Balance	6	20	15.03	2.508	6.288	-.370	.121	.094	.241	14.830	15.239
2 – Merging	5	20	13.68	2.446	5.982	-.190	.121	.076	.241	13.483	13.882
3 – Goals	6	20	15.17	2.794	7.806	-.356	.121	-.162	.241	14.939	15.394
4 – Feedback	4	20	15.16	2.546	6.482	-.478	.121	.552	.241	14.951	15.366
5 – Concentration	5	20	14.54	2.857	8.161	-.273	.121	-.092	.241	14.307	14.773
6 – Control	5	20	14.99	2.597	6.745	-.303	.121	.144	.241	14.774	15.197
7 – Consciousness	4	20	12.97	3.248	10.551	-.194	.121	-.087	.241	12.708	13.238
8 – Time	4	20	12.91	2.961	8.765	-.269	.121	-.062	.241	12.673	13.156
9 – Autotelic	6	20	14.94	2.670	7.127	-.332	.121	-.032	.241	14.726	15.161

*Note.* DFS = Dispositional Flow Scale – 2; CI = confidence interval.

Table 2

*Distributional Statistics of the NEO-PI-R, N = 409*

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Overall											
NEO-PI-R	384	670	530.89	46.114	2126.502	.580	.121	.263	.241	527.128	534.647
Individual Scale Items											
1	0	4	1.95	1.159	1.343	.091	.121	-1.004	.241	1.859	2.048
2	0	4	2.67	.926	.857	-.707	.121	.235	.241	2.599	2.750
3	0	4	2.80	.892	.796	-.661	.121	.196	.241	2.729	2.875
4	0	4	1.68	1.060	1.123	.409	.121	-.486	.241	1.598	1.771
5	1	4	2.72	.830	.689	-.411	.121	-.280	.241	2.649	2.784
6	1	4	2.05	1.030	1.061	.406	.121	-1.157	.241	1.970	2.138
7	0	4	1.81	1.206	1.456	.185	.121	-1.000	.241	1.716	1.913
8	0	4	2.01	1.108	1.228	.084	.121	-.854	.241	1.922	2.103
9	1	4	2.24	.965	.931	.184	.121	-1.010	.241	2.158	2.316
10	0	4	1.61	1.057	1.116	.345	.121	-.722	.241	1.523	1.695
11	0	4	1.61	1.095	1.198	.417	.121	-.649	.241	1.524	1.703
12	1	4	2.30	.994	.988	-.019	.121	-1.206	.241	2.215	2.377
13	0	4	2.46	.960	.921	-.318	.121	-.575	.241	2.384	2.540

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
14	0	4	2.19	1.205	1.452	-.054	.121	-1.020	.241	2.090	2.286
15	0	4	2.88	.839	.704	-.822	.121	.864	.241	2.812	2.949
16	0	4	2.11	1.082	1.170	-.204	.121	-.969	.241	2.019	2.196
17	0	4	1.59	.979	.959	.479	.121	-.418	.241	1.507	1.667
18	0	4	1.44	.914	.836	.713	.121	.133	.241	1.368	1.517
19	0	4	2.79	.921	.848	-.745	.121	.303	.241	2.715	2.865
20	0	4	1.55	.982	.964	.375	.121	-.385	.241	1.470	1.630
21	0	4	1.86	1.055	1.114	.002	.121	-.788	.241	1.770	1.942
22	0	4	2.36	.969	.938	-.312	.121	-.329	.241	2.285	2.443
23	0	4	2.51	.990	.981	-.557	.121	-.210	.241	2.425	2.587
24	0	4	1.96	1.078	1.163	.097	.121	-.774	.241	1.875	2.051
25	0	4	2.66	.953	.908	-.698	.121	.029	.241	2.578	2.733
26	0	4	1.73	1.214	1.473	.185	.121	-1.035	.241	1.630	1.828
27	0	4	2.07	1.249	1.559	.120	.121	-1.100	.241	1.967	2.170
28	0	4	2.28	1.267	1.606	-.124	.121	-1.095	.241	2.180	2.387
29	0	4	2.96	.818	.670	-.755	.121	.779	.241	2.889	3.023
30	0	4	1.58	1.087	1.181	.515	.121	-.429	.241	1.491	1.668
31	0	4	1.77	1.089	1.185	.145	.121	-.861	.241	1.677	1.854

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
32	0	4	2.31	1.168	1.365	-.215	.121	-1.028	.241	2.210	2.401
33	0	4	1.83	1.104	1.219	.250	.121	-.873	.241	1.741	1.921
34	0	4	2.67	.920	.846	-.655	.121	.052	.241	2.590	2.740
35	0	4	2.25	1.233	1.521	-.169	.121	-1.073	.241	2.149	2.350
36	0	4	1.51	1.000	1.000	.502	.121	-.370	.241	1.432	1.595
37	0	4	2.19	1.053	1.109	-.281	.121	-.615	.241	2.102	2.274
38	0	4	2.66	.962	.925	-.659	.121	-.106	.241	2.584	2.741
39	0	4	1.95	1.193	1.424	.217	.121	-1.058	.241	1.849	2.043
40	0	4	2.69	1.026	1.053	-.594	.121	-.273	.241	2.606	2.773
41	0	4	1.89	1.249	1.560	-.073	.121	-1.135	.241	1.793	1.997
42	0	4	1.57	1.029	1.059	.659	.121	-.224	.241	1.488	1.656
43	0	4	2.08	1.169	1.366	-.097	.121	-.998	.241	1.983	2.174
44	0	4	2.89	.879	.773	-.637	.121	.154	.241	2.821	2.964
45	0	4	1.99	1.166	1.360	.192	.121	-.978	.241	1.893	2.083
46	0	4	1.91	1.077	1.159	.212	.121	-.934	.241	1.824	2.000
47	0	4	2.40	.897	.804	-.257	.121	-.353	.241	2.325	2.472
48	0	4	2.89	.840	.705	-.754	.121	.496	.241	2.817	2.954
49	0	4	1.33	1.009	1.017	.616	.121	-.022	.241	1.253	1.417

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
50	0	4	2.74	.863	.745	-.513	.121	-.068	.241	2.673	2.814
51	0	4	2.34	1.014	1.029	-.366	.121	-.631	.241	2.257	2.423
52	0	4	1.99	1.235	1.524	.199	.121	-1.028	.241	1.890	2.091
53	0	4	2.07	1.132	1.282	.022	.121	-.893	.241	1.974	2.158
54	0	4	2.44	.994	.988	-.487	.121	-.242	.241	2.364	2.526
55	0	4	1.97	1.173	1.376	.030	.121	-1.088	.241	1.870	2.061
56	0	4	1.19	.834	.696	.684	.121	.610	.241	1.118	1.254
57	0	4	2.75	.904	.818	-.616	.121	.122	.241	2.672	2.819
58	0	4	2.81	.860	.740	-.617	.121	.333	.241	2.737	2.877
59	0	4	1.64	1.013	1.026	.266	.121	-.736	.241	1.553	1.718
60	0	4	2.94	.735	.541	-.577	.121	.684	.241	2.881	3.001
61	0	4	1.93	1.080	1.167	.137	.121	-.911	.241	1.843	2.020
62	0	4	2.83	.903	.815	-.830	.121	.761	.241	2.760	2.907
63	0	4	2.41	1.058	1.120	-.306	.121	-.631	.241	2.324	2.497
64	0	4	1.60	1.064	1.132	.291	.121	-.773	.241	1.517	1.691
65	0	4	2.88	.736	.542	-.845	.121	1.638	.241	2.820	2.940
66	0	4	1.80	1.252	1.568	.188	.121	-1.081	.241	1.697	1.902
67	0	4	1.58	.987	.974	.371	.121	-.419	.241	1.504	1.665

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
68	0	4	1.84	1.192	1.422	.206	.121	-.952	.241	1.739	1.933
69	0	4	2.18	1.072	1.149	-.150	.121	-.828	.241	2.094	2.268
70	0	4	2.16	1.069	1.142	-.170	.121	-.818	.241	2.069	2.244
71	0	4	1.93	1.134	1.287	.120	.121	-.962	.241	1.837	2.022
72	0	4	2.54	1.024	1.048	-.619	.121	-.100	.241	2.459	2.626
73	0	4	2.92	.832	.692	-.977	.121	1.508	.241	2.852	2.987
74	0	4	2.12	1.193	1.424	-.015	.121	-1.048	.241	2.023	2.217
75	0	4	2.81	.928	.861	-.538	.121	-.081	.241	2.734	2.885
76	0	4	2.19	1.157	1.339	-.296	.121	-.848	.241	2.094	2.283
77	0	4	1.81	1.066	1.137	.111	.121	-.903	.241	1.720	1.894
78	0	4	1.27	.857	.734	.947	.121	1.194	.241	1.204	1.344
79	0	4	2.25	1.079	1.164	-.397	.121	-.699	.241	2.164	2.340
80	0	4	1.68	1.008	1.015	.303	.121	-.498	.241	1.602	1.767
81	0	4	1.91	1.073	1.152	.028	.121	-.861	.241	1.827	2.002
82	0	4	2.34	1.081	1.168	-.473	.121	-.530	.241	2.257	2.433
83	0	4	2.79	.942	.887	-.737	.121	.243	.241	2.713	2.867
84	0	4	1.80	1.107	1.224	.294	.121	-.679	.241	1.709	1.890
85	0	4	2.80	.870	.757	-.906	.121	.985	.241	2.731	2.873

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
86	0	4	2.34	1.075	1.156	-.388	.121	-.594	.241	2.252	2.428
87	0	4	2.15	1.185	1.405	-.100	.121	-.956	.241	2.050	2.243
88	0	4	1.83	1.208	1.459	.378	.121	-.761	.241	1.733	1.930
89	0	4	2.36	1.110	1.232	-.443	.121	-.518	.241	2.274	2.455
90	0	4	1.74	1.012	1.025	.432	.121	-.528	.241	1.661	1.826
91	0	4	1.81	1.093	1.195	-.052	.121	-1.101	.241	1.718	1.896
92	0	4	2.25	1.152	1.326	-.213	.121	-.900	.241	2.158	2.346
93	0	4	1.80	1.095	1.198	.163	.121	-.961	.241	1.713	1.891
94	0	4	2.68	.872	.761	-.767	.121	.577	.241	2.614	2.756
95	0	4	1.90	1.082	1.172	.137	.121	-.823	.241	1.814	1.990
96	0	4	1.71	1.055	1.114	.263	.121	-.701	.241	1.623	1.795
97	0	4	2.42	1.000	.999	-.490	.121	-.339	.241	2.339	2.502
98	0	4	2.62	.916	.839	-.555	.121	.104	.241	2.544	2.693
99	0	4	2.19	1.136	1.290	-.123	.121	-.884	.241	2.096	2.281
100	0	4	2.66	.988	.976	-.583	.121	-.240	.241	2.575	2.736
101	0	4	2.25	1.144	1.309	-.366	.121	-.731	.241	2.154	2.340
102	0	4	1.52	.998	.995	.642	.121	-.082	.241	1.439	1.602
103	0	4	1.97	1.111	1.234	.035	.121	-.927	.241	1.875	2.056

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
104	0	4	2.99	.843	.711	-.845	.121	.907	.241	2.921	3.059
105	0	4	2.16	1.227	1.505	.021	.121	-1.138	.241	2.064	2.264
106	0	4	2.08	1.087	1.182	.184	.121	-.966	.241	1.992	2.169
107	0	4	2.11	1.047	1.097	-.090	.121	-.805	.241	2.030	2.200
108	0	4	2.44	1.076	1.158	-.430	.121	-.572	.241	2.350	2.525
109	0	4	1.96	1.094	1.197	-.064	.121	-.879	.241	1.869	2.048
110	0	4	2.96	.869	.756	-.774	.121	.565	.241	2.888	3.029
111	0	4	2.65	.956	.914	-.536	.121	-.245	.241	2.572	2.728
112	0	4	1.78	1.207	1.458	.258	.121	-.984	.241	1.679	1.876
113	0	4	1.81	1.075	1.156	.272	.121	-.732	.241	1.719	1.895
114	0	4	2.83	.904	.817	-.761	.121	.471	.241	2.758	2.905
115	0	4	1.85	1.094	1.196	.084	.121	-.910	.241	1.762	1.940
116	0	4	1.43	.950	.902	.767	.121	.411	.241	1.348	1.503
117	0	4	2.65	.934	.872	-.692	.121	.358	.241	2.569	2.722
118	0	4	2.65	.874	.764	-.507	.121	.094	.241	2.574	2.717
119	0	4	2.05	1.118	1.250	-.006	.121	-.863	.241	1.960	2.142
120	0	4	2.62	.886	.785	-.647	.121	.360	.241	2.549	2.693
121	0	4	1.88	1.003	1.006	.296	.121	-.795	.241	1.794	1.957

(table continues)



Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
122	0	4	2.75	.917	.841	-.688	.121	.214	.241	2.673	2.823
123	0	4	2.40	1.048	1.099	-.288	.121	-.833	.241	2.318	2.489
124	0	4	1.92	1.099	1.207	-.007	.121	-.961	.241	1.830	2.009
125	0	4	2.70	.827	.684	-.916	.121	1.503	.241	2.637	2.772
126	0	4	2.07	1.141	1.301	-.040	.121	-.949	.241	1.978	2.164
127	0	4	1.66	1.057	1.116	.357	.121	-.659	.241	1.576	1.749
128	0	4	1.91	1.090	1.187	.220	.121	-.923	.241	1.818	1.996
129	0	4	2.72	.959	.919	-.714	.121	.387	.241	2.638	2.795
130	0	4	2.09	1.132	1.281	-.123	.121	-.933	.241	1.996	2.180
131	0	4	2.41	1.026	1.052	-.347	.121	-.463	.241	2.330	2.497
132	0	4	2.64	.878	.771	-.689	.121	.479	.241	2.567	2.710
133	0	4	2.70	.912	.831	-.667	.121	.341	.241	2.630	2.778
134	0	4	2.16	1.140	1.301	-.175	.121	-.941	.241	2.066	2.252
135	0	4	2.82	.865	.748	-.679	.121	.509	.241	2.753	2.894
136	0	4	1.94	1.137	1.293	-.130	.121	-1.028	.241	1.851	2.036
137	0	4	1.99	1.122	1.260	.039	.121	-.993	.241	1.894	2.077
138	0	4	1.40	.905	.818	.612	.121	.092	.241	1.322	1.470
139	0	4	2.33	1.057	1.118	-.322	.121	-.665	.241	2.241	2.414

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
140	0	4	2.01	1.128	1.272	-.004	.121	-.952	.241	1.915	2.099
141	0	4	1.84	1.038	1.077	.182	.121	-.778	.241	1.754	1.923
142	0	4	2.40	.967	.936	-.324	.121	-.531	.241	2.317	2.475
143	0	4	2.58	.987	.974	-.521	.121	-.300	.241	2.504	2.665
144	0	4	1.57	.937	.877	.403	.121	-.403	.241	1.498	1.651
145	0	4	2.76	.919	.844	-.764	.121	.554	.241	2.685	2.835
146	0	4	2.25	1.100	1.211	-.246	.121	-.905	.241	2.157	2.337
147	0	4	1.83	1.065	1.134	.079	.121	-.743	.241	1.747	1.921
148	0	4	1.75	1.074	1.153	.295	.121	-.713	.241	1.663	1.838
149	0	4	2.59	.903	.816	-.499	.121	.114	.241	2.516	2.663
150	0	4	1.77	.994	.989	.154	.121	-.669	.241	1.684	1.846
151	0	4	2.29	1.019	1.038	-.443	.121	-.594	.241	2.203	2.369
152	0	4	2.52	.950	.902	-.485	.121	-.295	.241	2.438	2.593
153	0	4	1.69	.997	.994	.266	.121	-.838	.241	1.608	1.771
154	0	4	2.48	.983	.966	-.549	.121	-.289	.241	2.399	2.559
155	0	4	2.19	1.167	1.362	-.260	.121	-.883	.241	2.098	2.288
156	0	4	1.66	1.020	1.040	.466	.121	-.601	.241	1.572	1.738
157	0	4	2.25	1.081	1.168	-.333	.121	-.570	.241	2.161	2.337

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
158	0	4	2.59	.924	.854	-.512	.121	-.168	.241	2.519	2.669
159	0	4	2.10	1.088	1.185	.028	.121	-.960	.241	2.007	2.184
160	0	4	2.23	.942	.887	-.132	.121	-.485	.241	2.151	2.304
161	0	4	1.80	1.151	1.324	.122	.121	-1.058	.241	1.703	1.891
162	0	4	1.71	.983	.966	.231	.121	-.731	.241	1.631	1.792
163	0	4	2.07	1.160	1.345	.013	.121	-1.038	.241	1.976	2.165
164	0	4	2.78	.811	.657	-.631	.121	.529	.241	2.714	2.846
165	0	4	2.65	.842	.709	-.497	.121	.049	.241	2.579	2.717
166	0	4	1.39	.874	.763	.835	.121	.516	.241	1.320	1.462
167	0	4	2.25	1.038	1.077	-.115	.121	-.916	.241	2.170	2.339
168	0	4	2.44	1.018	1.037	-.621	.121	-.316	.241	2.360	2.526
169	0	4	1.82	1.039	1.080	.144	.121	-.833	.241	1.734	1.904
170	0	4	2.73	.919	.845	-.691	.121	.263	.241	2.654	2.804
171	0	4	1.87	1.161	1.347	.094	.121	-1.014	.241	1.771	1.960
172	0	4	2.39	1.162	1.350	-.565	.121	-.510	.241	2.292	2.481
173	0	4	1.90	1.135	1.287	.249	.121	-.782	.241	1.812	1.997
174	0	4	2.33	1.059	1.122	-.405	.121	-.452	.241	2.239	2.412
175	0	4	2.06	1.115	1.244	-.089	.121	-.987	.241	1.970	2.152

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
176	0	4	1.30	.891	.794	.708	.121	.421	.241	1.228	1.373
177	0	4	2.63	.901	.813	-.590	.121	.145	.241	2.555	2.702
178	0	4	2.81	.902	.813	-.759	.121	.551	.241	2.733	2.880
179	0	4	2.91	.914	.835	-.812	.121	.526	.241	2.837	2.986
180	0	4	2.45	.928	.861	-.517	.121	.003	.241	2.377	2.528
181	0	4	1.85	.994	.988	.163	.121	-.733	.241	1.765	1.927
182	0	4	2.71	.844	.713	-.629	.121	.348	.241	2.638	2.775
183	0	4	2.06	1.210	1.464	.024	.121	-1.137	.241	1.962	2.160
184	0	4	2.63	.929	.862	-.667	.121	.181	.241	2.550	2.702
185	0	4	2.79	.852	.727	-.866	.121	1.162	.241	2.718	2.857
186	0	4	2.44	1.011	1.022	-.580	.121	-.266	.241	2.358	2.522
187	0	4	2.04	1.092	1.192	-.073	.121	-.949	.241	1.948	2.126
188	0	4	2.44	1.025	1.051	-.482	.121	-.388	.241	2.357	2.524
189	0	4	2.20	1.127	1.270	-.092	.121	-.970	.241	2.104	2.287
190	0	4	1.78	1.117	1.248	.210	.121	-.881	.241	1.694	1.876
191	0	4	2.09	1.065	1.134	-.211	.121	-.745	.241	2.006	2.180
192	0	4	2.16	1.007	1.013	-.198	.121	-.657	.241	2.079	2.243
193	0	4	2.73	.883	.779	-.763	.121	.886	.241	2.662	2.805

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
194	0	4	2.72	.833	.694	-.706	.121	.763	.241	2.648	2.784
195	0	4	2.85	.850	.722	-.717	.121	.579	.241	2.779	2.918
196	0	4	2.24	1.033	1.066	-.310	.121	-.749	.241	2.158	2.326
197	0	4	2.41	.974	.948	-.269	.121	-.650	.241	2.329	2.488
198	0	4	1.68	.973	.947	.362	.121	-.650	.241	1.605	1.764
199	0	4	1.77	1.041	1.083	.243	.121	-.770	.241	1.688	1.857
200	0	4	2.76	.865	.748	-.951	.121	.994	.241	2.687	2.828
201	0	4	2.23	1.080	1.166	-.192	.121	-.839	.241	2.139	2.315
202	0	4	2.29	1.035	1.071	-.211	.121	-.742	.241	2.209	2.378
203	0	4	2.77	.888	.788	-.727	.121	.563	.241	2.693	2.838
204	0	4	2.61	.907	.822	-.674	.121	.384	.241	2.535	2.683
205	0	4	1.81	1.058	1.119	.145	.121	-.913	.241	1.726	1.898
206	0	4	1.32	.805	.649	1.030	.121	1.491	.241	1.252	1.384
207	0	4	1.85	1.122	1.258	.292	.121	-.907	.241	1.762	1.945
208	0	4	2.12	1.137	1.294	.019	.121	-.917	.241	2.030	2.215
209	0	4	2.84	.866	.750	-.852	.121	1.109	.241	2.773	2.914
210	0	4	2.71	.896	.803	-.761	.121	.741	.241	2.641	2.787
211	0	4	2.29	.990	.980	-.604	.121	-.470	.241	2.208	2.369

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
212	0	4	2.72	.843	.711	-.568	.121	.310	.241	2.653	2.790
213	0	4	1.97	1.122	1.259	.109	.121	-1.039	.241	1.874	2.057
214	0	4	2.65	.875	.766	-.584	.121	.149	.241	2.581	2.724
215	0	4	2.85	.808	.653	-.808	.121	1.043	.241	2.783	2.914
216	0	4	2.33	1.019	1.039	-.462	.121	-.486	.241	2.242	2.408
217	0	4	2.37	1.049	1.101	-.437	.121	-.485	.241	2.284	2.455
218	0	4	2.28	1.025	1.051	-.338	.121	-.667	.241	2.198	2.365
219	0	4	1.83	.984	.967	.183	.121	-.653	.241	1.754	1.914
220	0	4	1.93	1.104	1.218	.119	.121	-.892	.241	1.839	2.019
221	0	4	2.07	1.141	1.301	-.050	.121	-.928	.241	1.978	2.164
222	0	4	1.98	1.083	1.174	.127	.121	-.937	.241	1.895	2.071
223	0	4	2.43	1.048	1.098	-.399	.121	-.524	.241	2.342	2.513
224	0	4	2.82	.881	.776	-.784	.121	.653	.241	2.747	2.891
225	0	4	2.54	1.073	1.151	-.518	.121	-.415	.241	2.450	2.625
226	0	4	2.47	.921	.848	-.572	.121	.008	.241	2.394	2.544
227	0	4	2.60	.924	.853	-.572	.121	.038	.241	2.526	2.677
228	0	4	1.44	.954	.909	.576	.121	-.224	.241	1.367	1.523
229	0	4	2.13	1.148	1.318	-.041	.121	-1.051	.241	2.041	2.228

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Individual Scale Items											
230	0	4	2.32	1.056	1.114	-.286	.121	-.703	.241	2.232	2.404
231	0	4	1.63	.989	.979	.351	.121	-.590	.241	1.550	1.711
232	0	4	2.44	1.001	1.002	-.506	.121	-.427	.241	2.356	2.519
233	0	4	2.76	.860	.740	-.637	.121	.544	.241	2.693	2.833
234	0	4	1.75	1.055	1.113	.280	.121	-.590	.241	1.667	1.839
235	0	4	2.62	.886	.784	-.591	.121	.142	.241	2.551	2.696
236	0	4	1.32	.866	.751	.592	.121	.150	.241	1.245	1.386
237	0	4	2.78	.907	.822	-.810	.121	.545	.241	2.701	2.849
238	0	4	1.63	.933	.871	.361	.121	-.107	.241	1.555	1.707
239	0	4	2.52	.918	.843	-.491	.121	-.020	.241	2.446	2.596
240	0	4	2.74	.928	.861	-.690	.121	.458	.241	2.660	2.812
Domains											
Neuroticism	34	151	92.90	18.129	328.676	-.449	.121	.855	.241	91.419	94.375
Extraversion	54	165	107.35	16.857	284.155	.248	.121	1.010	.241	105.978	108.726
Openness	65	177	106.75	17.589	309.374	1.258	.121	1.608	.241	105.317	108.184
Agreeableness	72	160	109.94	16.629	276.535	.739	.121	.003	.241	108.581	111.292
Conscientiousness	57	178	113.95	17.791	316.503	.492	.121	.290	.241	112.501	115.401

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Original Facets											
N1 - Anxiety	1	30	15.75	4.657	21.691	-.097	.121	1.379	.241	15.373	16.133
N2 - Angry Hostility	2	26	15.57	4.173	17.418	-.470	.121	-.068	.241	15.227	15.907
N3 - Depression	0	31	16.06	5.127	26.291	-.275	.121	.180	.241	15.641	16.477
N4 - Self-Consciousness	4	31	16.33	4.103	16.831	.206	.121	.993	.241	16.001	16.669
N5 - Impulsiveness	7	30	16.32	3.468	12.028	.623	.121	1.237	.241	16.040	16.605
N6 - Vulnerability	1	26	12.86	4.159	17.297	-.334	.121	.296	.241	12.522	13.200
E1 - Warmth	6	32	20.76	4.661	21.723	-.204	.121	-.184	.241	20.378	21.138
E2 - Gregariousness	1	32	16.33	4.331	18.759	.048	.121	1.219	.241	15.972	16.678
E3 - Assertiveness	3	31	16.43	3.627	13.157	.076	.121	1.740	.241	16.130	16.721
E4 - Activity	6	28	17.16	3.303	10.912	-.107	.121	.854	.241	16.887	17.426
E5 - Excitement-Seeking	5	32	17.99	4.432	19.642	-.262	.121	.377	.241	17.629	18.352
E6 - Positive Emotions	5	32	18.70	4.650	21.624	.492	.121	.226	.241	18.318	19.076
O1 - Fantasy	5	32	16.97	4.442	19.734	.682	.121	.701	.241	16.604	17.328
O2 - Aesthetics	3	31	18.35	4.382	19.204	.278	.121	.935	.241	17.995	18.709
O3 - Feelings	3	32	19.36	4.167	17.364	.472	.121	.785	.241	19.022	19.702
O4 - Actions	6	32	15.01	3.290	10.821	.571	.121	2.170	.241	14.739	15.275
O5 - Ideas	6	32	19.19	4.430	19.627	.336	.121	.549	.241	18.825	19.547
O6 - Values	4	32	17.88	4.706	22.147	.859	.121	.268	.241	17.494	18.261

(table continues)



Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Original Facets											
A1 - Trust	6	32	18.32	4.396	19.324	.063	.121	.313	.241	17.957	18.67375
A2 - Straightforwardness	7	30	17.39	4.460	19.891	.475	.121	-.087	.241	17.030	17.757
A3 - Altruism	11	32	20.67	4.431	19.630	.264	.121	-.343	.241	20.304	21.026
A4 - Compliance	4	29	16.39	3.706	13.733	.218	.121	.282	.241	16.087	16.691
A5 - Modesty	3	28	17.30	3.805	14.476	.340	.121	.516	.241	16.991	17.611
A6 - Tender-Mindedness	8	30	19.87	3.548	12.587	.069	.121	.223	.241	19.584	20.162
C1 - Competence	9	32	20.28	3.982	15.855	.277	.121	-.135	.241	19.957	20.606
C2 - Order	0	28	17.14	4.267	18.208	.112	.121	.294	.241	16.792	17.487
C3 - Dutifulness	9	32	20.70	4.037	16.299	.029	.121	.110	.241	20.370	21.028
C4 - Achievement	5	31	18.75	3.611	13.037	.141	.121	.880	.241	18.454	19.043
C5 - Self-Discipline	3	32	18.53	4.440	19.715	.344	.121	.293	.241	18.169	18.893
C6 - Deliberation	6	31	18.55	3.614	13.062	.099	.121	.703	.241	18.258	18.847
Study Facets											
N1 - Anxiety RS	0	16	7.61	3.359	11.283	.227	.121	-.443	.241	7.333	7.880
N2 - Anxiety	0	16	8.15	3.239	10.493	-.270	.121	-.156	.241	7.883	8.411
N3 - Angry Hostility	1	20	10.69	3.933	15.465	-.049	.121	-.556	.241	10.369	11.010
N4 - Angry Hostility RS	0	12	4.88	2.187	4.784	.219	.121	-.343	.241	4.699	5.056
N5 - Depression RS	0	8	3.54	1.886	3.558	.225	.121	-.656	.241	3.389	3.697

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Study Facets											
N6 - Depression	0	24	12.52	4.848	23.505	-.168	.121	-.498	.241	12.121	12.911
N7 – Self-Consciousness	0	20	10.95	3.726	13.880	-.139	.121	-.330	.241	10.647	11.255
N8 - Self-Conscious RS	0	12	5.38	2.245	5.041	.442	.121	.233	.241	5.201	5.567
N9 - Impulsiveness	0	16	9.08	2.955	8.733	-.107	.121	-.132	.241	8.842	9.324
N10 - Impulsiveness RS	0	16	7.24	2.900	8.408	-.002	.121	-.059	.241	7.003	7.476
N11 - Vulnerability	0	12	6.32	2.675	7.158	-.305	.121	-.608	.241	6.097	6.533
N12 - Vulnerability RS	0	19	6.55	3.011	9.067	.685	.121	.988	.241	6.300	6.791
E1 - Warmth	2	24	16.20	3.982	15.857	-.623	.121	.360	.241	15.876	16.525
E2 - Warmth RS	0	8	4.56	2.045	4.184	-.224	.121	-.872	.241	4.391	4.724
E3 - Gregariousness RS	0	16	7.10	3.303	10.907	.304	.121	-.447	.241	6.829	7.367
E4 - Gregariousness	0	16	9.23	2.998	8.990	-.450	.121	-.067	.241	8.983	9.472
E5 - Assertiveness	1	16	9.64	2.686	7.217	-.307	.121	.212	.241	9.419	9.857
E6 - Assertiveness RS	0	16	6.79	2.812	7.908	.273	.121	.044	.241	6.558	7.017
E7 - Activity RS	0	11	5.51	1.650	2.721	.153	.121	.990	.241	5.203	5.555
E8 – Activity	4	19	11.65	2.764	7.640	-.090	.121	.154	.241	11.512	12.043
E9 - Excitement-Seeking	0	24	14.22	4.054	16.433	-.228	.121	.209	.241	13.892	14.553
E10 - Excitement RS	0	8	3.77	1.929	3.723	.258	.121	-.641	.241	3.610	3.925
E11 - Pos Emotions RS	0	16	7.90	3.401	11.569	.166	.121	-.439	.241	7.625	8.179

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Study Facets											
E12 - Positive Emotions	0	16	10.79	2.725	7.428	-.659	.121	.993	.241	10.572	11.017
O1 - Fantasy	0	12	7.62	2.431	5.909	-.366	.121	-.324	.241	7.418	7.814
O2 - Fantasy RS	1	20	9.35	4.013	16.105	.246	.121	-.623	.241	9.022	9.677
O3 - Aesthetics RS	0	12	5.76	2.598	6.749	.222	.121	-.193	.241	5.544	5.967
O4 - Aesthetics	0	20	12.60	3.461	11.977	-.461	.121	.366	.241	12.314	12.879
O5 - Feelings RS	0	12	6.11	2.881	8.303	.111	.121	-.859	.241	5.880	6.350
O6 - Feelings	1	20	13.25	2.966	8.799	-.432	.121	.984	.241	13.005	13.489
O7 - Actions	1	12	7.77	2.019	4.077	-.454	.121	.186	.241	7.601	7.930
O8 - Actions RS	0	20	7.24	3.110	9.674	.671	.121	.996	.241	6.989	7.496
O9 - Ideas	0	20	13.41	3.311	10.963	-.525	.121	.740	.241	13.138	13.678
O10 - Ideas RS	0	12	5.78	2.685	7.208	.321	.121	-.384	.241	5.559	5.996
O11 - Values RS	0	20	9.62	4.179	17.462	.315	.121	-.467	.241	9.278	9.959
O12 - Values	0	12	8.26	2.006	4.026	-.634	.121	.877	.241	8.096	8.423
A1 - Trust RS	0	12	5.21	2.625	6.891	.227	.121	-.503	.241	4.994	5.422
A2 - Trust	2	20	13.11	3.544	12.557	-.583	.121	.221	.241	12.819	13.396
A3 - Straightforwardness	1	12	7.13	1.958	3.832	-.122	.121	-.072	.241	6.975	7.294
A4 - Straightforward RS	0	20	10.26	4.212	17.741	.083	.121	-.546	.241	9.916	10.603
A5 - Altruism RS	0	12	6.47	2.863	8.196	-.084	.121	-.827	.241	6.234	6.700

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Study Facets											
A6 - Altruism	1	20	14.20	3.016	9.095	-.714	.121	1.261	.241	13.952	14.444
A7 - Compliance RS	0	20	9.02	3.564	12.705	-.054	.121	-.279	.241	8.729	9.310
A8 - Compliance	0	12	7.37	2.140	4.581	-.379	.121	.245	.241	7.195	7.544
A9 - Modesty RS	0	16	7.09	3.107	9.656	.251	.121	-.427	.241	6.837	7.344
A10 - Modesty	0	16	10.21	2.519	6.343	-.522	.121	.740	.241	10.005	10.416
A11 - Tender-Minded	1	24	16.19	3.340	11.157	-.434	.121	1.330	.241	15.914	16.458
A12 - TenderMinded RS	0	8	3.69	1.672	2.794	.038	.121	-.496	.241	3.551	3.823
C1 - Competence RS	0	12	6.34	2.769	7.668	-.162	.121	-.461	.241	6.119	6.570
C2 - Competence	2	20	13.94	2.817	7.937	-.597	.121	1.363	.241	13.707	14.166
C3 - Order	0	20	9.57	3.693	13.638	-.078	.121	-.294	.241	7.394	7.750
C4 - Order RS	0	12	7.57	2.187	4.785	-.403	.121	-.099	.241	9.266	9.868
C5 - Dutifulness RS	0	8	4.15	2.016	4.065	.064	.121	-.667	.241	3.987	4.316
C6 - Dutifulness	2	24	16.55	3.336	11.131	-.642	.121	1.059	.241	16.276	16.820
C7 - Achievement	2	20	13.51	3.023	9.138	-.439	.121	.506	.241	13.260	13.753
C8 - Achievement RS	0	12	5.24	2.220	4.929	-.040	.121	-.316	.241	5.061	5.423
C9 - Self-Discipline TS	0	16	7.69	3.403	11.582	.074	.121	-.575	.241	7.412	7.967
C10 - Self-Discipline	1	16	10.84	2.664	7.095	-.657	.121	.928	.241	10.624	11.058
C11 - Deliberation	1	20	13.46	2.871	8.244	-.573	.121	1.131	.241	13.230	13.699

(table continues)

Variable	Min	Max	<i>M</i>	<i>SD</i>	Variance	Skewness		Kurtosis		.90 CI	
						Statistic	<i>SE</i>	Statistic	<i>SE</i>	Lower	Upper
Study Facets											
C12 - Deliberation RS	0	12	5.09	2.265	5.129	.351	.121	.027	.241	4.903	5.273

*Note.* NEO-PI-R = NEO – Personality Inventory – Revised; CI = confidence interval; N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness; RS = Reverse-Scored.

Table 3

*Normative Means and Standard Deviations for the DFS-2 and NEO-PI-R Measurements*

Measurement	Subscale / Domain / Facet	Mean	Standard Deviation
DFS-2			
	Balance	14.72	2.72
	Merging	13.92	3.4
	Goals	16.04	2.56
	Feedback	15.48	2.6
	Concentration	14.84	3.24
	Control	14.88	3.04
	Consciousness	15.48	3.64
	Time	13.76	3.24
	Autotelic	16.08	3.12
NEO-PI-R Domains			
	Neuroticism	79.1	21.2
	Extraversion	109.4	18.4

(table continues)

Measurement	Subscale / Domain / Facet	Mean	Standard Deviation
NEO-PI-R Domains			
	Openness	110.6	17.3
	Agreeableness	124.3	15.8
	Conscientiousness	123.1	17.6
NEO-PI-R Facets			
	N1 - Anxiety	14.3	5.3
	N2 - Angry Hostility	12.4	4.6
	N3 - Depression	12.3	5.4
	N4 - Self-Consciousness	14.3	4.4
	N5 - Impulsiveness	15.8	4.4
	N6 - Vulnerability	10.0	3.9
	E1 - Warmth	22.9	4.0
	E2 - Gregariousness	16.5	4.8
	E3 - Assertiveness	15.8	4.7
	E4 - Activity	17.6	4.7
	E5 - Excitement-Seeking	16.4	4.9
	E6 - Positive Emotions	20.2	4.5
	O1 - Fantasy	16.6	4.9
	O2 - Aesthetics	17.6	5.3
	O3 - Feelings	20.3	4.0
	O4 - Actions	16.4	3.7
	O5 - Ideas	19.0	5.0
	O6 - Values	20.7	4.1
	A1 - Trust	21.3	4.2
	A2 - Straightforwardness	21.2	4.4
	A3 - Altruism	23.6	3.5
	A4 - Compliance	18.9	4.0

(table continues)

Measurement	Subscale / Domain / Facet	Mean	Standard Deviation
NEO-PI-R Facets	A5 - Modesty	18.9	4.2
	A6 - Tender-Mindedness	20.5	3.5
	C1 - Competence	22.2	3.5
	C2 - Order	19.0	4.2
	C3 - Dutifulness	23.2	3.9
	C4 - Achievement	19.5	4.0
	C5 - Self-Discipline	21.8	4.3
	C6 - Deliberation	17.5	4.1

*Note.* DFS-2 statistics from *The FLOW Manual: The Manual for the Flow Scales* (p. 45), by S. Jackson, B. Eklund, & A. Martin, 2010, Queensland, Australia: Mind Garden, Inc. NEO-PI-R statistics from *NEO Inventories for the NEO-PI-3, NEO-FFI-3, NEO-PI-R Professional Manual* (p. 117), by R. R. McCrae & P. T. Costa, 2010, Lutz, FL: PAR.

Table 4

*Correlation Matrix & Cronbach's Alphas for the DFS-2 Subscales, N = 409*

Subscale	Balance	Merging	Goals	Feedback	Concentration	Control	Consciousness	Time	Autotelic
1 – Balance	<b>0.737</b>								
2 – Merging	.548**	<b>0.611</b>							
3 – Goals	.682**	.501**	<b>0.810</b>						
4 – Feedback	.608**	.421**	.700**	<b>0.764</b>					
5 – Concentration	.454**	.472**	.609**	.579**	<b>0.763</b>				
6 – Control	.626**	.482**	.641**	.630**	.648**	<b>0.742</b>			
7 – Consciousness	.216**	.420**	.257**	.271**	.380**	.305**	<b>0.784</b>		
8 – Time	.156**	.433**	.170**	.133**	.247**	.149**	.417**	<b>0.710</b>	
9 – Autotelic	.667**	.490**	.625**	.551**	.485**	.595**	.315**	.394**	<b>0.771</b>

*Note.* Cronbach's Alphas for subscales are presented on the diagonal in boldface. DFS-2 = Dispositional Flow Scale – 2.

\* $p < .05$ . \*\* $p < .01$ .

Table 5

*Correlation Matrix & Cronbach's Alphas for the NEO-PI-R Domains, N = 409*

Domain	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Neuroticism	<b>.793</b>				
Extraversion	-.330**	<b>.753</b>			
Openness	-.219**	.421**	<b>.778</b>		
Agreeableness	-.357**	.360**	.472**	<b>.768</b>	
Conscientiousness	-.438**	.387**	.296**	.517**	<b>.835</b>

*Note.* Cronbach's Alphas for subscales are presented on the diagonal in boldface. NEO-PI-R = NEO – Personality Inventory – Revised.

\* $p < .05$ . \*\* $p < .01$ .

Table 6

*Correlation Matrix & Cronbach's Alphas for the NEO-PI-R Original Facets, N = 409*

Original Facet	N1	N2	N3	N4	N5	N6	E1	E2
N1 - Anxiety	<b>.674</b>							
N2 - Angry Hostility	.330**	<b>.543</b>						
N3 - Depression	.512**	.569**	<b>.701</b>					
N4 - Self-Consciousness	.505**	.403**	.577**	<b>.544</b>				
N5 - Impulsiveness	.207**	.150**	.168**	.221**	<b>.309</b>			
N6 - Vulnerability	.454**	.491**	.549**	.397**	.111*	<b>.639</b>		
E1 - Warmth	-.160**	-.349**	-.241**	-.114*	.134**	-.466**	<b>.747</b>	
E2 - Gregariousness	-.189**	-.246**	-.237**	-.274**	.020	-.145**	.459**	<b>.588</b>

(table continues)



Original Facet	N1	N2	N3	N4	N5	N6	E1	E2
E3 - Assertiveness	-.291**	-.144**	-.319**	-.281**	.060	-.326**	.340**	.353**
E4 - Activity	-.077	-.064	-.084	-.086	.019	-.231**	.320**	.284**
E5 - Excitement-Seeking	-.119*	.193**	.137**	-.012	.108*	-.128**	.260**	.368**
E6 - Positive Emotions	-.143**	-.408**	-.382**	-.183**	.205**	-.464**	.644**	.384**
O1 - Fantasy	-.008	-.222**	-.138**	-.104*	.236**	-.122*	.204**	.137**
O2 - Aesthetics	-.039	-.167**	-.086	-.035	.003	-.198**	.395**	.169**
O3 - Feelings	.184**	-.165**	-.091	.100*	.278**	-.253**	.535**	.198**
O4 - Actions	-.053	-.243**	-.200**	-.200**	.049	-.091	.096	.241**
O5 - Ideas	-.107*	-.245**	-.215**	-.077	.032	-.345**	.317**	.058
O6 - Values	.008	-.412**	-.335**	-.124*	.177**	-.347**	.323**	.068
A1 - Trust	-.332**	-.535**	-.368**	-.227**	-.067	-.486**	.592**	.325**
A2 - Straightforwardness	.060	-.398**	-.347**	-.030	-.017	-.265**	.219**	-.058
A3 - Altruism	-.023	-.430**	-.260**	-.046	.107*	-.497**	.652**	.224**
A4 - Compliance	-.111*	-.478**	-.279**	-.174**	-.195**	-.211**	.301**	.198**
A5 - Modesty	.216**	-.173**	.057	.158**	.087	-.082	.116*	-.121*
A6 - Tender-Mindedness	.023	-.253**	-.033	.081	.064	-.380**	.515**	.128**
C1 - Competence	-.274**	-.346**	-.432**	-.164**	-.031	-.653**	.521**	.149**
C2 - Order	.062	-.101*	-.278**	-.111*	-.051	-.240**	.105*	.014
C3 - Dutifulness	-.101*	-.173**	-.208**	-.009	-.042	-.496**	.440**	.070
C4 - Achievement	-.113*	-.227**	-.322**	-.173**	-.018	-.516**	.414**	.156**
C5 - Self-Discipline	-.213**	-.356**	-.479**	-.292**	-.201**	-.583**	.351**	.089
E3 - Assertiveness	-.111*	-.093	-.096	-.006	-.323**	-.257**	.199**	-.015

Original Facet	E3	E4	E5	E6	O1	O2	O3	O4
E3 - Assertiveness	<b>.447</b>							
E4 - Activity	.335**	<b>.291</b>						
E5 - Excitement-Seeking	.220**	.305**	<b>.593</b>					
E6 - Positive Emotions	.306**	.327**	.159**	<b>.684</b>				

(table continues)

Original Facet	E3	E4	E5	E6	O1	O2	O3	O4
O1 - Fantasy	.155**	-.004	.033	.353**	<b>.613</b>			
O2 - Aesthetics	.094	.093	.149**	.431**	.361**	<b>.634</b>		
O3 - Feelings	.176**	.162**	.104*	.518**	.391**	.443**	<b>.599</b>	
O4 - Actions	.136**	.129**	.049	.207**	.274**	.140**	.151**	<b>.388</b>
O5 – Ideas	.194**	.084	.176**	.375**	.392**	.557**	.417**	.240**
O6 – Values	.089	-.026	-.149**	.436**	.494**	.316**	.511**	.292**
A1 - Trust	.265**	.205**	.031	.494**	.061	.299**	.288**	.123*
A2 - Straightforwardness	-.075	-.022	-.351**	.279**	.116*	.024	.354**	.035
A3 - Altruism	.187**	.190**	.082	.598**	.207**	.326**	.565**	.053
A4 - Compliance	-.025	-.076	-.258**	.261**	.133**	.137**	.136**	.062
A5 - Modesty	-.150**	-.022	-.246**	.145**	.113*	-.008	.266**	.039
A6 - Tender-Mindedness	.076	.174**	.164**	.414**	.170**	.422**	.510**	-.023
C1 - Competence	.264**	.215**	.052	.497**	.172**	.289**	.421**	.031
C2 - Order	.102*	.101*	-.110*	.188**	-.045	.010	.107*	-.076
C3 - Dutifulness	.103*	.284**	.078	.365**	-.044	.250**	.362**	-.086
C4 - Achievement	.341**	.400**	.094	.429**	.061	.281**	.378**	.032
C5 - Self-Discipline	.237**	.219**	-.051	.345**	-.024	.149**	.235**	-.018
C6 - Deliberation	.029	.139**	.001	.130**	-.148**	.167**	.070	-.182**

Original Facet	O5	O6	A1	A2	A3	A4	A5	A6
O5 – Ideas	<b>.671</b>							
O6 – Values	.417**	<b>.694</b>						
A1 - Trust	.243**	.340**	<b>.690</b>					
A2 - Straightforwardness	.143**	.391**	.273**	<b>.618</b>				
A3 - Altruism	.385**	.438**	.515**	.456**	<b>.689</b>			
A4 - Compliance	.055	.297**	.377**	.413**	.359**	<b>.408</b>		
A5 - Modesty	-.014	.285**	.159**	.383**	.346**	.229**	<b>.501</b>	
A6 - Tender-Mindedness	.370**	.359**	.477**	.275**	.588**	.246**	.198**	<b>.469</b>

(table continues)

Original Facet	O5	O6	A1	A2	A3	A4	A5	A6
C1 - Competence	.430**	.387**	.419**	.346**	.623**	.243**	.171**	.404**
C2 - Order	.008	.168**	.010	.255**	.256**	.229**	.094	.065
C3 - Dutifulness	.304**	.208**	.329**	.371**	.558**	.171**	.191**	.443**
C4 - Achievement	.347**	.277**	.320**	.220**	.441**	.070	.048	.360**
C5 - Self-Discipline	.274**	.274**	.294**	.370**	.466**	.259**	.009	.281**
C6 - Deliberation	.133**	-.007	.164**	.106*	.281**	.173**	-.012	.183**

Original Facet	C1	C2	C3	C4	C5	C6
C1 - Competence	<b>.613</b>					
C2 - Order	.371**	<b>.436</b>				
C3 - Dutifulness	.616**	.346**	<b>.599</b>			
C4 - Achievement	.516**	.368**	.547**	<b>.489</b>		
C5 - Self-Discipline	.611**	.555**	.558**	.583**	<b>.666</b>	
C6 - Deliberation	.420**	.273**	.443**	.306**	.347**	<b>.526</b>

*Note.* Cronbach's Alphas for subscales are presented on the diagonal in boldface. NEO-PI-R = NEO – Personality Inventory – Revised; N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness.  
\* $p < .05$ . \*\* $p < .01$ .

Table 7

*Correlation Matrix & Cronbach's Alphas for the NEO-PI-R Study Facets, N = 409*

Study Facet	N1	N2	N3	N4	N5	N6	E1	E2
N1 - Anxiety RS	<b>0.801</b>							
N2 - Anxiety	-.004	<b>0.774</b>						
N3 - Angry Hostility	-.127*	.521**	<b>0.766</b>					
N4 - Angry Hostility RS	.314**	-.120*	-.165**	<b>0.511</b>				
N5 - Depression RS	.420**	.020	-.092	.385**	<b>0.603</b>			
N6 - Depression	-.025	.627**	.707**	-.209**	-.042	<b>0.808</b>		
N7 – Self-Consciousness	-.143**	.671**	.578**	-.176**	-.102*	.705**	<b>0.735</b>	
N8 - Self-Conscious RS	.608**	-.171**	-.178**	.293**	.327**	-.117*	-.125*	<b>0.576</b>
N9 - Impulsiveness	-.153**	.353**	.580**	-.258**	-.172**	.546**	.468**	-.160**
N10 - Impulsiveness RS	.390**	-.246**	-.480**	.405**	.348**	-.412**	-.312**	.372**
N11 - Vulnerability	-.032	.563**	.668**	-.126*	-.080	.749**	.609**	-.139**
N12 - Vulnerability RS	.347**	.072	.032	.281**	.337**	.033	-.032	.280**
E1 - Warmth	-.294**	.076	-.082	-.194**	-.225**	.025	.176**	-.290**
E2 - Warmth RS	.280**	-.370**	-.575**	.181**	.179**	-.529**	-.435**	.243**
E3 - Gregariousness RS	.196**	-.402**	-.620**	.202**	.093	-.565**	-.471**	.141**
E4 - Gregariousness	-.364**	.204**	.312**	-.233**	-.229**	.309**	.248**	-.430**
E5 - Assertiveness	-.315**	.079	.338**	-.229**	-.330**	.263**	.223**	-.370**
E6 - Assertiveness RS	.123*	-.431**	-.571**	.311**	.148**	-.621**	-.496**	.161**
E7 - Activity RS	.345**	-.365**	-.500**	.223**	.191**	-.523**	-.445**	.343**
E8 – Activity	-.343**	.248**	.316**	-.245**	-.266**	.311**	.322**	-.432**
E9 - Excitement-Seeking	-.360**	.208**	.411**	-.188**	-.209**	.349**	.305**	-.343**
E10 - Excitement RS	.201**	-.254**	-.332**	.282**	.252**	-.328**	-.335**	.160**
E11 - Pos Emotions RS	.250**	-.333**	-.617**	.181**	.122*	-.555**	-.397**	.201**
E12 - Positive Emotions	-.296**	.049	.010	-.189**	-.323**	.069	.160**	-.265**
O1 - Fantasy	-.230**	.045	.216**	-.145**	-.147**	.262**	.198**	-.247**

(table continues)

Study Facet	N1	N2	N3	N4	N5	N6	E1	E2
O2 - Fantasy RS	.324**	-.231**	-.462**	.214**	.256**	-.385**	-.333**	.295**
O3 - Aesthetics RS	.321**	-.311**	-.542**	.230**	.239**	-.453**	-.366**	.289**
O4 - Aesthetics	-.268**	.191**	.176**	-.160**	-.167**	.220**	.263**	-.279**
O5 - Feelings RS	.356**	-.216**	-.514**	.217**	.214**	-.439**	-.250**	.279**
O6 - Feelings	-.008	.230**	.235**	-.178**	-.128**	.260**	.312**	-.129**
O7 - Actions	-.221**	.099*	.070	-.142**	-.174**	.083	.106*	-.239**
O8 - Actions RS	.148**	-.151**	-.295**	.053	.124*	-.282**	-.261**	.088
O9 - Ideas	-.298**	.055	.069	-.175**	-.208**	.059	.192**	-.261**
O10 - Ideas RS	.305**	-.256**	-.491**	.172**	.235**	-.441**	-.340**	.261**
O11 - Values RS	.331**	-.260**	-.559**	.141**	.183**	-.493**	-.349**	.284**
O12 - Values	-.159**	.019	.102*	-.229**	-.191**	.123*	.159**	-.184**
A1 - Trust RS	.109*	-.383**	-.647**	.023	-.009	-.576**	-.397**	.120*
A2 - Trust	-.337**	-.043	-.028	-.370**	-.359**	.086	.119*	-.313**
A3 - Straightforwardness	-.244**	.260**	.207**	-.306**	-.301**	.247**	.325**	-.231**
A4 - Straightforward RS	.394**	-.321**	-.533**	.123*	.160**	-.511**	-.376**	.424**
A5 - Altruism RS	.310**	-.268**	-.644**	.199**	.259**	-.514**	-.349**	.314**
A6 - Altruism	-.121*	.026	-.010	-.278**	-.175**	.056	.156**	-.131**
A7 - Compliance RS	.262**	-.379**	-.682**	.249**	.257**	-.541**	-.451**	.307**
A8 - Compliance	-.260**	.172**	.233**	-.371**	-.319**	.347**	.279**	-.278**
A9 - Modesty RS	.454**	-.125*	-.316**	.086	.243**	-.215**	-.212**	.408**
A10 - Modesty	-.233**	.285**	.208**	-.280**	-.235**	.330**	.370**	-.248**
A11 - Tender-Minded	-.073	.125*	.133**	-.305**	-.182**	.217**	.274**	-.136**
A12 - TenderMinded RS	.235**	-.271**	-.607**	.197**	.196**	-.443**	-.335**	.234**
C1 - Competence RS	.152**	-.413**	-.633**	.270**	.115*	-.629**	-.400**	.244**
C2 - Competence	-.199**	-.099*	.109*	-.276**	-.186**	.001	.077	-.141**
C3 - Order	-.188**	.206**	.290**	-.081	-.081	.194**	.208**	-.198**
C4 - Order RS	.398**	-.317**	-.453**	.331**	.314**	-.558**	-.429**	.388**
C5 - Dutifulness RS	.265**	-.342**	-.434**	.268**	.263**	-.513**	-.364**	.317**

(table continues)

Study Facet	N1	N2	N3	N4	N5	N6	E1	E2
C6 - Dutifulness	-.198**	.071	.104*	-.277**	-.211**	.064	.190**	-.163**
C7 - Achievement	-.181**	-.029	.072	-.258**	-.210**	-.015	.076	-.205**
C8 - Achievement RS	.286**	-.265**	-.483**	.338**	.259**	-.522**	-.407**	.269**
C9 - Self-Discipline TS	.236**	-.459**	-.586**	.202**	.209**	-.665**	-.522**	.263**
C10 - Self-Discipline	-.267**	.040	.050	-.134**	-.193**	-.022	.087	-.264**
C11 - Deliberation	-.207**	.111*	.222**	-.233**	-.145**	.193**	.256**	-.156**
C12 - Deliberation RS	.184**	-.314**	-.397**	.220**	.228**	-.423**	-.354**	.228**

Study Facet	E3	E4	E5	E6	O1	O2	O3	O4
E3 - Gregariousness RS	<b>0.754</b>							
E4 - Gregariousness	-.057	<b>0.684</b>						
E5 - Assertiveness	-.139**	.472**	<b>0.628</b>					
E6 - Assertiveness RS	.576**	-.281**	-.130**	<b>0.626</b>				
E7 - Activity RS	.495**	-.352**	-.302**	.500**	<b>-0.260</b>			
E8 - Activity	-.188**	.495**	.548**	-.226**	-.307**	<b>0.441</b>		
E9 - Excitement-Seeking	-.178**	.656**	.559**	-.289**	-.310**	.499**	<b>0.728</b>	
E10 - Excitement RS	.317**	-.097	-.173**	.302**	.268**	-.084	-.033	<b>0.398</b>
E11 - Pos Emotions RS	.589**	-.259**	-.271**	.539**	.560**	-.201**	-.255**	.296**
E12 - Positive Emotions	.066	.388**	.448**	-.104*	-.153**	.455**	.481**	-.088
O1 - Fantasy	-.175**	.363**	.408**	-.187**	-.313**	.370**	.482**	-.091
O2 - Fantasy RS	.501**	-.435**	-.362**	.444**	.484**	-.424**	-.333**	.225**
O3 - Aesthetics RS	.480**	-.330**	-.299**	.437**	.467**	-.334**	-.347**	.280**
O4 - Aesthetics	-.213**	.394**	.323**	-.269**	-.340**	.363**	.427**	-.129**
O5 - Feelings RS	.500**	-.387**	-.312**	.505**	.443**	-.257**	-.346**	.261**
O6 - Feelings	-.072	.322**	.427**	-.291**	-.195**	.324**	.435**	-.127**
O7 - Actions	-.045	.350**	.298**	-.137**	-.174**	.474**	.402**	-.004
O8 - Actions RS	.386**	-.252**	-.274**	.352**	.367**	-.337**	-.255**	.108*
O9 - Ideas	-.113*	.225**	.403**	-.112*	-.229**	.353**	.444**	-.063

(table continues)

Study Facet	E3	E4	E5	E6	O1	O2	O3	O4
O10 - Ideas RS	.389**	-.414**	-.343**	.403**	.390**	-.365**	-.328**	.286**
O11 - Values RS	.464**	-.495**	-.410**	.450**	.412**	-.378**	-.452**	.223**
O12 – Values	-.055	.259**	.341**	-.179**	-.177**	.273**	.357**	-.040
A1 - Trust RS	.523**	-.332**	-.276**	.490**	.455**	-.250**	-.402**	.137**
A2 – Trust	-.005	.407**	.468**	-.191**	-.241**	.380**	.375**	-.174**
A3 - Straightforwardness	-.265**	.162**	.185**	-.299**	-.258**	.314**	.166**	-.236**
A4 - Straightforward RS	.440**	-.513**	-.436**	.371**	.469**	-.402**	-.512**	.168**
A5 - Altruism RS	.516**	-.356**	-.352**	.489**	.514**	-.316**	-.382**	.351**
A6 - Altruism	.049	.220**	.363**	-.138**	-.113*	.335**	.352**	-.033
A7 - Compliance RS	.556**	-.381**	-.437**	.454**	.491**	-.449**	-.502**	.223**
A8 - Compliance	-.216**	.349**	.342**	-.443**	-.424**	.353**	.290**	-.252**
A9 - Modesty RS	.312**	-.496**	-.450**	.257**	.427**	-.447**	-.493**	.080
A10 - Modesty	-.244**	.192**	.231**	-.299**	-.305**	.370**	.246**	-.191**
A11 - Tender-Minded	-.103*	.221**	.357**	-.273**	-.185**	.325**	.351**	-.118*
A12 - TenderMinded RS	.422**	-.288**	-.342**	.401**	.407**	-.299**	-.339**	.275**
C1 - Competence RS	.499**	-.372**	-.318**	.539**	.505**	-.228**	-.399**	.288**
C2 - Competence	-.074	.210**	.445**	-.175**	-.096	.268**	.355**	-.036
C3 - Order	-.241**	.303**	.307**	-.236**	-.263**	.356**	.324**	-.064
C4 - Order RS	.397**	-.436**	-.385**	.486**	.594**	-.383**	-.449**	.286**
C5 - Dutifulness RS	.362**	-.297**	-.309**	.382**	.466**	-.232**	-.298**	.344**
C6 - Dutifulness	-.110*	.183**	.290**	-.168**	-.126*	.386**	.261**	-.161**
C7 - Achievement	-.023	.250**	.437**	-.063	-.039	.448**	.351**	-.035
C8 - Achievement RS	.430**	-.412**	-.330**	.548**	.513**	-.253**	-.401**	.237**
C9 - Self-Discipline TS	.464**	-.386**	-.319**	.513**	.576**	-.352**	-.404**	.294**
C10 - Self-Discipline	-.162**	.233**	.350**	-.091	-.164**	.443**	.250**	-.009
C11 – Deliberation	-.240**	.238**	.309**	-.272**	-.233**	.354**	.284**	-.130**
C12 - Deliberation RS	.253**	-.280**	-.270**	.288**	.332**	-.247**	-.402**	.256**

(table continues)

Study Facet	O5	O6	A1	A2	A3	A4	A5	A6
O5 - Feelings RS	<b>0.787</b>							
O6 – Feelings	.015	<b>0.636</b>						
O7 – Actions	-.114*	.381**	<b>0.433</b>					
O8 - Actions RS	.299**	-.241**	-.233**	<b>0.702</b>				
O9 – Ideas	-.047	.449**	.448**	-.214**	<b>0.752</b>			
O10 - Ideas RS	.533**	-.049	-.082	.377**	.082	<b>0.752</b>		
O11 - Values RS	.678**	-.154**	-.122*	.417**	-.076	.588**	<b>0.793</b>	
O12 – Values	.044	.590**	.372**	-.219**	.485**	-.016	.039	<b>0.637</b>
A1 - Trust RS	.558**	-.196**	-.142**	.347**	-.113*	.426**	.613**	-.025
A2 – Trust	-.162**	.404**	.397**	-.285**	.389**	-.194**	-.192**	.462**
A3 - Straightforwardness	-.170**	.230**	.216**	-.310**	.254**	-.305**	-.226**	.164**
A4 - Straightforward RS	.591**	-.078	-.186**	.239**	-.195**	.488**	.571**	-.076
A5 - Altruism RS	.658**	-.105*	-.140**	.204**	-.086	.499**	.550**	-.040
A6 - Altruism	.040	.619**	.381**	-.272**	.480**	-.031	-.042	.547**
A7 - Compliance RS	.475**	-.276**	-.289**	.348**	-.235**	.393**	.519**	-.170**
A8 - Compliance	-.298**	.311**	.288**	-.342**	.240**	-.309**	-.291**	.296**
A9 - Modesty RS	.450**	-.173**	-.322**	.374**	-.405**	.346**	.501**	-.184**
A10 - Modesty	-.130**	.364**	.272**	-.319**	.336**	-.262**	-.188**	.342**
A11 - Tender-Minded	.014	.609**	.298**	-.331**	.459**	-.090	-.097*	.620**
A12 - TenderMinded RS	.442**	-.154**	-.080	.275**	-.101*	.472**	.494**	-.073
C1 - Competence RS	.612**	-.135**	-.096	.195**	.022	.455**	.575**	.013
C2 - Competence	-.127*	.508**	.333**	-.300**	.500**	-.087	-.185**	.477**
C3 - Order	-.244**	.186**	.247**	-.425**	.249**	-.307**	-.329**	.202**
C4 - Order RS	.462**	-.245**	-.266**	.236**	-.294**	.379**	.443**	-.182**
C5 - Dutifulness RS	.442**	-.118*	-.166**	.096	-.066	.368**	.390**	-.079
C6 - Dutifulness	-.055	.481**	.371**	-.344**	.437**	-.106*	-.136**	.431**
C7 - Achievement	-.072	.473**	.385**	-.355**	.446**	-.101*	-.190**	.470**
C8 - Achievement RS	.558**	-.228**	-.156**	.300**	-.107*	.451**	.543**	-.175**

(table continues)



Study Facet	O5	O6	A1	A2	A3	A4	A5	A6
C9 - Self-Discipline TS	.466**	-.181**	-.138**	.260**	-.109*	.427**	.443**	-.067
C10 - Self-Discipline	-.095	.295**	.338**	-.469**	.453**	-.177**	-.177**	.347**
C11 – Deliberation	-.243**	.377**	.303**	-.433**	.406**	-.238**	-.302**	.360**
C12 - Deliberation RS	.233**	-.249**	-.174**	.105*	-.189**	.250**	.227**	-.158**

Study Facet	C1	C2	C3	C4	C5	C6
C1 - Competence RS	<b>0.707</b>					
C2 - Competence	.016	<b>0.731</b>				
C3 - Order	-.097*	.336**	<b>0.700</b>			
C4 - Order RS	.565**	-.093	-.013	<b>0.586</b>		
C5 - Dutifulness RS	.606**	.010	-.009	.554**	<b>0.590</b>	
C6 - Dutifulness	.096	.593**	.399**	-.085	.082	<b>0.672</b>
C7 - Achievement	.008	.600**	.389**	-.073	.035	.637**
C8 - Achievement RS	.588**	-.221**	-.185**	.587**	.445**	-.088
C9 - Self-Discipline TS	.626**	.025	-.095	.709**	.556**	.051
C10 - Self-Discipline	.121*	.501**	.531**	-.079	.090	.576**
C11 – Deliberation	-.084	.553**	.400**	-.173**	-.068	.598**
C12 - Deliberation RS	.422**	-.064	-.093	.478**	.457**	-.125*

*Note.* Cronbach's Alphas for subscales are presented on the diagonal in boldface. NEO-PI-R = NEO – Personality Inventory – Revised; N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness; RS = Reverse-Scored.

\* $p < .05$ . \*\* $p < .01$ .

## Reliability

Reliability was calculated in order to further assess each scale and scale items, both as overall instruments and as individual subscales (dimensions/facets) of those instruments. The following cut-offs were utilized to describe reliability:  $\alpha \geq .90$  = excellent,  $.90 > \alpha \geq .80$  = good,  $.80 > \alpha \geq .70$  = acceptable,  $.70 > \alpha \geq .60$  = questionable,  $.60 > \alpha \geq .50$  = poor, and  $.50 > \alpha$  = unacceptable. For these instruments, Cronbach's alpha was utilized as a measure of internal consistency due to the nature of the data set. The DFS-2 was found to have a Cronbach's alpha of .928 indicating excellent reliability of the measure. Cronbach's alphas for each of the DFS-2 subscales ranged from .611 to .814. The merging subscale had the lowest Cronbach's alpha indicating poor reliability. The majority of the subscales indicated acceptable reliability including: time, balance, control, concentration, feedback, autotelic personality, and loss of self-consciousness. The goals subscale was the only subscale to indicate good reliability. A complete breakdown of the individual subscale and facet alphas is presented in the correlations tables for each subscale (Tables 4 – 7).

The NEO-PI-R was found to have a Cronbach's alpha of .886 indicating good reliability of the measure. Cronbach's alphas for each of the domains ranged from .753 to .835, indicating acceptable to good reliability. Of the 5 domains, 4 had Cronbach's alphas indicating acceptable reliability: extraversion, agreeableness, openness to experience, and neuroticism. Conscientiousness was the only domain to indicate good reliability. Cronbach's alphas for each of the NEO-PI-R facets ranged from .291 to .747. These reliabilities replicated the pattern of poor reliabilities found for some of the facets in the original normative sample and indicated even lower reliability for some facets. Of the 30 facets, 8 had Cronbach's alphas lower than .50, indicating unacceptable reliability,

including: one neuroticism facet – impulsiveness, two extraversion facets – assertiveness and activity, one openness facet – actions, two agreeableness facets – compliance and tender-mindedness, and two conscientiousness facets – order and achievement seeking. Another eight facets had Cronbach’s alphas between .50 and .60 indicating poor reliability, including: two neuroticism facets – angry hostility and self-consciousness, two extraversion facets – gregariousness and excitement-seeking, one openness facet – feelings, one agreeableness facet – modesty, and two conscientiousness facets – dutifulness and deliberation. An additional twelve facets had Cronbach’s alphas between .60 and .70 indicating experimental reliability including: two neuroticism facets – anxiety and vulnerability, one extraversion facet – positive emotions, four openness facets – fantasy, aesthetics, ideas, and values, three agreeableness facets – trust, straightforwardness, and altruism, and two conscientiousness facets – competence and self-discipline. The final two facets had Cronbach’s alphas between .70 and .80 indicating acceptable reliability including one neuroticism facet – depression and one extraversion facet – warmth. A complete breakdown of the individual subscale and facet alphas is presented in the correlations tables for each subscale (Tables 4 – 7).

### **Dimensionality**

All instruments in this study are hypothesized to measure hierarchical multidimensional constructs (e.g., flow, neuroticism, extraversion, openness, conscientiousness, or agreeableness). Evidence for multidimensional structures of the results of the measurements was provided utilizing exploratory factor analysis (EFA). A robust weighted least-squares estimator (WLSMV) in Mplus Version 7.31 (Muthen & Muthen, 2015) was utilized to perform the EFAs with an oblique rotation. This estimator

allowed the modeling of the ordinal categorical nature of the items used in the DFS-2 and the NEO-PI-R. Previous research was utilized to determine the number of factors to be extracted for each measure (e.g., nine for the DFS-2, six for each of the NEO-PI-R domains). The current study did not have an adequate sample size to conduct factor analysis at the item-level for the each item of the two measures as previously discussed. Due to this fact, the current study opted to utilize parcels created by the nine subscales of the DFS-2 and the six facets of each of the five NEO-PI-R domains. Before proceeding with the structural equation modeling analysis, verification of the unidimensionality of each parcel (e.g., subscale or facet) had to be obtained. Each parcel was tested for unidimensionality through the use of EFA to ensure each was measuring a single construct (e.g., challenge-skill balance, clear goals, neuroticism – anxiety, extraversion – warmth, etc.). Not all parcels were found to be unidimensional, and thus, the following section explains how the current study's parcels were determined.

### **Initial Exploratory Factor Analysis Results: Creation of Parcels**

The Mplus WLSMV estimator allows the computation of the following goodness of fit statistics for EFA models: chi-square, Comparative Fit Index (CFI), Tucker Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR.) Good model fit is indicated by the following fit indices values. Chi-square is indicated by non-significant chi-square results. CFI/TLI indicates acceptable fit with values greater than .90 (Kline, 2005), and good fit for values greater than .95. RMSEA values indicate better fit with lower values; specifically less than .05 indicates good fit, less than .08 adequate fit, and greater than .10 poor fit (Kline, 2005). SRMR indicates acceptable fit for values less than .10, and good fit for values less than .05 (Kline, 2005).

Chi-square was significant in the vast majority of the EFA models fitted, even when other indices indicated good fit. However, chi-square is sensitive to highly complex models, such as EFAs employing many items (Kline, 2011). Therefore, models with significant chi-square values were still considered to have good global fit if the other indices met the guidelines above.

### **Dispositional Flow Scale – 2 (DFS-2)**

The estimated nine-factors of the DFS-2 were confirmed by the individual EFA results for each subscale. Factor loadings and standard errors for these models can be found in Table 8; all factor loadings were significant and of good size (i.e., greater than .32). Fit statistics for the models, including chi-square tests, RMSEA, CFI, TLI, and SRMR, can also be found in Table 8. The chi-square tests revealed significant results; however, this is likely due to model complexity rather than an indicator of poor fit of the model. This was supported by model fit indices that indicated acceptable fit of the factors. Good fit was indicated for the majority of the models by the CFI and TLI indices as these measures were greater than .95, and SRMR as it was less than .05. Specifically model fit indices were as follows for each of the nine factors: Factor 1 (balance): CFI = .993, TLI = .980, and SRMR = .023; Factor 2 (merging): CFI = .955, TLI = .866, and SRMR = .044; Factor 3 (goals): CFI = 1.00, TLI = 1.00, and SRMR = .006; Factor 4 (feedback): CFI = .984, TLI = .952, and SRMR = .029; Factor 5 (concentration): CFI = .993, TLI = .980, and SRMR = .021; Factor 6 (control): CFI = .981, TLI = .944, and SRMR = .041; Factor 7 (loss of consciousness): CFI = .981, TLI = .943, and SRMR = .032; Factor 8 (time): CFI = 1.00, TLI = 1.001, and SRMR = .011; and Factor 9 (autotelic personality): CFI = .998, TLI = .995, and SRMR =

.014. Overall these results support the estimated nine-factors of the DFS-2 and replicated the findings of Jackson and Eklund (2002).

Table 8

*Initial EFA Factor Loadings, Standard Errors, & Model Fit Indices – DFS-2, N = 409*

		1-Balance		2-Merging		3-Goals		4-Feedback		5-Concentration
Chi-square value		8.848		16.740		0.713		16.547		11.342
Chi-square p value		0.0120		0.0002		0.7001		0.0003		0.0034
RMSEA		0.091		0.134		0.000		0.133		0.107
CFI		0.993		0.955		1.000		0.984		0.993
TLI		0.980		0.866		1.002		0.952		0.980
SRMR		0.023		0.044		0.006		0.029		0.021
Factor Loadings	1	0.725*	2	0.520*	3	0.782*	4	0.709*	5	0.731*
	10	0.737*	11	0.499*	12	0.847*	13	0.705*	14	0.523*
	19	0.780*	20	0.670*	21	0.728*	22	0.773*	23	0.824*
	28	0.564*	29	0.591*	30	0.736*	31	0.704*	32	0.792*
Estimated Residual	1	0.474	2	0.730	3	0.389	4	0.497	5	0.465
Variances	10	0.456	11	0.751	12	0.283	13	0.504	14	0.726
	19	0.392	20	0.551	21	0.469	22	0.403	23	0.321
	28	0.682	29	0.651	30	0.458	31	0.505	32	0.372

(table continues)

		6-Control	7-Consciousness	8-Time	9-Autotelic			
Chi-square value		19.043	27.989	1.794	3.799			
Chi-square p value		0.0001	<.0001	0.4077	0.1496			
RMSEA		0.144	0.178	0.000	0.047			
CFI		0.981	0.981	1.000	0.998			
TLI		0.944	0.943	1.001	0.995			
SRMR		0.041	0.032	0.011	0.014			
Factor Loadings	6	0.714*	7	0.779*	8	0.660*	9	0.700*
	15	0.698*	16	0.808*	17	0.831*	18	0.723*
	24	0.653*	25	0.602*	26	0.601*	27	0.739*
	33	0.735*	34	0.735*	35	0.520*	36	0.745*
Estimated Residual Variances	6	0.491	7	0.394	8	0.564	9	0.510
	15	0.513	16	0.347	17	0.310	18	0.478
	24	0.573	25	0.637	26	0.639	27	0.454
	33	0.460	34	0.460	35	0.730	36	0.446

*Note.* DFS-2 = Dispositional Flow Scale – 2; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual. \* $p < .05$ .



## **NEO Personality Inventory–Revised (NEO-PI-R)**

The NEO-PI-R was examined utilizing each domain (neuroticism, extraversion, openness, agreeableness, and conscientiousness) and its facets, hypothesizing the dimensionality of each domain would be upheld within the proposed six facet structure. Each domain and its facet were examined separately as is recommended by the NEO-PI-R manual when examining personality due to the complexity of the FFM. In addition to following this recommendation, the limited size of the current sample also supported analyzing each domain individually.

The hypothesized dimensionality of each domain and its facets were not confirmed by the EFA results (e.g., a single factor represented by 6 facets). Instead, the EFA results suggested data for each facet fit best as two-factors with a total of 12 facets rather than 6 facets per domain as the fit greatly improved over the one-factor solutions. This was confirmed by the chi-square difference tests that were performed by comparing the one-factor solutions (6 facets) to the two-factor solutions (12 facets). Results from these difference tests can be found in Table 9. Additionally, better fit for the two-factor solutions (12 facets) was established by improvement in model fit indices.

Secondly, the second factor appeared to have been due to the measurement artifact of reverse-scoring as the two-factors for each facet were formed by items requiring reverse-scoring loading on one factor and items not requiring reverse-scoring loading on the other factor. A few facets provided three-factor solutions that provided better fit statistics for the model than the two-factor solutions; however, these models had a lack of items that loaded on the third factor and thus did not provide theoretically grounded solutions for the proposed factor structure. Due to the lack of theoretical support and limited improvement of model fit

for the three-factor solutions, it was determined the two-factor solutions would be utilized in the current study.

Factor loadings and standard errors for these models can be found in Table 9; the majority of factor loadings were significant and of good size (i.e., greater than .32). The chi-square tests, RMSEA, CFI, TLI, and SRMR for these models can also be found in Table 9. Again, many of these chi-square tests revealed significant results; however, these results are likely due to model complexity rather than an indicator of poor fit of the models. This was supported by model fit indices that indicated acceptable fit of the models. Again, not all two-factor solutions were supported with good fit indices; however, the model fit was adequate when taken into account the theoretically grounded two-factor solutions rather than the unsupported three-factor solutions. Additionally, acceptable fit of these models rather than good fit may be associated with the poor reliabilities that were found for many of the facets. Overall these results did not support the hypothesized six facet structure for each subscale, but rather supported a pattern of twelve facets for each subscale that followed a pattern created by the measurement artifact of reverse-scoring. This twelve facet pattern was utilized in the preceding analyses.

Table 9

*Initial EFA Factor Loadings, Standard Errors, & Model Fit Indices – Original NEO-PI-R Facets, N = 409*

		N1-Anxiety	N2-Angry Hostility	N3- Depression	N4-Self- Consciousness	N5- Implusiveness				
Chi-square value		82.637	30.814	32.824	85.181	17.832				
Chi-square p value		<.0001	0.0036	0.0018	<.0001	0.164				
RMSEA		0.114	0.058	0.061	0.117	0.030				
CFI		0.967	0.984	0.989	0.930	0.995				
TLI		0.928	0.965	0.975	0.848	0.988				
SRMR		0.031	0.029	0.028	0.046	0.021				
Factor Loadings - Factor 1	<b>1</b>	<b>0.653*</b>	<b>6</b>	<b>0.777*</b>	<b>11</b>	<b>0.213</b>	<b>16</b>	<b>0.659*</b>	21	-0.008
	31	-0.070	36	0.002	41	0.018	46	0.003	<b>51</b>	<b>0.817*</b>
	<b>61</b>	<b>0.849*</b>	<b>66</b>	<b>0.711*</b>	<b>71</b>	<b>2.214</b>	<b>76</b>	<b>0.553*</b>	81	-0.199*
	91	-0.076	96	-0.107	101	-0.057	106	-0.037	<b>111</b>	<b>0.508*</b>
	<b>121</b>	<b>0.718*</b>	<b>126</b>	<b>0.742*</b>	131	-0.001	<b>136</b>	<b>0.799*</b>	141	0.022
	151	0.090*	156	0.028	161	-0.036	166	0.042	<b>171</b>	<b>0.519*</b>
	<b>181</b>	<b>0.790*</b>	<b>186</b>	<b>0.490*</b>	191	0.023	<b>196</b>	<b>0.594*</b>	<b>201</b>	<b>0.454*</b>
	211	0.007	<b>216</b>	<b>0.612*</b>	221	0.000	<b>226</b>	<b>0.599*</b>	231	0.062
Factor Loadings - Factor 2	1	0.124	6	0.000	11	-0.013	16	-0.047	<b>21</b>	<b>0.609*</b>
	<b>31</b>	<b>0.661*</b>	<b>36</b>	<b>0.575*</b>	<b>41</b>	<b>0.730*</b>	<b>46</b>	<b>0.734*</b>	51	0.003
	61	0.092	66	0.05	71	0.000	76	0.007	<b>81</b>	<b>0.572*</b>
	<b>91</b>	<b>0.731*</b>	<b>96</b>	<b>0.530*</b>	<b>101</b>	<b>0.525*</b>	<b>106</b>	<b>0.609*</b>	111	0.031
	121	-0.117	126	0.000	<b>131</b>	<b>0.596*</b>	136	0.077	<b>141</b>	<b>0.703*</b>
	<b>151</b>	<b>0.796*</b>	<b>156</b>	<b>0.498*</b>	<b>161</b>	<b>0.750*</b>	<b>166</b>	<b>0.446*</b>	171	-0.276*
	181	-0.059	186	-0.246*	<b>191</b>	<b>0.650*</b>	196	-0.003	201	-0.354*
	<b>211</b>	<b>0.758*</b>	216	-0.040	<b>221</b>	<b>0.789*</b>	226	-0.022	<b>231</b>	<b>0.492*</b>
Estimated Residual	1	0.555	6	0.396	11	0.954	16	0.552	21	0.627
Variances	31	0.560	36	0.670	41	0.467	46	0.462	51	0.333
	61	0.267	66	0.505	71	-3.904	76	0.696	81	0.599

(table continues)

		N1-Anxiety		N2-Angry Hostility		N3- Depression		N4-Self- Consciousness		N5- Implusiveness
Estimated Residual	91	0.462	96	0.688	101	0.721	106	0.619	111	0.746
Variences	121	0.474	126	0.449	131	0.645	136	0.379	141	0.510
	151	0.356	156	0.756	161	0.435	166	0.806	171	0.611
	181	0.374	186	0.657	191	0.578	196	0.646	201	0.619
	211	0.424	216	0.614	221	0.378	226	0.636	231	0.763
Chi-square Difference Test		648.975		139.457		224.353		214.534		180.878
(Chi-square value & p-value)		<.0001		<.0001		<.0001		<.0001		<.0001

		N6- Vulnerability		E1-Warmth		E2- Gregariousness		E3- Assertiveness		E4-Activity
Chi-square value		25.424		73.738		50.194		52.215		105.292
Chi-square p value		0.0203		<.0001		<.0001		<.0001		<.0001
RMSEA		0.048		0.107		0.084		0.086		0.132
CFI		0.989		0.975		0.968		0.944		0.900
TLI		0.976		0.947		0.932		0.880		0.785
SRMR		0.025		0.036		0.032		0.040		0.057
Factor Loadings - Factor 1	<b>26</b>	<b>0.666*</b>	<b>2</b>	<b>0.708*</b>	<b>7</b>	<b>0.655*</b>	<b>12</b>	<b>0.517*</b>	<b>17</b>	<b>-0.009</b>
	56	0.098*	32	0.001	37	0.076	42	-0.048	47	-0.01
	<b>86</b>	<b>0.657*</b>	<b>62</b>	<b>0.778*</b>	<b>67</b>	<b>0.690*</b>	<b>72</b>	<b>0.787*</b>	<b>77</b>	<b>0.143</b>
	116	-0.183*	92	0.000	97	-0.118*	102	0.008	107	-0.018
	<b>146</b>	<b>0.741*</b>	<b>122</b>	<b>0.753*</b>	<b>127</b>	<b>0.716*</b>	<b>132</b>	<b>0.639*</b>	<b>137</b>	<b>1.554*</b>
	176	0.008	<b>152</b>	<b>0.691*</b>	157	-0.231*	162	0.016	167	-0.132
	206	-0.069	<b>182</b>	<b>0.642*</b>	<b>187</b>	<b>0.743*</b>	<b>192</b>	<b>0.437*</b>	197	0.006
	236	0.155*	<b>212</b>	<b>0.789*</b>	217	-0.002	222	-0.016	227	0.167
Factor Loadings - Factor 2	26	0.064	2	0.016	7	0.197*	12	-0.189*	17	-0.305*
	<b>56</b>	<b>0.561*</b>	<b>32</b>	<b>0.835*</b>	<b>37</b>	<b>0.715*</b>	<b>42</b>	<b>0.386*</b>	<b>47</b>	<b>0.460*</b>
	86	0.004	62	0.040	67	0.107*	72	0.232*	77	-0.339*
	<b>116</b>	<b>0.672*</b>	<b>92</b>	<b>0.708*</b>	<b>97</b>	<b>0.531*</b>	<b>102</b>	<b>0.523*</b>	<b>107</b>	<b>0.540*</b>
	146	-0.144*	122	0.091	127	-0.052	132	-0.006	137	0.000

(table continues)

	N6- Vulnerability		E1-Warmth		E2- Gregariousness		E3- Assertiveness		E4-Activity	
Estimated Residual	<b>176</b>	<b>0.742*</b>	152	-0.078	<b>157</b>	<b>0.466*</b>	<b>162</b>	<b>0.700*</b>	<b>167</b>	<b>0.554*</b>
Variances	<b>206</b>	<b>0.654*</b>	182	-0.123*	187	-0.009	192	-0.276*	<b>197</b>	<b>0.780*</b>
	<b>236</b>	<b>0.545*</b>	212	-0.129*	<b>217</b>	<b>0.755*</b>	<b>222</b>	<b>0.725*</b>	<b>227</b>	<b>0.645*</b>
	26	0.541	2	0.494	7	0.551	12	0.671	17	0.907
	56	0.662	32	0.302	37	0.491	42	0.843	47	0.787
	86	0.568	62	0.381	67	0.524	72	0.376	77	0.850
	116	0.546	92	0.498	97	0.694	102	0.728	107	0.705
	146	0.457	122	0.397	127	0.479	132	0.590	137	-1.416
	176	0.448	152	0.538	157	0.713	162	0.513	167	0.654
	206	0.579	182	0.605	187	0.447	192	0.700	197	0.393
	236	0.658	212	0.401	217	0.430	222	0.471	227	0.588
Chi-square Difference Test	434.849		447.573		397.534		216.33		97.702	
(Chi-square value & p-value)	<.0001		<.0001		<.0001		<.0001		<.0001	

	E5-Excitement- Seeking		E6-Positive Emotions		O1-Fantasy		O2- Aesthetics		O3- Feelings	
Chi-square value	36.159		45.523		58.808		121.081		40.427	
Chi-square p value	0.0006		<.0001		<.0001		<.0001		0.0001	
RMSEA	0.066		0.078		0.093		0.143		0.072	
CFI	0.972		0.972		0.971		0.913		0.978	
TLI	0.939		0.939		0.937		0.813		0.952	
SRMR	0.033		0.032		0.035		0.049		0.031	
Factor Loadings - Factor 1	<b>22</b>	<b>0.649</b>	<b>27</b>	<b>0.632*</b>	<b>3</b>	<b>0.664*</b>	<b>8</b>	<b>0.764*</b>	13	-0.112
	52	-0.010	57	0.050	33	0.017	38	0.000	<b>43</b>	<b>0.756</b>
	<b>82</b>	<b>0.538</b>	<b>87</b>	<b>0.663*</b>	<b>63</b>	<b>0.772*</b>	<b>68</b>	<b>0.576*</b>	73	-0.005
	112	0.000	117	-0.003	93	0.112*	98	0.010	<b>103</b>	<b>0.811</b>
	<b>142</b>	<b>0.695</b>	<b>147</b>	<b>0.696*</b>	<b>123</b>	<b>0.770*</b>	<b>128</b>	<b>0.636*</b>	133	0.009
	<b>172</b>	<b>0.586</b>	177	-0.054	153	-0.091	158	-0.007	<b>163</b>	<b>0.771</b>
	<b>202</b>	<b>0.647</b>	<b>207</b>	<b>0.613*</b>	183	-0.108*	188	0.047	193	0.033

(table continues)

		E5-Excitement- Seeking	E6-Positive Emotions	O1-Fantasy	O2- Aesthetics	O3- Feelings				
Factor Loadings - Factor 1	<b>232</b>	<b>0.495</b>	237	0.072	213	-0.002	218	-0.123*	223	-0.248
Factor Loadings - Factor 2	22	-0.017	27	-0.003	3	0.093*	8	-0.060	<b>13</b>	<b>0.418</b>
	<b>52</b>	<b>0.346</b>	<b>57</b>	<b>0.597*</b>	<b>33</b>	<b>0.666*</b>	<b>38</b>	<b>0.728*</b>	43	0.071
	82	-0.126	87	0.200*	63	-0.121*	68	0.065	<b>73</b>	<b>0.594</b>
	<b>112</b>	<b>0.683</b>	<b>117</b>	<b>0.756*</b>	<b>93</b>	<b>0.688*</b>	<b>98</b>	<b>0.542*</b>	103	0.003
	142	0.026	147	0.000	123	0.002	128	0.009	<b>133</b>	<b>0.757</b>
	172	0.234	<b>177</b>	<b>0.769*</b>	<b>153</b>	<b>0.637*</b>	<b>158</b>	<b>0.693*</b>	163	-0.121
	202	-0.073	207	-0.012	<b>183</b>	<b>0.627*</b>	<b>188</b>	<b>0.716*</b>	<b>193</b>	<b>0.575</b>
	232	0.088	<b>237</b>	<b>0.607*</b>	<b>213</b>	<b>0.733*</b>	<b>218</b>	<b>0.677*</b>	<b>223</b>	<b>0.521</b>
Estimated Residual	22	0.576	27	0.600	3	0.564	8	0.417	13	0.832
Variances	52	0.880	57	0.634	33	0.558	38	0.470	43	0.402
	82	0.681	87	0.491	63	0.369	68	0.660	73	0.648
	112	0.534	117	0.429	93	0.530	98	0.705	103	0.342
	142	0.519	147	0.516	123	0.407	128	0.595	133	0.424
	172	0.629	177	0.415	153	0.574	158	0.520	163	0.428
	202	0.566	207	0.626	183	0.581	188	0.482	193	0.661
	232	0.755	237	0.616	213	0.463	218	0.535	223	0.720
Chi-square Difference Test		62.956		313.202		434.261		358.444		367.733
(Chi-square value & p-value)		<.0001		<.0001		<.0001		<.0001		<.0001

		O4-Actions	O5-Ideas	O6-Values	A1-Trust	A2- Straightforwardness				
Chi-square value		22.353	92.821	22.194	51.364	36.833				
Chi-square p value		0.0501	<.0001	0.0524	<.0001	0.0004				
RMSEA		0.042	0.123	0.042	0.085	0.067				
CFI		0.989	0.943	0.993	0.985	0.988				
TLI		0.975	0.877	0.985	0.968	0.975				
SRMR		0.025	0.041	0.022	0.027	0.030				
Factor Loadings - Factor 1	18	-0.057	<b>23</b>	<b>0.539*</b>	<b>28</b>	<b>0.738*</b>	<b>4</b>	<b>0.715*</b>	<b>9</b>	<b>0.721*</b>

(table continues)

	O4-Actions	O5-Ideas	O6-Values	A1-Trust	A2-Straightforwardness					
Factor Loadings - Factor 1	<b>48</b>	<b>0.858*</b>	53	0.044	58	0.035	34	-0.010	39	0.071
	78	-0.308*	<b>83</b>	<b>0.758*</b>	<b>88</b>	<b>0.656*</b>	<b>64</b>	<b>0.654*</b>	<b>69</b>	<b>0.358*</b>
	<b>108</b>	<b>0.276*</b>	113	-0.002	118	-0.048	94	-0.018	99	-0.046
	138	0.003	<b>143</b>	<b>0.777*</b>	<b>148</b>	<b>0.711*</b>	<b>124</b>	<b>0.851*</b>	<b>129</b>	<b>0.238*</b>
	<b>168</b>	<b>0.349*</b>	173	-0.041	178	0.001	154	0.045	159	0.178*
	198	0.107	<b>203</b>	<b>0.649*</b>	<b>208</b>	<b>0.731*</b>	184	-0.006	189	-0.012
	228	-0.001	<b>233</b>	<b>0.599*</b>	<b>238</b>	<b>0.615*</b>	214	0.040	219	-0.080
Factor Loadings - Factor 2	<b>18</b>	<b>0.520*</b>	23	0.102*	28	0.008	4	0.089	9	-0.001
	48	0.003	<b>53</b>	<b>0.728*</b>	<b>58</b>	<b>0.628*</b>	<b>34</b>	<b>0.702*</b>	<b>39</b>	<b>0.723*</b>
	<b>78</b>	<b>0.522*</b>	83	-0.013	88	0.061	64	0.005	69	-0.089
	108	-0.130*	<b>113</b>	<b>0.768*</b>	<b>118</b>	<b>0.647*</b>	<b>94</b>	<b>0.720*</b>	<b>99</b>	<b>0.711*</b>
	<b>138</b>	<b>0.704*</b>	143	-0.057	148	0.002	124	-0.063	129	0.143*
	168	-0.021	<b>173</b>	<b>0.639*</b>	<b>178</b>	<b>0.672*</b>	<b>154</b>	<b>0.758*</b>	<b>159</b>	<b>0.840*</b>
	<b>198</b>	<b>0.607*</b>	203	0.121*	208	-0.020	<b>184</b>	<b>0.808*</b>	<b>189</b>	<b>0.843*</b>
	<b>228</b>	<b>0.632*</b>	233	0.097	238	-0.082	<b>214</b>	<b>0.763*</b>	<b>219</b>	<b>0.528*</b>
Estimated Residual	18	0.710	23	0.693	28	0.455	4	0.491	9	0.479
Variances	48	0.264	53	0.465	58	0.601	34	0.506	39	0.495
	78	0.542	83	0.426	88	0.561	64	0.572	69	0.850
	108	0.887	113	0.410	118	0.583	94	0.478	99	0.477
	138	0.505	143	0.398	148	0.494	124	0.263	129	0.938
	168	0.873	173	0.593	178	0.549	154	0.429	159	0.329
	198	0.657	203	0.557	208	0.467	184	0.346	189	0.286
	228	0.600	233	0.626	238	0.622	214	0.422	219	0.696
Chi-square Difference Test		89.557		452.804		273.493		731.872		64.890
(Chi-square value & p-value)		<.0001		<.0001		<.0001		<.0001		<.0001

(table continues)

		A3- Altruism		A4- Compliance		A5- Modesty		A6-Tender- Mindedness		C1- Competence
Chi-square value		35.675		41.673		54.028		26.777		21.804
Chi-square p value		0.0007		0.0001		<.0001		0.0133		0.0585
RMSEA		0.065		0.073		0.088		0.051		0.0141
CFI		0.985		0.962		0.952		0.979		0.993
TLI		0.968		0.919		0.896		0.954		0.985
SRMR		0.028		0.036		0.041		0.030		0.022
Factor Loadings - Factor 1	<b>14</b>	<b>0.714*</b>	19	0.060	<b>24</b>	<b>0.599*</b>	<b>29</b>	<b>0.516*</b>	5	0.001
	44	0.246*	<b>49</b>	<b>0.355*</b>	54	0.000	59	-0.229	<b>35</b>	<b>0.678*</b>
	<b>74</b>	<b>0.739*</b>	79	-0.086	<b>84</b>	<b>0.775*</b>	<b>89</b>	<b>0.385*</b>	65	-0.015
	104	0.127*	<b>109</b>	<b>0.761*</b>	114	-0.071	119	0.071	<b>95</b>	<b>0.704*</b>
	<b>134</b>	<b>0.701*</b>	139	0.000	<b>144</b>	<b>0.631*</b>	<b>149</b>	<b>0.695*</b>	125	-0.192*
	164	0.001	<b>169</b>	<b>0.592*</b>	174	0.067	<b>179</b>	<b>0.744*</b>	<b>155</b>	<b>0.750*</b>
	194	-0.053	<b>199</b>	<b>0.538*</b>	204	0.000	<b>209</b>	<b>0.605*</b>	185	0.025
	224	-0.097	<b>229</b>	<b>0.629*</b>	<b>234</b>	<b>0.651*</b>	<b>239</b>	<b>0.393*</b>	215	0.131*
Factor Loadings - Factor 2	14	-0.003	<b>19</b>	<b>0.372*</b>	24	0.033	29	0.025	<b>5</b>	<b>0.515*</b>
	<b>44</b>	<b>0.651*</b>	49	-0.122	<b>54</b>	<b>0.465*</b>	<b>59</b>	<b>0.372*</b>	35	0.000
	74	0.063	<b>79</b>	<b>0.414*</b>	84	0.006	89	-0.197*	<b>65</b>	<b>0.706*</b>
	<b>104</b>	<b>0.710*</b>	109	0.062	<b>114</b>	<b>0.395*</b>	<b>119</b>	<b>0.747*</b>	95	-0.182*
	134	-0.014	<b>139</b>	<b>0.797*</b>	144	-0.146*	<b>149</b>	<b>-0.369*</b>	<b>125</b>	<b>0.666*</b>
	<b>164</b>	<b>0.597*</b>	169	-0.089	<b>174</b>	<b>0.401*</b>	179	0.011	155	0.090
	<b>194</b>	<b>0.598*</b>	199	0.005	<b>204</b>	<b>0.832*</b>	209	0.016	<b>185</b>	<b>0.709*</b>
	<b>224</b>	<b>0.744*</b>	229	-0.011	234	-0.009	239	-0.339*	<b>215</b>	<b>0.652*</b>
Estimated Residual	14	0.490	19	0.873	24	0.646	29	0.728	5	0.735
Variances	44	0.480	49	0.829	54	0.783	59	0.844	35	0.540
	74	0.440	79	0.797	84	0.400	89	0.843	65	0.503
	104	0.460	109	0.450	114	0.831	119	0.415	95	0.490
	134	0.511	139	0.365	144	0.554	149	0.483	125	0.539
	164	0.644	169	0.605	174	0.842	179	0.443	155	0.420
	194	0.647	199	0.713	204	0.308	209	0.629	185	0.493

(table continues)



		A3- Altruism		A4- Compliance		A5- Modesty		A6-Tender- Mindedness		C1- Competence
Estimated Residual Variances	224	0.453	229	0.599	234	0.574	239	0.784	215	0.545
Chi-square Difference Test (Chi-square value & p-value)		420.627 <.0001		76.925 <.0001		188.302 <.0001		113.967 <.0001		543.993 <.0001

		C2-Order		C3- Dutifulness		C4- Achievement		C5-Self- Discipline		C6- Deliberation
Chi-square value		28.483		34.940		35.801		48.494		25.297
Chi-square p value		0.0077		0.0009		0.0006		<.0001		0.0211
RMSEA		0.054		0.064		0.065		0.082		0.048
CFI		0.987		0.974		0.974		0.973		0.981
TLI		0.971		0.944		0.944		0.942		0.960
SRMR		0.027		0.033		0.031		0.032		0.027
Factor Loadings - Factor 1	10	-0.257*	15	0.128*	20	-0.165*	25	-0.115*	30	-0.084
	<b>40</b>	<b>0.848*</b>	<b>45</b>	<b>0.845*</b>	<b>50</b>	<b>0.564*</b>	<b>55</b>	<b>0.630*</b>	<b>60</b>	<b>0.644*</b>
	70	-0.028	75	0.003	80	-0.242*	85	0.007	90	0.006
	<b>100</b>	<b>0.729*</b>	<b>105</b>	<b>0.567*</b>	<b>110</b>	<b>0.701*</b>	<b>115</b>	<b>0.779*</b>	<b>120</b>	<b>0.753*</b>
	130	0.123*	235	-0.008	140	0.011	145	0.054	150	-0.229*
	<b>160</b>	<b>0.341*</b>	165	-0.071	<b>170</b>	<b>0.731*</b>	<b>175</b>	<b>0.699*</b>	<b>180</b>	<b>0.525*</b>
	190	0.196*	195	0.127*	<b>200</b>	<b>0.655*</b>	<b>205</b>	<b>0.740*</b>	<b>210</b>	<b>0.430*</b>
	220	-0.006	225	-0.255*	<b>230</b>	<b>0.406*</b>	235	-0.093*	<b>240</b>	<b>0.541*</b>
Factor Loadings - Factor 2	<b>10</b>	<b>0.432*</b>	<b>15</b>	<b>0.608*</b>	<b>20</b>	<b>0.406*</b>	<b>25</b>	<b>0.629*</b>	<b>30</b>	<b>0.441*</b>
	40	0.023	45	0.003	50	-0.030	55	0.066	60	-0.086
	<b>70</b>	<b>0.572*</b>	<b>75</b>	<b>0.531*</b>	<b>80</b>	<b>0.471*</b>	<b>85</b>	<b>0.704*</b>	<b>90</b>	<b>0.894*</b>
	100	-0.016	105	-0.003	110	0.155*	115	-0.003	120	0.165*
	<b>130</b>	<b>0.884*</b>	<b>235</b>	<b>0.673*</b>	<b>140</b>	<b>0.821*</b>	<b>145</b>	<b>0.743*</b>	<b>150</b>	<b>0.477*</b>
	160	-0.395*	<b>165</b>	<b>0.511*</b>	170	-0.006	175	-0.104*	180	0.000
	<b>190</b>	<b>0.431*</b>	<b>195</b>	<b>0.590*</b>	200	0.028	205	0.008	210	0.075
	<b>220</b>	<b>0.672*</b>	<b>225</b>	<b>0.455*</b>	230	-0.259*	<b>235</b>	<b>0.610*</b>	240	-0.016

(table continues)

		C2-Order	C3- Dutifulness	C4- Achievement	C5-Self- Discipline	C6- Deliberation				
Estimated Residual	10	0.785	15	0.587	20	0.828	25	0.613	30	0.803
Variations	40	0.274	45	0.285	50	0.686	55	0.586	60	0.583
	70	0.678	75	0.718	80	0.754	85	0.502	90	0.199
	100	0.472	105	0.679	110	0.452	115	0.394	120	0.393
	130	0.167	235	0.548	140	0.323	145	0.433	150	0.732
	160	0.773	165	0.747	170	0.466	175	0.522	180	0.724
	190	0.748	195	0.610	200	0.565	205	0.450	210	0.806
	220	0.549	225	0.768	230	0.799	235	0.636	240	0.707
Chi-square Difference Test		395.382		187.870		206.383		408.153		263.037
(Chi-square value & p-value)		<.0001		<.0001		<.0001		<.0001		<.0001

*Note.* Items loading on each individual factor are in boldface. NEO-PI-R = NEO – Personality Inventory – Revised; N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual. Chi-square Difference Test = Difference test between one-factor (6 facets) solution and two-factor (12 facets) solution.

\* $p < .05$ .

## Confirmatory Factor Analysis Results

### Overall Model

In order to explore the relationships between dispositional flow and the FFM, a six-factor CFA model was specified that consisted of a latent variable for dispositional flow and the domains of the FFM: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Dispositional flow was indicated by the nine DFS-2 subscale scores. The domains of the FFM were indicated by the original hypothesized five subscale scores of the NEO-PI-R, each composed of six facets. The specified model converged with maximum likelihood estimation; however, the fit statistics indicated unacceptable fit:  $\chi^2(687) = 3792.253, p = .000$ . Additional fit statistics included: CFI = .645, TLI = .617, RMSEA = .105 with 90% confidence interval ranging from .102 to .108; and SRMR = .126. These additional fit statistics further indicated poor fit of the model and therefore model respecification was indicated.

### Individual Models: Flow & FFM Domains

Due to the poor fit of the overall model between dispositional flow and the five domains of the FFM, the proposed relationship between dispositional flow and the five domains of the FFM was examined utilizing the individual facets for each of the five FFM domains. This approach was supported by an examination of the correlations among the parcels. This examination revealed many additional relationships among the parcels in competing personality domains, including dispositional flow. Due to this complexity, each personality domain was examined separately in regards to its proposed relationship with dispositional flow.

Each model was examined by specifying a two-factor CFA that consisted of a latent variable for dispositional flow and the specific FFM domain. Dispositional flow was indicated by the nine DFS-2 subscale scores. Each of the FFM domains (e.g., neuroticism, extraversion, openness to experience, agreeableness, conscientiousness) were specified by the corresponding subscale of the NEO-PI-R composed of 12 facets established through the initial EFA results. Each of the specified models converged; however, the fit statistics indicated unacceptable fit for all models. Model fit statistics for each CFA model can be found in Table 10.

Table 10

*CFA Results for DFS-2 & NEO-PI-R, N = 409*

	Overall Model	DFS-2 by N	DFS-2 by E	DFS-2 by O	DFS-2 by A	DFS-2 by C
Chi-square Value	3792.253	1680.113	1957.993	1823.046	1872.623	2190.008
Chi-square DF	687	188	188	188	188	188
Chi-square P-Value	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
RMSEA	0.105	0.139	0.152	0.146	0.148	0.161
RMSEA 90 CI Low	0.102	0.133	0.146	0.140	0.142	0.155
RMSEA 90 CI High	0.108	0.145	0.158	0.152	0.154	0.167
CFI	0.645	0.677	0.614	0.630	0.623	0.577
TLI	0.617	0.640	0.568	0.587	0.579	0.527
SRMR	0.126	0.183	0.148	0.175	0.170	0.228

*Note.* DFS-2 = Dispositional Flow Scale – 2; NEO-PI-R = NEO – Personality Inventory – Revised; N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness; DF = degrees of freedom; RMSEA = Root Mean Square Error of Approximation; CI = confidence interval; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual.

Although each of the individual models converged, none of the five models had acceptable fit, indicating that further respecification was necessary. It should be noted too much respecification risks overspecifying the model and loss of generalizability. In order to minimize overspecification, modification indices were reviewed to determine possible changes to assist in improving overall fit of the individual models. Additional CFA analyses were performed based on the suggested changes from the modification indices review; however, these analyses did not improve the overall fit of the models. Therefore, additional EFA analyses were conducted to examine the relationships between dispositional flow and each of the five individual factors of personality as proposed by the FFM.

### **Additional Exploratory Factor Analysis Results**

Additional EFA analyses using maximum likelihood estimation and geomin rotation (the facets were continuous variables with normal distributions) were conducted to examine the relationships between dispositional flow and each of the five individual domains of the FFM: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Modification indices were utilized to help determine changes to assist in improving model fit. Modification indices indicate that a relationship in the model leads to an over- or under-prediction of variable correlations which indicates that a change is in order. Changing the indicated relationship by either adding or removing it from the model should improve overall model fit. According to Kline (2011), values greater than 10.00 as designated by the modification indices indicate a potential problem. The following sections detail changes made to improve model fit, including the factors that were retained and removed from the models.

## **Neuroticism**

It was hypothesized dispositional flow and neuroticism would have a negative or inverse relationship. As the initial EFA for dispositional flow and neuroticism yielded an unacceptable model fit, respecification of the model was warranted. Dispositional flow was indicated by seven of the nine DFS-2 subscale scores. Upon a review of the modification indices, DFS 7 (loss of self-consciousness) of the DFS-2 was revealed to have a poor factor loading and significant correlations with the other scales and thus was removed from the model. DFS 7 (loss of self-consciousness) was positively related to the six reverse-scored facets and negatively related to the five reverse-scored facets.

Although supporting research for removal of this subscale was limited, it may best be explained that DFS 7 (loss of self-consciousness) provides little information to differentiate between dispositional flow and neuroticism. The items that compose DFS 7 (loss of self-consciousness) focus on losing oneself in one's experience and not focusing or caring about what other individuals may think of him/her during that moment. This dimension of flow ought to be negatively related to self-consciousness, a hallmark characteristic of neuroticism. This relationship is indeed observed in the present data as one of the inverse relationships between DFS 7 (loss of self-consciousness) and the neuroticism facets; however, DFS 7 (loss of self-consciousness) also has other positive and inverse relationships with the remaining neuroticism facets. Due to the ambiguous nature of these relationships, it is inferred that DFS 7 (loss of self-consciousness) does not provide enough information to differentiate between dispositional flow and neuroticism. Furthermore, DFS 7 (loss of self-consciousness) also had weak to moderate correlations with the other DFS-2 subscales as indicated in the initial correlation results. In addition to these potential reasons,

the removal of DFS 7 (loss of self-consciousness) was further supported by better overall fit of the model.

DFS 8 (time) of the DFS-2 was revealed to have a poor factor loading and was removed from the model. The removal of this subscale has also been supported by other research. A previous study by Hager (2012) assessing the relationship between psychological reactance and dispositional flow as latent variables also found the time subscale of the DFS-2 did not correlate with the other DFS-2 subscales. This was further supported by the face and process validity of Hager's (2012) study that found several participants had difficulty in answering the questions pertaining to the time subscale when assessed as a dispositional trait. When participants were asked to explain their difficulty, many commented it was difficult as they did not have a specific event or context in which to relate their answers. Another study conducted by Balagna and Marszalek (2011) assessing students' motivation to learn a foreign language and flow yielded the same result that time did not correlate with the other DFS-2 subscales. In addition to these studies, the DFS-2 manual also cautions that time has been found to be unrepresentative in other studies when assessing flow as a disposition (Jackson, Eklund, & Martin, 2010). Furthermore, DFS 8 (time) also had weak to moderate correlations with the other DFS-2 subscales as indicated in the initial correlation results. Due to these findings, it was supported that DFS 7 (loss of self-consciousness) and DFS 8 (time) be removed from the model, and dispositional flow was represented by the remaining seven subscales of the DFS-2.

Neuroticism was indicated by the neuroticism subscale of the NEO-PI-R composed of eleven of the twelve facets established through the initial EFA results. Upon a review of the modification indices, NEO N12 (vulnerability reverse-scored) of the revised neuroticism



subscale was revealed to have a poor factor loading and significant correlations with the other parcels, and thus was removed from the model. This was further supported by examining the constructs that embody neuroticism. Neurotic individuals often possess a negative affect which is expressed through anxiety, self-consciousness, depression, anger, impulsivity, and vulnerability. The items on NEO N12 (vulnerability reverse-scored) center on the idea that individuals are capable of handling themselves in difficult situations and have the ability to cope with emotions that lead to negative affect. When an individual enters into a state of flow, a loss of self-consciousness occurs. While an individual's ability to handle difficult situations may be a benefit in entering into a state of flow, once in a state of flow this ability is less crucial in maintaining the flow state. As was previously found in this model regarding the removal of DFS 7 (loss of self-consciousness), it may also be inferred that NEO N12 (vulnerability reverse-scored) provides little information to differentiate between dispositional flow and neuroticism as this factor does not emerge as a strong predictor of either construct. In addition to these potential reasons, the removal of NEO N12 (vulnerability reverse-scored) was further supported by better overall fit of the model.

Factor loadings and standard errors for these models can be found in Table 11; all factor loadings were statistically significant and of good size (i.e., greater than .32 as recommended by Tabachnick & Fidell, 2001). The EFA results revealed a three-factor solution. Factor 1 consisted of all seven of the remaining DFS-2 subscales composing a single factor that represented dispositional flow. Factors 2 and 3 consisted of the remaining neuroticism facets. Factor 2 was composed of the six facets of neuroticism that were not reverse-scored. These facets included: anxiety, angry hostility, depression, self-

consciousness, impulsiveness, and vulnerability. Factor 3 was composed of the five facets of neuroticism that were reverse-scored: anxiety reverse-scored, angry hostility reverse-scored, depression reverse-scored, self-consciousness reverse-scored, and impulsiveness reverse-scored.

Model fit statistics for these models, including chi-square tests, RMSEA, CFI, TLI, and SRMR, can also be found in Table 11. The chi-square test revealed significant results; however, this is likely due to model complexity rather than an indicator of poor fit of the model. This was supported by model fit indices that indicated acceptable fit of the overall model. Acceptable fit was indicated the model fit indices: CFI = .923, RMSEA = .085, and SRMR = .035. Although the overall model only yielded results that supported an acceptable fit of the model rather than good fit, this solution was the best overall fit that was also theoretically grounded, and provided the best explanation as to the possible relationship between dispositional flow and neuroticism.

In addition to the EFA results, a bivariate correlation of the scale scores revealed a weak to moderate negative relationship between dispositional flow and neuroticism ( $r = -.214, p < .0001$ ). The factor correlations provided by the EFA results mirrored the overall correlation: dispositional flow (Factor 1) was found to have a weak nonsignificant negative relationship with neuroticism (Factor 2) ( $r = -.071$ ), and a strong negative relationship with neuroticism-reversed (Factor 3) ( $r = -.519, p < .05$ ), and neuroticism (Factor 2) was found to have a weak to moderate negative relationship with neuroticism-reversed (Factor 3) ( $r = -.208, p < .05$ ). The strong correlations between dispositional flow (Factor 1) and neuroticism-reversed (Factor 3) may be explained that as individuals experience flow their experience of neurotic traits may also decrease as these traits typically impede the

experience of flow. For example, neurotic individuals often experience anxiety, depression, hostility, self-consciousness, and impulsiveness; many of which have been shown to hinder individuals' ability to enter into a state of flow. These correlations partially supported Hypothesis 1 that hypothesized dispositional flow and neuroticism would have a negative or inverse relationship with one another. This is also theoretically supported as those who are high in neuroticism experience anxiety, self-consciousness, and depression which impede an individual's ability to experience flow.

Table 11

*Final EFA Factor Loadings, Standard Errors, & Model Fit Indices – DFS & N, N = 409*

Chi-square value	405.671		
Chi-square p value	<.0001		
RMSEA	0.085		
CFI	0.923		
TLI	0.884		
SRMR	0.035		
Factor Loadings	1	2	3
DFS 1 – Balance	<b>0.807*</b>	-0.006	0.026
DFS 2 – Merging	<b>0.634*</b>	0.276*	-0.004
DFS 3 – Goals	<b>0.934*</b>	0.001	0.166*
DFS 4 – Feedback	<b>0.803*</b>	-0.022	0.040
DFS 5 – Concentration	<b>0.705*</b>	0.155*	-0.027
DFS 6 – Control	<b>0.794*</b>	-0.045	-0.004
DFS 9 – Autotelic	<b>0.747*</b>	0.063	-0.011
NEO N1 - Anxiety RS	-0.005	0.088	<b>0.824*</b>
NEO N2 - Anxiety	-0.088	<b>0.691*</b>	0.01
NEO N3 - Angry Hostility	-0.005	<b>0.777*</b>	-0.085
NEO N4 - Angry Hostility RS	0.045	-0.127*	<b>0.457*</b>
NEO N5 - Depression RS	0.003	0.022	<b>0.546*</b>
NEO N6 - Depression	-0.045	<b>0.911*</b>	0.031
NEO N7 – Self-Consciousness	0.059	0.774*	-0.002
NEO N8 - Self-Conscious RS	0.048	-0.015	<b>0.724*</b>
NEO N9 - Impulsiveness	0.082	<b>0.605*</b>	-0.089

(table continues)

Factor Loadings	1	2	3
NEO N10 - Impulsiveness RS	-0.036	-0.378*	<b>0.463*</b>
NEO N11 - Vulnerability	-0.038	<b>0.821*</b>	0.009
Estimated Residual Variables			
DFS 1 – Balance	0.368		
DFS 2 – Merging	0.544		
DFS 3 – Goals	0.261		
DFS 4 – Feedback	0.384		
DFS 5 – Concentration	0.473		
DFS 6 – Control	0.360		
DFS 9 – Autotelic	0.436		
NEO N1 - Anxiety RS	0.339		
NEO N2 - Anxiety	0.509		
NEO N3 - Angry Hostility	0.361		
NEO N4 - Angry Hostility RS	0.769		
NEO N5 - Depression RS	0.708		
NEO N6 - Depression	0.171		
NEO N7 – Self-Consciousness	0.402		
NEO N8 - Self-Conscious RS	0.504		
NEO N9 - Impulsiveness	0.596		
NEO N10 - Impulsiveness RS	0.553		
NEO N11 - Vulnerability	0.323		
Factor Correlations	1	2	
2	-0.071		
3	-0.519*	-0.208*	

*Note.* Items loading on each individual factor are in boldface. DFS-2 = Dispositional Flow Scale – 2; NEO = NEO – Personality Inventory – Revised; N = Neuroticism; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual; RS = Reverse-Scored. \* $p < .05$ .

## Extraversion

The potential relationship between dispositional flow and extraversion was explored. As the initial EFA for dispositional flow and extraversion yielded an unacceptable model fit, respecification of the model was warranted. Dispositional flow was indicated by eight of the nine DFS-2 subscale scores. Upon review of the modification indices, DFS 8 (time) of the DFS-2 was revealed to have a poor factor loading and was removed from the model. The

removal of this subscale has also been supported by other research as explained in the neuroticism model and was further supported by better overall fit of the model.

Extraversion was indicated by the extraversion subscale of the NEO-PI-R composed of the twelve facets established through the initial EFA results.

Factor loadings and standard errors for these models can be found in Table 12; all factor loadings were statistically significant and of good size (i.e., greater than .32). The EFA results revealed a three-factor solution. Factor 1 consisted all eight of the remaining DFS-2 subscales composing a single factor that represented dispositional flow. Factors 2 and 3 consisted of the extraversion facets. Factor 2 was composed of the six facets of extraversion that were not reverse-scored. These facets included: warmth, gregariousness, assertiveness, activity, excitement-seeking, and positive emotions. Factor 3 was composed of the six facets of extraversion that were reverse-scored: warmth reverse-scored, gregariousness reverse-scored, assertiveness reverse-scored, activity reverse-scored, excitement-seeking reverse-scored, and positive emotions reverse-scored.

Model fit statistics for these models, including chi-square tests, RMSEA, CFI, TLI, and SRMR, can also be found in Table 12. The chi-square test revealed significant results; however, this is likely due to the complexity of the model rather than an indicator of poor fit of the model. This was supported by model fit indices that indicated acceptable fit of the overall model. Acceptable fit was indicated by the model fit indices: CFI = .908, RMSEA = .085, and SRMR = .034. Although the overall model only yielded results that supported an acceptable fit of the model rather than good fit, this solution was the best overall fit that was also theoretically grounded and provided the best explanation as to the possible relationship between dispositional flow and extraversion.

In addition to the EFA results, a bivariate correlation of the scale scores revealed a moderate to strong positive relationship between dispositional flow and extraversion ( $r = .380, p < .0001$ ). The factor correlations provided by the EFA results mirrored the overall correlation: dispositional flow (Factor 1) was found to have a strong relationship with extraversion (Factor 2) ( $r = .525, p < .05$ ) and a weak to moderate relationship with extraversion-reversed (Factor 3) ( $r = .265, p < .05$ ). The strong correlation between dispositional flow (Factor 1) and extraversion (Factor 2) may be explained by attributes that are shared by both of the characteristics. For example, those individuals higher in extraversion often engage in a heightened level of activity, are more assertive, and seek sensations; these traits can also be seen in those who more have a higher disposition to experience flow. The weak to moderate correlation between dispositional flow (Factor 1) and extraversion-reversed (Factor 3) may also be explained as the reversed items represent attributes that may hinder individuals' ability to enter into a state of flow.

These correlations provide evidence to assist in answering Research Question 1 indicating that dispositional flow and extraversion have a positive relationship with one another. This is also theoretically supported as both flow and extraversion are described as positive emotional experiences. Additionally, extraversion is also often described as the opposite of neuroticism and thus would be hypothesized to have the opposite relationship that neuroticism has with flow. Although the correlations provide some evidence to support a potential positive relationship between dispositional flow and extraversion, the overall model provided a limited fit and thus extraversion may not necessarily be related to individuals' ability to experience flow and further research is needed into these constructs.

Table 12

*Final EFA Factor Loadings, Standard Errors, & Model Fit Indices – DFS & E, N = 409*

Chi-square value	527.892		
Chi-square p value	<.0001		
RMSEA	0.085		
CFI	0.908		
TLI	0.869		
SRMR	0.034		
Factor Loadings	1	2	3
DFS 1 – Balance	<b>0.757*</b>	0.041	0.039
DFS 2 – Merging	<b>0.569*</b>	0.177*	-0.233*
DFS 3 – Goals	<b>0.808*</b>	0.062	0.037
DFS 4 – Feedback	<b>0.785*</b>	0.015	-0.038
DFS 5 – Concentration	<b>0.819*</b>	-0.052	-0.331*
DFS 6 – Control	<b>0.798*</b>	0.011	-0.01
DFS 7 – Consciousness	<b>0.377*</b>	0.129	-0.384*
DFS 9 - Autotelic	<b>0.587*</b>	0.264*	0.054
NEO E1 – Warmth	0.049	<b>0.695*</b>	0.373*
NEO E2 - Warmth RS	-0.001	-0.188*	<b>0.716*</b>
NEO E3 - Gregariousness RS	-0.246*	0.012	<b>0.817*</b>
NEO E4 - Gregariousness	-0.182*	<b>0.793*</b>	0.012
NEO E5 - Assertiveness	-0.014	<b>0.699*</b>	-0.030
NEO E6 - Assertiveness RS	0.006	-0.277*	<b>0.585*</b>
NEO E7 - Activity RS	0.064	-0.456*	<b>0.511*</b>
NEO E8 – Activity	0.021	<b>0.707*</b>	-0.038
NEO E9 - Excitement-Seeking	-0.132*	<b>0.802*</b>	-0.019
NEO E10 - Excitement RS	-0.043	-0.088	<b>0.366*</b>
NEO E11 - Positive Emotions RS	-0.040	-0.164*	<b>0.782*</b>
NEO E12 - Positive Emotions	0.007	<b>0.707*</b>	0.351*
Estimated Residual Variables			
DFS 1 – Balance	0.376		
DFS 2 – Merging	0.546		
DFS 3 – Goals	0.274		
DFS 4 – Feedback	0.385		
DFS 5 – Concentration	0.409		
DFS 6 – Control	0.358		
DFS 7 – Consciousness	0.709		
DFS 9 - Autotelic	0.406		
NEO E1 – Warmth	0.386		

(table continues)

Estimated Residual Variables		
NEO E2 - Warmth RS	0.422	
NEO E3 - Gregariousness RS	0.384	
NEO E4 - Gregariousness	0.492	
NEO E5 - Assertiveness	0.515	
NEO E6 - Assertiveness RS	0.546	
NEO E7 - Activity RS	0.490	
NEO E8 - Activity	0.477	
NEO E9 - Excitement-Seeking	0.445	
NEO E10 - Excitement RS	0.854	
NEO E11 - Positive Emotions RS	0.342	
NEO E12 - Positive Emotions	0.424	
Factor Correlations	1	2
2	0.525*	
3	0.265*	-0.107

*Note.* Items loading on each individual factor are in boldface. DFS-2 = Dispositional Flow Scale – 2; NEO = NEO – Personality Inventory – Revised; E = Extraversion; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual; RS = Reverse-Scored. \* $p < .05$

### **Openness to Experience**

It was hypothesized dispositional flow and openness to experience would have a positive relationship. As the initial EFA for dispositional flow and openness to experience yielded an unacceptable model fit, respecification of the model was warranted.

Dispositional flow was indicated by the nine DFS-2 subscales scores. Openness was indicated by the openness subscale of the NEO-PI-R composed of the twelve facets established through the initial EFA results.

Factor loadings and standard errors for these models can be found in Table 13; all factor loadings were statistically significant and of good size (i.e., greater than .32). The EFA results revealed a four-factor solution. Factors 1 and 4 consisted of the nine subscales of the DFS-2. Factor 1 included the following subscales: balance, merging, goals,



feedback, concentration, control, and autotelic personality. Factor 4 included the consciousness and time subscales. This division of flow is supported by Chen and colleagues (1999) who conceptualized a three stage model of flow: antecedents, experience, and effects. Antecedents includes the dimensions of flow that precede entering into the flow state including the perception of goals, feedback, and matched skills and challenge. Experience includes those dimensions that occur during the state of flow comprising the merging of action and awareness, concentration, and sense of potential control. Effects includes the dimensions that are a result of the flow state: loss of self-consciousness, time distortion, and autotelic personality (Chen et al., 1999). Factors 1 and 4 follow a similar pattern to this model as Factor 1 aligns with the states of antecedents and experience and Factor 4 with effects. Although the autotelic personality did not load onto Factor 4 with the other two effect subscales, it can also be stated that the autotelic personality assists with an individual entering into a state of flow and thus is supported to load onto Factor 1 with the other antecedent dimensions.

Factors 2 and 3 consisted of the openness facets. Factor 2 was composed of the six facets of openness that were reverse-scored. These facets included: fantasy reverse-scored, aesthetics reverse-scored, feelings reverse-scored, actions reverse-scored, ideas reverse-scored, and values reverse-scored. Factor 3 was composed of the six facets of openness that were not reverse-scored: fantasy, aesthetics, feelings, actions, ideas, and values.

Model fit statistics for these models, including chi-square tests, RMSEA, CFI, TLI, and SRMR, can also be found in Table 13. The chi-square test revealed significant results; however, this is likely due to the complexity of the model rather than an indicator of poor fit of the model. This was supported by model fit indices that indicated good fit of the overall

model. Good fit was indicated by the model fit indices: CFI = .931, RMSEA = .075, and SRMR = .029. The overall model yielded results that supported a good fit of the model, was theoretically grounded, and provided the best explanation as to the possible relationship between dispositional flow and openness.

In addition to the EFA results, a bivariate correlation of the scale scores revealed dispositional flow and openness to experience to not have a relationship with one another ( $r = .009, p = .853$ ). The factors of the EFA results were found to have correlations (provided by the EFA results) among the factors that yielded both positive and negative relationships: dispositional flow (Factor 1) was found to have a weak negative correlation with openness-reversed (Factor 2) ( $r = -.146, p < .05$ ), a moderate positive correlation with openness (Factor 3) ( $r = .486, p < .05$ ), and a weak positive correlation with consciousness and time (Factor 4) ( $r = .179, p < .05$ ); openness-reversed (Factor 2) was found to have a moderate negative correlation with consciousness and time (Factor 4) ( $r = -.404, p < .05$ ), and openness (Factor 3) was found to have a weak to moderate positive correlation with consciousness and time (Factor 4) ( $r = .253, p < .05$ ). The positive correlations between dispositional flow and openness may be explained by attributes that are shared by both experiences. Those who are characterized as open often have a sense of creativity, are intrinsically motivated, and rational problem-solvers which are also traits that are associated with the experience of flow. The negative correlations between dispositional flow and openness may also be explained in a similar manner as those who embrace openness likely do not embrace the facets of openness that may best facilitate an experience of flow.

These correlations offer some support for Hypothesis 3 that hypothesized dispositional flow and openness would have a positive relationship with one another. This is

also theoretically supported as several traits that are associated with dispositional flow are also associated with openness such as creativity and intrinsic motivation which support the notion that the two traits would be positively related to one another.

Table 13

*Final EFA Factor Loadings, Standard Errors, & Model Fit Indices – DFS & O, N = 409*

Chi-square value	438.787			
Chi-square p value	<.0001			
RMSEA	0.075			
CFI	0.931			
TLI	0.890			
SRMR	0.029			
Factor Loadings	1	2	3	4
DFS 1 – Balance	<b>0.782*</b>	0.190*	0.040	0.130
DFS 2 – Merging	<b>0.530*</b>	-0.026	-0.033	0.424*
DFS 3 – Goals	<b>0.832*</b>	-0.013	0.065	-0.055
DFS 4 – Feedback	<b>0.781*</b>	-0.085*	0.025	-0.087
DFS 5 – Concentration	<b>0.707*</b>	<b>-0.313*</b>	-0.084	-0.015
DFS 6 – Control	<b>0.822*</b>	-0.020	-0.058	0.013
DFS 7 – Consciousness	0.245*	-0.165*	-0.007	<b>0.385*</b>
DFS 8 - Time	0.028	-0.125	0.076	<b>0.679*</b>
DFS 9 - Autotelic	<b>0.646*</b>	0.108*	0.099	0.318*
NEO O1 – Fantasy	-0.016	-0.036	<b>0.555*</b>	0.218*
NEO O2 - Fantasy RS	-0.129*	<b>0.799*</b>	-0.059	0.025
NEO O3 - Aesthetics RS	0.046	<b>0.559*</b>	0.098	-0.293*
NEO O4 – Aesthetics	0.000	-0.024	<b>0.736*</b>	0.086
NEO O5 - Feelings RS	0.053	<b>0.692*</b>	-0.011	-0.182
NEO O6 – Feelings	-0.062	-0.026	<b>0.733*</b>	-0.014
NEO O7 – Actions	0.179*	-0.080	<b>0.454*</b>	0.021
NEO O8 - Actions RS	-0.125*	<b>0.487*</b>	-0.274*	0.065
NEO O9 – Ideas	0.161*	0.062	<b>0.649*</b>	0.012
NEO O10 - Ideas RS	-0.002	<b>0.672*</b>	0.053	-0.135
NEO O11 - Values RS	0.006	<b>0.741*</b>	-0.074	-0.162
NEO O12 – Values	0.020	0.080	<b>0.697*</b>	-0.033
Estimated Residual Variables				
DFS 1 – Balance	0.329			
DFS 2 – Merging	0.468			

(table continues)

Estimated Residual Variables

DFS 3 – Goals	0.264			
DFS 4 – Feedback	0.368			
DFS 5 – Concentration	0.397			
DFS 6 – Control	0.358			
DFS 7 – Consciousness	0.672			
DFS 8 - Time	0.410			
DFS 9 - Autotelic	0.357			
NEO O1 – Fantasy	0.584			
NEO O2 - Fantasy RS	0.316			
NEO O3 - Aesthetics RS	0.484			
NEO O4 – Aesthetics	0.414			
NEO O5 - Feelings RS	0.397			
NEO O6 – Feelings	0.506			
NEO O7 – Actions	0.661			
NEO O8 - Actions RS	0.643			
NEO O9 – Ideas	0.449			
NEO O10 - Ideas RS	0.460			
NEO O11 - Values RS	0.315			
NEO O12 – Values	0.507			
Factor Correlations	1	2	3	
2	-0.146*			
3	0.486*	-0.043		
4	0.179*	-0.404*	0.253*	

*Note.* Items loading on each individual factor are in boldface. DFS-2 = Dispositional Flow Scale – 2; NEO = NEO – Personality Inventory – Revised; O = Openness to Experience; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual; RS = Reverse-Scored.

\* $p < .05$ .

### Agreeableness

The potential relationship between dispositional flow and agreeableness was explored. Because the initial EFA for dispositional flow and agreeableness yielded an unacceptable model fit, respecification of the model was warranted. Dispositional flow was indicated by eight of the nine DFS-2 subscale scores. Upon review of the modification indices, DFS 8 (time) of the DFS-2 was revealed to have a poor factor loading and was

removed from the model. The removal of this subscale has also been supported by other research and was further supported by better overall fit of the model. Agreeableness was indicated by the agreeableness subscale of the NEO-PI-R composed of the twelve facets established through the initial EFA results.

Factor loadings and standard errors for these models can be found in Table 14; all factor loadings were statistically significant and of good size (i.e., greater than .32). The EFA results revealed a three-factor solution. Factor 1 consisted of all eight of the remaining DFS-2 subscales composing a single factor that represented dispositional flow. Factors 2 and 3 consisted of the agreeableness facets. Factor 2 was composed of the six facets of agreeableness that were reverse-scored. These facets included: trust reverse-scored, straightforwardness reverse-scored, altruism reverse-scored, compliance reverse-scored, modesty reverse-scored, and tender-mindedness reverse-scored. Factor 3 was composed of the six facets of agreeableness that were not reverse-scored: trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness.

Model fit statistics for these models, including chi-square tests, RMSEA, CFI, TLI, and SRMR, can also be found in Table 14. The chi-square test revealed significant results; however, this is likely due to the complexity of the model rather than an indicator of poor fit of the model. This was supported by model fit indices that indicated acceptable fit of the overall model. Acceptable fit was indicated by the model fit indices: CFI = .910, RMSEA = .084, and SRMR = .037. Although the overall model only yielded results that supported an acceptable fit of the model rather than good fit, this solution was the best overall fit that was also theoretically grounded and provided the best explanation as to the possible relationship between dispositional flow and agreeableness.

In addition to the EFA results, a bivariate correlation of the scale scores revealed a weak to moderate positive relationship between dispositional flow and agreeableness ( $r = .104, p = .036$ ). The factor correlations provided by the EFA results partially supported the overall correlation by showing a strong positive relationship between dispositional flow (Factor 1) and agreeableness (Factor 3) ( $r = .512, p < .05$ ). This correlation may be explained by the fact that some of the traits associated with agreeableness such as cooperation, compliance, and altruism may also assist in experiencing flow; however, there is also limited evidence to support this relationship.

These correlations provide limited evidence to assist in answering Research Question 2 indicating that dispositional flow and agreeableness may have a relationship with one another. This is also theoretically supported as limited theoretical evidence exists to support a relationship between the dispositional flow and agreeableness.

Table 14

*Final EFA Factor Loadings, Standard Errors, & Model Fit Indices – DFS & A, N = 409*

Chi-square value	514.214		
Chi-square p value	<.0001		
RMSEA	0.084		
CFI	0.910		
TLI	0.871		
SRMR	0.037		
Factor Loadings	1	2	3
DFS 1 – Balance	<b>0.795*</b>	0.107*	0.018
DFS 2 – Merging	<b>0.588*</b>	-0.240*	0.031
DFS 3 – Goals	<b>0.854*</b>	0.076	0.001
DFS 4 – Feedback	<b>0.771*</b>	0.009	0.018
DFS 5 – Concentration	<b>0.722*</b>	-0.193*	-0.055
DFS 6 – Control	<b>0.811*</b>	0.030	-0.024
DFS 7 – Consciousness	<b>0.313*</b>	-0.415*	0.041

(table continues)

Factor Loadings	1	2	3
DFS 9 – Autotelic	<b>0.702*</b>	-0.047	0.097*
NEO A1 - Trust RS	-0.016	<b>0.698*</b>	-0.034
NEO A2 – Trust	0.101	-0.015	<b>0.664*</b>
NEO A3 - Straightforwardness	0.021	-0.156*	<b>0.427*</b>
NEO A4 - Straightforward RS	-0.085	<b>0.748*</b>	0.014
NEO A5 - Altruism RS	0.029	<b>0.847*</b>	0.014
NEO A6 - Altruism	0.067	0.211*	<b>0.812*</b>
NEO A7 - Compliance RS	-0.025	<b>0.728*</b>	-0.149*
NEO A8 - Compliance	-0.069	-0.280*	<b>0.590*</b>
NEO A9 - Modesty RS	-0.411*	<b>0.529*</b>	0.016
NEO A10 - Modesty	0.000	-0.101	<b>0.599*</b>
NEO A11 - Tender-Minded	-0.032	0.062	<b>0.805*</b>
NEO A12 – Tender-Minded RS	0.022	<b>0.623*</b>	-0.134*
Estimated Residual Variables			
DFS 1 – Balance	0.356		
DFS 2 – Merging	0.552		
DFS 3 – Goals	0.275		
DFS 4 – Feedback	0.392		
DFS 5 – Concentration	0.458		
DFS 6 – Control	0.365		
DFS 7 – Consciousness	0.690		
DFS 9 – Autotelic	0.420		
NEO A1 - Trust RS	0.504		
NEO A2 – Trust	0.478		
NEO A3 - Straightforwardness	0.768		
NEO A4 - Straightforward RS	0.426		
NEO A5 - Altruism RS	0.288		
NEO A6 - Altruism	0.276		
NEO A7 - Compliance RS	0.416		
NEO A8 - Compliance	0.577		
NEO A9 - Modesty RS	0.524		
NEO A10 - Modesty	0.618		
NEO A11 - Tender-Minded	0.385		
NEO A12 – Tender-Minded RS	0.580		
Factor Correlations			
	1	2	
2	-0.082		
3	0.512*	-0.111	

*Note.* Items loading on each individual factor are in boldface. DFS-2 = Dispositional Flow Scale – 2; NEO = NEO – Personality Inventory – Revised; A = Agreeableness; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual; RS = Reverse-Scored. \* $p < .05$ .

## **Conscientiousness**

It was hypothesized dispositional flow and conscientiousness would have a positive relationship. As the initial EFA for dispositional flow and conscientiousness yielded an unacceptable model fit, respecification of the model was warranted. Dispositional flow was indicated by eight of the nine DFS-2 subscale scores. Upon review of the modification indices, DFS 8 (time) of the DFS-2 was revealed to have a poor factor loading and was removed from the model. The removal of this subscale has also been supported by other research and was further supported by better overall fit of the model. Conscientiousness was indicated by the conscientiousness subscale of the NEO-PI-R composed of the twelve facets established through the initial EFA results.

Factor loadings and standard errors for these models can be found in Table 15; all factor loadings were statistically significant and of good size (i.e., greater than .32). The EFA results revealed a three-factor solution. Factor 1 consisted of the eight remaining DFS-2 subscales composing a single factor that represented dispositional flow. Factors 2 and 3 consisted of the conscientiousness facets. Factor 2 was composed of the six facets of extraversion that were reverse-scored. These facets included: competence reverse-scored, order reverse-scored, dutifulness reverse-scored, achievement striving reverse-scored, self-discipline reverse-scored, and deliberation reverse-scored. Factor 3 was composed of the six facets of conscientiousness that were not reverse-scored: competence, order, dutifulness, achievement striving, self-discipline, and deliberation.

Model fit statistics for these models, including chi-square tests, RMSEA, CFI, TLI, and SRMR, can also be found in Table 15. The chi-square test revealed significant results; however, this is likely due to the complexity of the model rather than an indicator of poor fit



of the model. This was supported by model fit indices that indicated good fit of the overall model. Good fit was indicated by the model fit indices: CFI = .925, RMSEA = .079, and SRMR = .033. The overall model yielded results that supported a good fit of the model, was theoretically grounded, and provided the best explanation as to the possible relationship between dispositional flow and conscientiousness.

In addition to the EFA results, a bivariate correlation of the scale scores revealed a moderate to strong positive relationship between dispositional flow and conscientiousness ( $r = .345, p < .0001$ ). The factor correlations provided by the EFA results also provided support to the overall correlation as dispositional flow (Factor 1) was found to have a strong positive relationship with conscientiousness-reversed (Factor 2) ( $r = .568, p < .05$ ). This correlation may be explained that many of the attributes that are associated with conscientious individuals are also associated with positive flow experiences such as active problem-solving, positive affect, and motivation.

These correlations support Hypothesis 2 that hypothesized dispositional flow and conscientiousness would have a positive relationship with one another. This is also theoretically supported as several traits that are associated with dispositional flow are also associated with conscientiousness such as problem solving, positive affect, and intrinsic motivation and support the notion that the two traits would be positively related to one another.

Table 15

*Final EFA Factor Loadings, Standard Errors, & Model Fit Indices – DFS & C, N = 409*

Chi-square value	468.763		
Chi-square p value	<.0001		
RMSEA	0.079		
CFI	0.925		
TLI	0.893		
SRMR	0.033		
Factor Loadings	1	2	3
DFS 1 – Balance	<b>0.758*</b>	0.074	0.078
DFS 2 – Merging	<b>0.682*</b>	-0.302*	-0.092
DFS 3 – Goals	<b>0.802*</b>	0.034	0.072
DFS 4 – Feedback	<b>0.727*</b>	-0.016	0.085
DFS 5 – Concentration	<b>0.698*</b>	-0.158*	0.007
DFS 6 – Control	<b>0.798*</b>	0.024	0.002
DFS 7 – Consciousness	<b>0.425*</b>	-0.436*	-0.094
DFS 9 – Autotelic	<b>0.707*</b>	-0.116*	0.072
NEO C1 - Competence RS	0.125*	<b>0.778*</b>	-0.021
NEO C2 - Competence	0.170*	-0.048	<b>0.633*</b>
NEO C3 - Order	0.143*	-0.098*	<b>0.434*</b>
NEO C4 - Order RS	-0.112*	<b>0.802*</b>	-0.024
NEO C5 - Dutifulness RS	0.004	<b>0.716*</b>	0.068
NEO C6 - Dutifulness	0.028	0.017	<b>0.806*</b>
NEO C7 - Achievement	0.223*	0.007	<b>0.636*</b>
NEO C8 - Achievement RS	-0.017	<b>0.709*</b>	-0.143*
NEO C9 - Self-Discipline TS	0.033	<b>0.824*</b>	0.031
NEO C10 - Self-Discipline	0.269*	0.033	<b>0.533*</b>
NEO C11 – Deliberation	-0.022	-0.143*	<b>0.727*</b>
NEO C11 – Deliberation RS	0.015	<b>0.547*</b>	-0.100
Estimated Residual Variables			
DFS 1 – Balance	0.344		
DFS 2 – Merging	0.514		
DFS 3 – Goals	0.283		
DFS 4 – Feedback	0.394		
DFS 5 – Concentration	0.486		
DFS 6 – Control	0.360		
DFS 7 – Consciousness	0.673		
DFS 9 – Autotelic	0.426		
NEO C1 - Competence RS	0.378		
NEO C2 - Competence	0.447		
NEO C3 - Order	0.711		
NEO C4 - Order RS	0.343		

(table continues)

Estimated Residual Variables			
NEO C5 - Dutifulness RS	0.483		
NEO C6 - Dutifulness	0.324		
NEO C7 - Achievement	0.385		
NEO C8 - Achievement RS	0.473		
NEO C9 - Self-Discipline TS	0.317		
NEO C10 - Self-Discipline	0.480		
NEO C11 – Deliberation	0.469		
NEO C11 – Deliberation RS	0.692		
Factor Correlations	1	2	3
2	0.018		
3	0.568*	-0.001	

*Note.* Items loading on each individual factor are in boldface. DFS-2 = Dispositional Flow Scale – 2; NEO-PI-R = NEO – Personality Inventory – Revised; C = Conscientiousness; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index; TLI = Tucker Lewis Index; SRMR = Standardized Root Mean Square Residual; RS = Reverse-Scored.

\* $p < .05$ .

### **Relationships between DFS-2 Subscales & NEO-PI-R Facets**

The current study sought to explore the possible relationship between the nine dimensions of flow and the NEO-PI-R facets. The CFA results failed to provide adequate fit of the overall model; therefore, an EFA model with all nine dimensions of flow and each of the NEO-PI-R domains and their 12 facets was conducted. This model converged, but fit statistics for the model only indicated adequate fit. Additionally, the model yielded a 22-factor solution that was not theoretically supported. Due to the lack of theoretical support for this model, it was determined the individual EFA models conducted between the nine dimensions of flow and each of the individual NEO-PI-R domains and their facets would provide the best explanation as to the relationships between the flow and each of the five domains with their facets. These relationships have been previously explained and revealed that the relationships between the nine dimensions of flow and the NEO-PI-R facets are

complex and multidimensional. In addition to the individual EFA models, correlations were conducted between the nine dimensions of flow (e.g., nine subscales of the DFS-2) and the NEO-PI-R facets (e.g., 60 facets found by this study). A full list of these correlations can be found in Table 16.

Table 16

*Correlations of Parcels – DFS-2 & NEO-PI-R, N = 409*

Facet	Balance	Merging	Goals	Feedback	Concentration	Control	Consciousness	Time	Autotelic
N1 - Anxiety RS	-.337**	-.324**	-.269**	-.300**	-.367**	-.351**	-.439**	-.204**	-.333**
N2 - Anxiety	-.043	.068	-.148**	-.135**	-.041	-.165**	.057	.350**	-.066
N3 - Angry Hostility	-.049	.205**	-.057	-.030	.154**	-.031	.251**	.455**	.008
N4 - Angry Hostility RS	-.119*	-.184**	-.123*	-.164**	-.145**	-.126*	-.331**	-.183**	-.100*
N5 - Depression RS	-.181**	-.229**	-.196**	-.206**	-.209**	-.203**	-.316**	-.163**	-.231**
N6 - Depression	-.119*	.177**	-.143**	-.133**	.067	-.145**	.188**	.494**	-.016
N7 - Self-Consciousness	.066	.195**	-.006	-.060	.084	-.044	.106*	.407**	.058
N8 - Self-Conscious RS	-.311**	-.226**	-.190**	-.229**	-.219**	-.215**	-.421**	-.262**	-.317**
N9 - Impulsiveness	.041	.252**	.022	.048	.157**	.066	.196**	.409**	.109*
N10 - Impulsiveness RS	-.117*	-.253**	-.127**	-.209**	-.338**	-.221**	-.382**	-.387**	-.202**
N11 - Vulnerability	-.126*	.193**	-.116*	-.075	.065	-.126*	.195**	.479**	-.022
N12 - Vulnerability RS	-.517**	-.373**	-.502**	-.460**	-.367**	-.500**	-.224**	-.089	-.454**
E1 - Warmth	.439**	.342**	.477**	.416**	.270**	.389**	.113*	.114*	.483**
E2 - Warmth RS	.072	-.148**	.094	.031	-.166**	.081	-.288**	-.381**	.014
E3 - Gregariousness RS	-.001	-.218**	-.014	-.037	-.267**	-.005	-.292**	-.413**	-.036
E4 - Gregariousness	.143**	.275**	.234**	.201**	.265**	.236**	.203**	.348**	.326**
E5 - Assertiveness	.264**	.363**	.331**	.292**	.253**	.310**	.317**	.327**	.344**
E6 - Assertiveness RS	.022	-.166**	-.010	-.020	-.169**	.038	-.227**	-.441**	-.061
E7 - Activity RS	-.046	-.288**	-.034	-.049	-.161**	-.034	-.296**	-.341**	-.115*
E8 - Activity	.316**	.399**	.333**	.322**	.299**	.292**	.306**	.427**	.433**
E9 - Excitement-Seeking	.247**	.299**	.244**	.244**	.247**	.266**	.255**	.400**	.389**
E10 - Excitement RS	.008	-.125*	.011	-.036	-.100*	.018	-.213**	-.147**	.054
E11 - Pos Emotions RS	.070	-.178**	.073	.014	-.182**	.045	-.294**	-.370**	.037

(table continues)

Facet	Balance	Merging	Goals	Feedback	Concentration	Control	Consciousness	Time	Autotelic
E12 - Positive Emotions	.382**	.290**	.458**	.356**	.273**	.364**	.153**	.148**	.440**
O1 - Fantasy	.238**	.323**	.271**	.258**	.195**	.236**	.220**	.302**	.347**
O2 - Fantasy RS	-.125*	-.296**	-.257**	-.213**	-.412**	-.207**	-.346**	-.353**	-.213**
O3 - Aesthetics RS	-.031	-.278**	.001	-.065	-.187**	-.011	-.342**	-.389**	-.083
O4 - Aesthetics	.336**	.299**	.348**	.285**	.267**	.268**	.239**	.275**	.381**
O5 - Feelings RS	.023	-.241**	-.040	-.109*	-.304**	-.111*	-.305**	-.402**	-.114*
O6 - Feelings	.261**	.198**	.301**	.231**	.173**	.198**	.162**	.198**	.306**
O7 - Actions	.323**	.305**	.368**	.342**	.266**	.305**	.206**	.195**	.409**
O8 - Actions RS	-.242**	-.316**	-.285**	-.290**	-.300**	-.226**	-.132**	-.259**	-.239**
O9 - Ideas	.432**	.256**	.428**	.369**	.253**	.356**	.196**	.177**	.443**
O10 - Ideas RS	-.019	-.279**	-.028	-.115*	-.287**	-.103*	-.239**	-.325**	-.138**
O11 - Values RS	-.010	-.268**	-.141**	-.168**	-.366**	-.170**	-.359**	-.468**	-.210**
O12 - Values	.363**	.245**	.287**	.265**	.152**	.258**	.097	.124*	.320**
A1 - Trust RS	-.012	-.225**	-.037	-.053	-.225**	-.028	-.206**	-.434**	-.106*
A2 - Trust	.308**	.297**	.361**	.369**	.278**	.358**	.253**	.166**	.398**
A3 - Straightforwardness	.202**	.255**	.204**	.166**	.247**	.150**	.227**	.239**	.227**
A4 - Straightforward RS	-.073	-.250**	-.058	-.099*	-.165**	-.056	-.326**	-.457**	-.177**
A5 - Altruism RS	.084	-.217**	.050	-.029	-.228**	-.006	-.389**	-.431**	-.066
A6 - Altruism	.394**	.249**	.410**	.378**	.279**	.368**	.078	.085	.407**
A7 - Compliance RS	-.060	-.271**	-.089	-.129**	-.205**	-.126*	-.377**	-.440**	-.155**
A8 - Compliance	.111*	.295**	.207**	.225**	.244**	.178**	.291**	.304**	.234**
A9 - Modesty RS	-.296**	-.387**	-.352**	-.327**	-.418**	-.311**	-.330**	-.376**	-.400**
A10 - Modesty	.333**	.270**	.240**	.207**	.211**	.232**	.257**	.223**	.295**
A11 - Tender-Minded	.316**	.238**	.320**	.311**	.229**	.277**	.140**	.189**	.330**
A12 - Tender-Minded RS	-.004	-.217**	-.037	-.116*	-.173**	-.059	-.330**	-.318**	-.109*
C1 - Competence RS	.204**	-.137**	.134**	.067	-.108*	.109*	-.300**	-.449**	.036
C2 - Competence	.458**	.316**	.480**	.450**	.373**	.430**	.184**	.122*	.414**

(table continues)

Facet	Balance	Merging	Goals	Feedback	Concentration	Control	Consciousness	Time	Autotelic
C3 - Order	.330**	.332**	.304**	.332**	.322**	.311**	.115*	.266**	.307**
C4 - Order RS	-.066	-.283**	-.089	-.090	-.149**	-.057	-.374**	-.430**	-.207**
C5 - Dutifulness RS	.124*	-.176**	.084	.048	-.135**	.045	-.352**	-.370**	-.023
C6 - Dutifulness	.422**	.250**	.431**	.413**	.334**	.413**	.160**	.114*	.413**
C7 - Achievement	.493**	.285**	.560**	.514**	.386**	.462**	.171**	.100*	.467**
C8 - Achievement RS	.019	-.274**	-.039	-.126*	-.210**	-.053	-.311**	-.420**	-.165**
C9 - Self-Discipline RS	.088	-.234**	.071	.041	-.023	.095	-.308**	-.482**	-.060
C10 - Self-Discipline	.520**	.343**	.496**	.450**	.404**	.440**	.164**	.142**	.435**
C11 - Deliberation	.348**	.233**	.367**	.327**	.347**	.291**	.140**	.194**	.344**
C12 - Deliberation RS	-.044	-.175**	.017	-.056	-.035	-.010	-.220**	-.315**	-.111*

*Note.* NEO-PI-R = NEO – Personality Inventory – Revised; N = Neuroticism; E = Extraversion; O = Openness to Experience; A = Agreeableness; C = Conscientiousness; RS = Reverse-Scored.

\* $p < .05$ . \*\* $p < .01$ .

## **Conclusions**

Overall these results provide evidence that supports the study hypotheses and provides insight into the research questions. It was supported that dispositional flow and neuroticism have a negative relationship with one another indicating that those individuals high in neurotic traits may have more difficulty experiencing flow. It was revealed that dispositional flow and extraversion have a positive relationship so that those individuals who embody the traits of extraversion may more easily engage in flow. Although these results did provide some mixed evidence in regards to dispositional flow and openness to experience, there is enough evidence to support a positive relationship between the two constructs, indicating that those who are open to experience may also be more likely to enter into a state of flow. The results did not provide conclusive evidence as to whether a relationship exists between dispositional flow and agreeableness. However, these results may suggest that dispositional flow and conscientiousness have a positive relationship indicating those high in conscientious traits may be more likely to experience flow.

Although the results supported the study hypotheses and provided insight into the research questions, the empirical data demanded alterations to the theoretical models. A probable measurement artifact appeared for the NEO-PI-R resulting in the domains being split into two facets per subscale, divided by those items that were reverse-scored versus those that were not reverse-scored rather than a single facet per subscale. Additionally, some models required removal of subscales to achieve model fit. DFS 8 (time) of the DFS-2 was revealed to be the most problematic and was removed from four of the five models. This indicated that it may be difficult to measure time when assessing flow as a dispositional



trait rather than state. Despite these alterations, these results still provide evidence into the relationships between dispositional flow and the five domains of the FFM.

## CHAPTER 5

### DISCUSSION

The purpose of the present study was to expand upon the investigation of the concept of flow in different contexts. The theory of flow has emerged as an area of study in a many of fields such sports, assessment, gaming, academics, and motivation; however, few studies have been conducted exploring the relationships between flow and other dispositional traits such as personality. An analysis of these relationships may lead to insight into the autotelic personality and which individuals may have a greater or decreased disposition to experience flow. Thus the aim of the present study expanded upon the beginning research in this area. Specifically, the present study sought to examine the relationships that exist between dispositional flow and different personality characteristics utilizing the FFM by expanding upon studies by Ullén and colleagues' (2012) and Ross and Keiser (2014).

Additionally, the present study attempted to improve upon the limitations that were presented by Ullén and colleagues' (2012) study and Ross and Keiser's (2014) study. The current study attempted to provide a more adequate sample size and heterogeneous sample. Ullén et al.'s study utilized a predominantly collegiate sample consisting of 137 students with an average age of 25.6 years. Ross and Keiser also utilized a predominantly collegiate sample consisting of 316 students with an average age of 19.9 years. Research into the FFM across the lifespan indicate that changes in scores for the FFM domains and facets occur. Specifically this research states that as individuals' age, their scores for neuroticism tend to

decrease while their scores for agreeableness and conscientiousness tend to increase (Soto, John, Gosling, & Potter, 2011). The present sample consisted of 409 individuals with an average age of 33.69 years spanning a wide variety of careers. Although the present study did not provide a sample that spanned across the lifespan, it did improve upon Ullén and colleagues' (2012) and Ross and Kieser's (2014) studies which were limited to a collegiate, young adult population.

Another limitation the present study attempted to improve upon was the measurement issues in Ullén and colleagues' research. Specifically, the present study utilized the DFS-2, which has been found to be an established, reliable, and valid measure of dispositional flow rather than the newly developed measure of flow utilized by Ullén and colleagues. In addition, Ullén et al. utilized the NEO-PI-R Swedish version while the current study utilized the NEO-PI-R in its original form with an English-speaking population. The NEO-PI-R Swedish version has been shown to have some validity evidence (Westerlund & Hansen, 2009); however, this evidence is not as strong as the validity evidence of the original NEO-PI-R written in English. Current reviews of the NEO-PI-R in *Tests in Print Mental Measurement Yearbook* suggest that translations of the original NEO-PI-R should be interpreted with caution (Juni, 1995).

Another limitation of Ross and Keiser's (2014) study was they failed to verify the unidimensionality of the DFS-2 subscales and the NEO-PI-R domains and facets, but rather assumed that measured a unidimensional construct. The present study improved upon this limitation by verifying the unidimensionality of each construct and making adjustments as was needed (e.g., the NEO-PI-R domains fitting as 12 facets rather than 6 facets). Additionally, the present study improved upon Ross and Keiser's by utilizing factor analysis

rather than multiple regression and canonical correlation analyses (CCA). This allowed for more statistically powerful analyses as latent factors were utilized which account for measurement error and the facet scores were utilized rather than the domain scores which provided more information and precision. With these adjustments, the present study attempted to improve on the original study by Ullén and colleagues (2012) and Ross and Keiser (2014).

In addition to improving upon the limitations of the studies by Ullén and colleagues (2012) and Ross and Keiser (2014), the present study sought to provide evidence for the validity of each of the measures utilized by examining their factor structures. The EFA analyses provided evidence that supported the previous factor structure found for the DFS-2 as a nine-factor model of dispositional flow. This supported the notion that dispositional flow is a multidimensional construct.

The present study failed to provide evidence that supported the previous factor structure for the NEO-PI-R as a five domain model supported by six facets per domain. Instead, the current study provided evidence that supported a factor structure for the NEO-PI-R as a five domain model supported by twelve facets per domain, created by the measurement artifact of reverse-scoring. Instead of each of the six facets being unidimensional, it was found that they were divided between the items that were reverse-scored and those that were not reverse-scored.

In the case of social desirability, such a pattern may arise as a way of appearing more favorable on the measure. This was observed on the NEO-PI-R by reviewing the Acquiescence validity check. The Acquiescence validity check indicates if respondents agreed to 150 or more of the 240 items on the NEO-PI-R; if this is found, the results should

be interpreted with caution as a strong acquiescence bias may have influenced the results (McCrae & Costa, 2010). In the current sample, 100 of the 409 cases were found to have responded in a manner that was consistent with an acquiescence bias. When these respondents were removed from the sample, no changes in results or improvement of model fit were found; however, these respondents may have hindered the ability of the present study to confirm the previous factor structure. In the case of survey length, respondents may have responded in that manner simply to complete the measure as quickly as possible. Although the present study failed to provide evidence that supported the original factor structure of the NEO-PI-R, it did provide evidence that supported personality is indeed a multidimensional construct.

### **Hypotheses**

The hypotheses of the current study sought to explore the relationships between dispositional flow and neuroticism, conscientiousness, and openness to experience. In order to establish models with acceptable global fit to explore these relationships, the models had to be modified from theoretical expectations. Specifics of these modifications were outlined in Chapter 4. Modifications to the models were supported by the data and review of the content of the measurements.

#### **Hypothesis 1**

It was hypothesized dispositional flow and neuroticism would have a negative or inverse relationship based on prior research. Both Ullén and colleagues (2012) and Ross and Keiser (2014) found support for this relationship. This relationship is further supported by theory. Neuroticism is often defined by the experience of negative affect and thus it may interfere with an individuals' ability to experience flow. Many traits associated with

neuroticism have been found to hinder one's ability to experience flow such as anxiety, self-consciousness, and depression (Ullén et al., 2012). Neurotic individuals also have difficulty controlling their behaviors. The lack of control prevents these individuals from being able to perform at an optimal level that is necessary when entering into a state of flow to achieve the challenge-skill balance (Ullén et al., 2012; McCrae & John, 1990; McCrae & Costa, 1987). The current study found results that support the negative relationship between dispositional flow and neuroticism.

The EFA results supported a three-factor solution in which dispositional flow loaded on Factor 1 and neuroticism loaded on Factors 2 and 3, with reverse-scored items loading on a single factor (Factor 3). These results supported the latent constructs of both dispositional flow and neuroticism and their potential relationship. Correlation results were utilized to further explore this relationship and revealed an overall significant negative correlation between dispositional flow and neuroticism ( $r = -.214, p < .0001$ ). Further exploration of correlational results from the EFA revealed a strong negative correlation between dispositional flow (Factor 1) and the reverse-scored items on the neuroticism facets (Factor 3) ( $r = -.519, p < .05$ ). These statistical results partially support Hypothesis 1 and provide evidence that dispositional flow and neuroticism have a strong inverse relationship with one another. Based on this evidence, the present study indicates that individuals higher in their level of neuroticism may have a lower disposition to experience flow while those lower in their level of neuroticism may have a greater disposition to experience flow.

## **Hypothesis 2**

It was hypothesized dispositional flow and conscientiousness would have a positive relationship based on prior research. As with neuroticism, both Ullén and colleagues (2012)

and Ross and Keiser (2014) found support for this relationship. This relationship is further supported by theory. Conscientiousness is a factor that directs individuals' behaviors and reduces impulsivity, a hindrance to individuals' ability to experience flow. Hard work, ambition, energy, and perseverance are all characteristics that conscientiousness individuals embody. These characteristics are also seen in individuals who possess an autotelic personality and are able to easily enter into a state of flow (Csikszentmihalyi, 1990; McCrae & Costa, 1987). Based on the current body of research and theory, support has been found for the positive relationship between flow and conscientiousness. The current study adds to this body of research as results found support for the positive relationship between dispositional flow and conscientiousness.

The EFA results supported a three-factor solution in which dispositional flow loaded on Factor 1 and conscientiousness loaded on Factors 2 and 3, with reverse-scored items loading on a single factor (Factor 2). These results supported the latent constructs of both dispositional flow and conscientiousness and their potential relationship. Correlation results were utilized to further explore this relationship and revealed an overall significant positive correlation between dispositional flow and conscientiousness ( $r = .345, p < .0001$ ). Further exploration of correlational results from the EFA revealed a strong correlation between dispositional flow (Factor 1) and the items that were not reverse-scored on the conscientiousness facets (Factor 3) ( $r = .568, p < .05$ ). These statistical results support Hypothesis 2 and provide evidence that dispositional flow and conscientiousness have a strong positive relationship with one another. Based on this evidence, the present study indicates that individuals higher in their level of conscientiousness may have a higher

disposition to experience flow while those lower in their level of conscientiousness may have a lower disposition to experience flow.

### **Hypothesis 3**

It was hypothesized dispositional flow and openness to experience would have a positive relationship based on theoretical support. Although the current body of research into flow and personality have not found evidence for a relationship between these two constructs, the theoretical evidence provides support for a proposed relationship. Many of the traits associated with dispositional flow are also found in individuals who embody openness as a personality characteristic. These traits include creativity, intrinsic motivation, and rational and constructive problem-solving. Each of these traits are associated with individuals who possess an autotelic personality and are able to easily enter into a state of flow; as well as, individuals who embody an openness personality characteristic (Manzano, Harmat, Theorell, & Ullén, 2010; Komarraju, Karau, & Schneck, 2009; Lee, 2005; Csikszentmihalyi, 1990). The current study found results that partially support the positive relationship between dispositional flow and openness to experience.

The EFA results supported a four-factor solution in which dispositional flow loaded on Factors 1 and 4, with the subscales consciousness and time loading on one factor (Factor 4) and the other subscales loading on the remaining factor (Factor 1). Openness to experience loaded on Factors 2 and 3, with reverse-scored items loading on a single factor (Factor 2). These results supported the latent constructs of both dispositional flow and openness to experience and their potential relationship. Correlation results were utilized to further explore this relationship and revealed significant correlations between dispositional flow and openness. Further exploration of correlational results from the EFA revealed the



following findings: a weak negative correlation between dispositional flow (Factor 1) and the items that were reverse-scored on the openness facets (Factor 2) ( $r = -.146, p < .05$ ), a moderate positive correlation between dispositional flow Factor 1 and the items that were not reverse-scored on the openness facets (Factor 3) ( $r = .486, p < .05$ ), a moderate negative correlation between dispositional flow Factor 4 and the items that were reverse-scored on the openness facets (Factor 2) ( $r = -.404, p < .05$ ), and a weak positive correlation between dispositional flow Factor 4 and the items that were not reverse-scored on the openness facets (Factor 3) ( $r = .253, p < .05$ ).

These statistical results provide partial support for Hypothesis 3 and evidence that dispositional flow and openness to experience have a relationship with one another. Overall the results indicate that individuals higher in their level of openness to experience may have a higher disposition to experience flow, while those lower in their level of openness to experience may have a lower disposition to experience flow. Additionally, the results also suggest that the way in which dispositional flow and openness to experience are conceptualized through the use of subscales may impact the magnitude and direction of the relationship between the two constructs.

### **Research Questions**

The research questions of the current study sought to explore the relationships between dispositional flow and extraversion and agreeableness. Additionally, the relationship between the NEO-PI-R facets of each of the five domains and the nine dimensions of flow was explored. In order to establish models with acceptable global fit to explore these relationships, the models had to be modified from theoretical expectations.

Specifics of these modifications were outlined in Chapter 4. Modifications to the models were supported by the data and review of the content of the measurements.

### **Research Question 1**

The potential relationship between dispositional flow and extraversion was explored in the current study. Ross and Keiser (2014) found evidence to support a positive relationship between dispositional flow and extraversion; however, evidence remains limited on this relationship. The potential relationship between dispositional flow and extraversion is also supported theory. Extraversion is often described as the opposite of neuroticism as it is associated with positive affect rather than negative affect (Fritz & Avsec, 2007; McCrae & John, 1990). Flow is a positive emotional experience and embodies many of the characteristics of extraversion such as assertiveness and sensation-seeking that may assist with individuals entering into a state of flow (Marrero et al., 2011; McCrae & Costa, 1987). The current study found results that support the positive relationship between dispositional flow and extraversion.

The EFA results supported a three-factor solution in which dispositional flow loaded on Factor 1 and extraversion loaded on Factors 2 and 3, with reverse-scored items loading on a single factor (Factor 3). These results supported the latent constructs of both dispositional flow and extraversion and their potential relationship. Correlation results were utilized to further explore this relationship and revealed an overall moderate positive correlation between dispositional flow and extraversion ( $r = .380, p < .0001$ ). Further exploration of correlational results from the EFA revealed a strong correlation between dispositional flow (Factor 1) and the items that were not reverse-scored on the extraversion facets (Factor 2) ( $r = .525, p < .05$ ), as well as a weak to moderate correlation between

dispositional flow (Factor 1) and the items that were reverse-scored on the extraversion facets (Factor 3) ( $r = .265, p < .05$ ).

These statistical results suggest that dispositional flow and extraversion have a positive relationship with one another. As previously stated, this relationship is also theoretically supported as both dispositional flow and extraversion are based on positive emotional experiences. In addition to positive emotional experiences, these constructs also share other traits such as positive affect, confidence, assertiveness, enjoyment, and sensation-seeking; these attributes lend to the idea these constructs would have a positive relationship with one another. Based on this evidence, the present study indicates that individuals higher in their level of extraversion may have a higher disposition to experience flow while those lower in their level of extraversion may have a lower disposition to experience flow.

## **Research Question 2**

The potential relationship between dispositional flow and agreeableness was explored in the current study. Ross and Keiser (2014) found limited evidence to support a negative relationship between dispositional flow and agreeableness, and evidence remains limited on this relationship in the body of research. The potential relationship between dispositional flow and agreeableness also has limited theoretical support. The possible support for a relationship between dispositional flow and agreeableness resides in the literature on amotivation as both have been found to have a negative relationship with amotivation (Komarraju, Karau, & Schmeck, 2009; Fullagar & Mills, 2008). Additionally, characteristics of agreeableness may assist in achieving some dimensions of flow such as unambiguous feedback and loss of self-consciousness; however, limited research is available

to support this possible finding. The current study found limited evidence to support a relationship between dispositional flow and agreeableness.

The EFA results supported a three-factor solution in which dispositional flow loaded on Factor 1 and agreeableness loaded on Factors 2 and 3, with reverse-scored items loading on a single factor. These results supported the latent constructs of both dispositional flow and agreeableness and their potential relationship. Correlation results were utilized to further explore this relationship and revealed a significant positive correlation between dispositional flow and agreeableness ( $r = .104, p = .036$ ). More specifically, the EFA results revealed a strong correlation between dispositional flow (Factor 1) and the items that were not reverse-scored on the extraversion facets (Factor 3) ( $r = .512, p < .05.$ ); however, did not provide a significant correlation between dispositional flow (Factor 1) and the items that were reverse-scored (Factor 2). These statistical results provide limited evidence for the potential relationship between dispositional flow and agreeableness. This is also theoretically supported as limited theoretical evidence exists to support a relationship between these two constructs.

### **Research Question 3**

The potential relationships between the dimensions of flow and the NEO-PI-R facets were explored in the current study. Ross and Keiser (2014) explored which dimensions of flow were related to the NEO-PI-R domains; however, did not research which dimensions of flow were related to the NEO-PI-R facets. Their findings found that the flow dimensions of clear goals had a relationship with the NEO-PI-R domains of neuroticism, conscientiousness and agreeableness indicating the importance of a clear direction in the flow experience. Additionally, they found the flow dimensions of loss of self-consciousness, clear goals, and

autotelic experience were related to the NEO-PI-R domains of extraversion and conscientiousness. Further, they discovered the flow dimensions of autotelic experience, merging of action and awareness, and concentration had a relationship with the NEO-PI-R domains of extraversion and conscientiousness indicating the importance of effortless involvement in the flow experience. Finally, they found the flow dimensions of time transformation, unambiguous feedback, challenge-skill balance, and autotelic experience had a relationships with the NEO-PI-R domains of openness and agreeableness indicating the idea of absorption into the flow experience. Although these findings begin to provide insight into the relationships between the specific components of flow and the NEO-PI-R domains, further insight is needed into the dimensions of flow and the NEO-PI-R facets to continue to break-down the relationships (Ross & Keiser, 2014).

As the overall model provided by the EFA results provided a solution that was unacceptable, it was determined the individual EFA models conducted between the dimensions of flow and each of the NEO-PI-R domains and their facets would provide the best explanations as to the relationships between these factors. In addition to the individual EFA models, correlations were conducted between the dimensions of flow (e.g., nine subscales of the DFS-2) and the NEO-PI-R facets (e.g., 60 facets found by this study). These results reveal multiple correlations between the nine dimensions of flow and the NEO-PI-R facets and mirror the relationships found by the EFA models and Ross and Keiser (2014). Overall, the exploration of the relationships between the nine dimensions of flow and the NEO-PI-R facets reveal that these constructs are indeed inter-related and provide a multi-faceted approach to understanding flow and personality. These results also indicated that further analysis into these relationships is warranted through additional

statistical means such as latent construct analysis or cluster analysis to further break-down these relationship.

### **Limitations of the Present Study**

Though the present study provides significant findings, there are limitations that must be considered. One limitation surrounds the use of sampling utilized in the study. The study employed the use of convenience sampling; this sampling method does not allow for bias to be ruled out as a threat to internal validity. Although this method allowed for the necessary sample size to be obtained, it may not have produced a sample that was diverse enough in nature. The sample may also have limited generalizability. Although the present study improved on the sampling limitations detailed by Ullén and colleagues (2012) and Ross and Kieser (2014), it is still limited its ability to generalize to the general population. The majority of the current sample were females of an average age of 33.69 identifying as Asian with a bachelor's degree level education. With this limited scope, it is difficult to generalize the results beyond the sample population of the current study. Additionally, it is possible that the current sample may include individuals from across the globe due to the recruiting on listservs and use of Amazon's Mturk. As no identifying information was collected, it is impossible to determine the locations of participants. The limited knowledge of the potential global sample also limits the generalizability of the current findings to other contexts. Another limitation is mono-method bias, which may inflate the correlations. Future studies may benefit from utilizing multiple methods to measure the same construct in an attempt to ensure the construct is being measured accurately and statistical results are not inflated.

In addition to the convenience sampling and limited generalizability of the sample, the present sample was also drawn from multiple online sources. Some participants were recruited through listserv recruitment methods, others were recruited through the use of the Psychology Department's internal research recruiting system PsychPool, and finally others were recruited through Amazon's Mechanical Turk online labor market (Mturk). Participants were also rewarded in different ways for their participation. Those participating through online recruitment methods were given the option of entering a raffle for a \$25 gift card to Amazon.com, others recruited through PsychPool were awarded credit that they were able to utilize in earning extra credit in their psychology courses, and those recruited through Mturk were monetarily compensated for their time. It may be possible that utilizing different methods of recruitment and rewards introduced extraneous variables in the study. For example, recruiting participants through Mtruk created a large Asian sample that was not an original intent of the current study. It is also unknown if one method of reward was found to be more rewarding than another as each reward was linked to a specific recruitment method. Additionally, the multiple methods of recruitment and reward may have created further extraneous variables that have impacted the findings. Future studies may benefit from utilizing only one recruitment and reward method.

Another limitation may be the possible presence of pattern response in the data. Although participants were instructed to give honest responses, it is possible their responses were directed towards a socially-acceptable or desirable response and/or the response they believed the researcher was seeking. For example, participants may have attempted to answer the DFS-2 in a way that presented them to possess the disposition to experience flow more easily, or the NEO-PI-R in a way that presented them to possess a favorable

personality trait such as openness or conscientiousness. These responses may have been given in order to be socially desirable, or assist the researcher, when in reality their disposition to experience flow or certain personality traits is lower or higher than the measure represented. It is also possible that test fatigue may have influenced participants to respond in this manner as the study survey was lengthy consisting of completing 276 items and demographics information. Due to the possible implications of these response patterns, the results should be interpreted with these in mind.

A possible limitation should also be addressed in regards to the content and construct validity of the NEO-PI-R. The present study did not find evidence to support the original five domains of the FFM with six facets, but rather support for the original five domains with twelve facets. As previously discussed these twelve facets were formed by the measurement artifact created by the reverse-scored items. As this differed from the original validity study of the NEO-PI-R, the validity of using the NEO-PI-R original six facet scores rather than the twelve facet scores found by this study is called into question. Future research should attempt to continue to replicate the results and further establish the content and construct validity of the NEO-PI-R.

Another limitation may be due to the nature in which the questions were phrased and the instructions were given, particularly in regards to the DFS-2. Participants were instructed to answer all measures in regards to their experiences in life rather than in a particular context, such as a sport or testing situation, as the study attempted to measure all constructs as a disposition or trait. Many of the previous studies utilized a specific context in which to measure these constructs rather than utilizing a general approach. In this manner, the measurements may not accurately be reflecting the true construct of flow. It



may be necessary to specify a context for individuals in which to base their answers about their dispositions to experience these constructs, rather than simply leaving the context open to life in general and the participants' experiences in everyday life. This limitation is particularly seen in the DFS 8 (time) subscale of the DFS-2. This subscale was unrelated to all the other DFS-2 subscales, and thus threatens the content validity of the DFS-2. This finding may have been caused by the instructions the participants were given, because they did not specify a certain activity or task. Further research is needed to determine if a context is necessary for these constructs, and in particular, the DFS 8 (time) subscale of the DFS-2.

A final limitation of the study is the lack of model fit found by the CFA results. Although the EFA results provided evidence to support relationships between the constructs of dispositional flow and the FFM personality factors of neuroticism, extraversion, openness, agreeableness, and conscientiousness, the present study failed to support the previous factor structure of the FFM and provide stronger support for the relationships between dispositional flow and the FFM. Further research is needed to support potential CFA results and confirm the factor structure of the FFM and its relationship with dispositional flow.

### **Strengths of the Present Study**

Although there are limitations to the present study, there are also strengths that are unique to this study and provide more credibility to the results. One of these strengths is the use of latent variable modeling. This form of modeling allowed for more accurate estimation of true-score relationships than what is possible with simple bivariate Pearson correlations. Another strength is how the psychometric properties of instrument scores were

handled as they went through a very rigorous and sophisticated treatment process. The use of the WLSMV estimator in Mplus is an additional strength of the study. This estimator allowed the modeling of the ordinal categorical nature of the items used in the DFS-2 and the NEO-PI-R, which has been a limitation to other studies that have explained these constructs such as Ullén and colleagues (2012) and Ross and Keiser (2014).

### **Areas of Future Research**

Despite the above mentioned limitations, the results of the final analyses provide support that the autotelic personality and dispositional flow are strongly related to certain personality factors. Further research should include a more diverse population to allow for greater generalizations to be made within a larger population. Much of the current research with these measures utilizes a collegiate population, and thus other populations and demographics should be explored.

An additional area of further exploration is to investigate if shorter versions of the measurements would yield the same results as the full versions. The current measurements utilize a 36-item measure for dispositional flow and 240-item measure for the FFM. It should be explored if the shortened versions of the DFS-2 and NEO-PI-R provide similar results to the full versions utilized in this study. Shortened versions of the measurements may assist with gaining a larger sample size as more individuals may opt to participate in research more freely or with decreasing a socially-acceptable or neutral response pattern.

Another area of further research is to continue to explore the latent traits of each of these measures. It should be examined if a context is necessary to measure an individual's disposition to experience the constructs of dispositional flow or the FFM personality factors: neuroticism, extraversion, openness, agreeableness, and conscientiousness; or if indeed these

constructs can simply be measured as one's ability in general. Additionally, further exploration is needed to investigate the potential relationships between dispositional flow and other theories of personality. The FFM was chosen for this study as it is a widely studied and validated measure of personality and was also utilized by Ullén and colleagues (2012). Although the FFM has supported research, it is not the only theory of personality and thus other theoretical models should be explored to gain a larger understanding of the relationship the autotelic personality may have with personality factors.

Further research may also benefit from looking at the differences between demographic variables such as gender, age, and ethnicity impact the relationship between dispositional flow and personality. This may be of particular interest to those in a counseling context as it may provide insight into how individuals adapt and function in their environments. This information can be of use in a therapeutic environment and assist the therapist in promoting growth in clients. Finally, further research would benefit from looking deeper into the current data to examine the individual correlations between the DFS-2 subscales and NEO-PI-R domains and facets. A benefit of the current study is that the data highlight the flow can help with various personality characteristics through these correlations and thus further research could provide more insight into these relationships. Latent construct analysis or cluster analysis may assist in examining these relationships as these methods can allow for a profile of personality to be examined in the context of the dimensions of flow.

### **Conclusions**

The present study provides support for continued investigation into the constructs of dispositional flow and the FFM personality factors: neuroticism, extraversion, openness,

agreeableness, and conscientiousness. The fact that a relationship exists strongly suggests that those possessing certain personality characteristics may also be more or less likely to enter into a state of flow. Implications of the current study suggest the DFS-2 may need to specify a particular activity in the directions to obtain a valid measurement, and the NEO-PI-R may be susceptible to certain measurement artifacts. The study continues to provide evidence that dispositional flow is related to certain characteristics of personality; however, further refinement of each measurement for each construct is needed, as well as more specific examination of the details of the relationships between the constructs.

Counseling psychology focuses on assisting personal and interpersonal growth across the life span. It is a discipline that places a strong focus on concerns that encompass emotional, social, vocational, educational, health, and developmental welfare. The exploration of dispositional flow and its relationships with the different personality factors can further build knowledge and assist with promoting growth in both personal and interpersonal areas. Expanding knowledge about individuals' disposition to experiencing flow and their personality characteristics can provide insight into their development of other areas of their welfare such as their emotional, social, vocational, educational, and developmental well-being. These areas of growth and well-being can be utilized within a therapeutic context.

Counseling psychology places an emphasis on brief therapeutic interventions that promote strength and assets of an individual. Counseling psychologists who are educated on an individual's disposition to flow and personality characteristics may be able to utilize this information to facilitate shorter and more effective therapeutic interventions for that individual if they are able to incorporate the flow experience into the therapeutic context.

Counseling psychologists may also be able to promote more growth and well-being in their clients by knowing their disposition to experience flow and personality characteristics by utilizing experience of flow to promote this growth and well-being. This information may allow counseling psychologists to more readily connect with their clients as it may provide a point of connection for the psychologist and client which can increase the strength of the therapeutic bond. Additionally, as these are considered to be fixed traits for individuals, this information can provide insight into how clients may function and cope in their daily lives which can provide vital information to counseling psychologists working with clients through the therapeutic process. Using this insight, counseling psychologists can more easily see areas of growth for the client and potential paths of change.

As previously stated, flow is of particular interest in the study of positive psychology. Positive psychology focuses on the positive aspects of the human experience such as happiness. Csikszentmihalyi (1990) states that flow is an important aspect of achieving happiness in life through control over individuals' inner life. Counseling psychologists can utilize this knowledge in their work with clients. By understanding individuals' disposition to experience flow, counseling psychologists can better help them to gain control over their inner lives and thus increase their happiness with their lives. By understanding the relationship between dispositional flow and personality, counseling psychologists may be able to gain even more insight and knowledge into how individuals can achieve control leading to happiness in their lives as more information is provided about individuals' strengths. Utilizing a strengths-based approach is grounded in positive psychology and a common focus of those in counseling psychology. Continued research into the relationships between dispositional flow and personality characteristics will

continue to provide insight into areas of growth, both personally and interpersonally, for individuals and foster the focus of counseling psychology.

This study sought to provide a synthesis of the available information on dispositional flow, personality characteristics, and the relationships between the two constructs. It is the hope of this researcher that the present study has provided a continued study into these constructs and their relationships. Continued research into the autotelic personality is needed in the current literature and the present study sought to fill a portion of this need by providing insight into which individuals may or may not be likely to possess a disposition to experience flow. The present study provides continued evidence that possessing certain personality characteristics may lead to a greater or lower disposition to experience flow. In this way, insight and knowledge is furthered into the study of dispositional traits and how these traits may promote growth in individuals, both personally and interpersonally.

APPENDIX A

DEMOGRAPHIC FORM

Please select or enter the appropriate response for the following questions:

1. Age: \_\_\_\_\_
2. Gender:
  - a. Male
  - b. Female
  - c. Transgender
3. Race/Ethnicity (check all that apply):
  - a. American Indian or Alaskan Native
  - b. Asian
  - c. Black or African American
  - d. Hispanic or Latino/a
  - e. Native Hawaiian or Pacific Islander
  - f. White
  - g. Other
4. Annual Household Income:
  - a. Under \$14,999
  - b. \$15,000 - \$24,999
  - c. \$25,000 - \$34,999
  - d. \$35,000 - \$49,999
  - e. \$50,000 - \$74,999
  - f. \$75,000 - \$99,999
  - g. Over \$100,000
5. Number of years of school beyond high school: \_\_\_\_\_
6. Highest degree obtained:
  - a. High school diploma or GED
  - b. Associate's degree
  - c. Bachelor's degree
  - d. Master's degree
  - e. Specialist certificate
  - f. Doctorate
  - g. Other
7. Program of study of highest degree: \_\_\_\_\_

## APPENDIX B

### SOLITATION EMAIL FOR LISTSERVS

Hello!

My name is Tricia Hager and I am a doctoral candidate in the Counseling Psychology program at the University of Missouri—Kansas City. You are invited to participate in my dissertation research study which investigates the proposed relationship between psychological constructs of motivation and personality.

To participate in this research, you must be 18 years of age or older. This study should take approximately **30-45 minutes** to finish, and is completely voluntary and confidential. The risk of participation is minimal and you may withdraw at any time during the study without penalty. As an incentive to filling out the questionnaire you will have the option to enter into a raffle drawing for one of four \$25 Amazon.com gift cards.

If you choose to participate in the current study, please click on the following link to read the consent information and complete the study materials:

<https://www.surveymonkey.com/r/HagerDissertationStudy>

Thanks so much!!

Best,

Tricia Hager  
Counseling Psychology Doctoral Candidate  
University of Missouri—Kansas City  
School of Education, Suite 215  
5100 Rockhill Rd. Kansas City, MO 64110  
plhn78@mail.umkc.edu



## APPENDIX C

### SOLICITATION ANNOUNCEMENT FOR PSYCHPOOL

***Study Name:***

Examination of Psychological Constructs of Motivation and Personality

***Abstract:***

This study will examine the relationship between psychological flow and personality characteristics.

***Description:***

This study will involve participants completing a series of measures about psychological flow and personality characteristics. These measures are utilized to better understand these constructs and their relationships with one another. It is estimated that 30 minutes will be needed to complete the questionnaire packet. PsychPool credit will only be granted for those who complete the survey in its entirety.

***Eligibility Requirements:***

UMKC undergraduate or graduate student at least 18 years of age or older

***Duration:***

30 minutes

***Contact Information:***

Tricia Hager

plhn78@mail.umkc.edu

XXX-XXX-XXXX

## APPENDIX D

### SOLICITATION ANNOUNCEMENT FOR MTURK

***Study Name:***

Motivation and Personality Survey

***Description:***

This study will examine the relationship between motivation and personality characteristics by completing a series of measures about motivation and personality characteristics. These measures are utilized to better understand these constructs and their relationships with one another. It is estimated that 30 minutes will be needed to complete the survey.

***Eligibility Requirements:***

Any individual at least 18 years of age or older

***Duration:***

30 minutes

***Contact Information:***

Tricia Hager

plhn78@mail.umkc.edu

## APPENDIX E

### INFORMED CONSENT FOR LISTSERV

Dear Participant,

You are invited to participate in a study that aims to better understand the relationship between psychological flow and personality characteristics. The investigators of this study are Tricia Hager, a doctoral candidate in the Counseling Psychology Program at UMKC, and Jake Marszalek, a faculty member of the Counseling Psychology Program at UMKC. This study has been approved by the campus Social Sciences Internal Review Board. A sample of 300 to 400 participants is being recruited to participate in this study.

You are eligible to participate if you are 18 years of age or older. Participation is completely voluntary. Participation requires approximately 30-45 minutes of time to complete a confidential and anonymous survey consisting of three measures used to look at different aspects of motivation, personality, and their proposed relationship. There will be no identifying information asked of you on any part of the survey so your responses are completely anonymous and confidential. You may choose to discontinue your participation without penalty at any time during the study, even after you have started on the survey. The alternative to participation for this study is not to participate.

As an incentive to filling out the questionnaire you will have the option to enter into a raffle drawing for one of four \$25 Amazon.com gift cards. Interested participants will be directed to a separate survey upon conclusion of the study to enter their name and email address for the raffle drawing. The raffle drawing will be held upon completion of all data collection. Winners will be notified via the email address they provide and emailed their Amazon.com gift cards. After the raffle is held and all winners have been notified, all of the raffle drawing data will be destroyed. There are no direct benefits of participating in this study.

There are no known or anticipated risks associated with this study beyond those normally encountered in everyday life. Attempts have been made to minimize risks by maintaining anonymous and confidential responses and careful selection of the included measures. However, if you experience any concerns or emotional upset as a result of participating in this study, please contact the UMKC Counseling, Health, and Testing Center at 816-235-1635.

Although it is not the University's policy to compensate or provide medical treatment for persons who participate in studies, if you think you have been injured as a result of participating in this study, please call the IRB Administrator of UMKC's Social Sciences Institutional Review Board at 816-235-5927.

While every effort will be made to keep confidential all of the information you complete and share, it cannot be absolutely guaranteed. Individuals from the University of Missouri – Kansas City Institutional Review Board (a committee that reviews and approves research

studies), Research Protection Program, and Federal regulatory agencies may look at the records related to this study for quality improvement and regulatory function.

I sincerely appreciate your consideration and participation in this study. If you have any questions about the study, please e-mail Tricia Hager at [plhn78@mail.umkc.edu](mailto:plhn78@mail.umkc.edu) or contact via phone at XXX-XXX-XXXX.

By completing the questionnaire, you indicate your agreement to participate in the study.

## APPENDIX F

### INFORMED CONSENT FOR PSYCHPOOL

Dear Participant,

You are invited to participate in a study that aims to better understand the relationship between psychological flow and personality characteristics. The investigators of this study are Tricia Hager, a doctoral candidate in the Counseling Psychology Program at UMKC, and Jake Marszalek, a faculty member of the Counseling Psychology Program at UMKC. This study has been approved by the campus Social Sciences Internal Review Board. A sample of 300 to 400 participants is being recruited to participate in this study.

You are eligible to participate if you are 18 years of age or older. Participation is completely voluntary. Participation requires approximately 30-45 minutes of time to complete a confidential and anonymous survey consisting of three measures used to look at different aspects of motivation, personality, and their proposed relationship. There will be no identifying information asked of you on any part of the survey so your responses are completely anonymous and confidential. You may choose to discontinue your participation without penalty at any time during the study, even after you have started on the survey. The alternative to participation for this study is not to participate.

You will receive credit in the PsychPool system once you have fully completed the study measures. Credit will only be awarded if the survey is completed in its entirety. There are no direct benefits of participating in this study.

There are no known or anticipated risks associated with this study beyond those normally encountered in everyday life. Attempts have been made to minimize risks by maintaining anonymous and confidential responses and careful selection of the included measures. However, if you experience any concerns or emotional upset as a result of participating in this study, please contact the UMKC Counseling, Health, and Testing Center at 816-235-1635.

Although it is not the University's policy to compensate or provide medical treatment for persons who participate in studies, if you think you have been injured as a result of participating in this study, please call the IRB Administrator of UMKC's Social Sciences Institutional Review Board at 816-235-5927.

While every effort will be made to keep confidential all of the information you complete and share, it cannot be absolutely guaranteed. Individuals from the University of Missouri – Kansas City Institutional Review Board (a committee that reviews and approves research studies), Research Protection Program, and Federal regulatory agencies may look at the records related to this study for quality improvement and regulatory function.

I sincerely appreciate your consideration and participation in this study. If you have any

questions about the study, please e-mail Tricia Hager at [plhn78@mail.umkc.edu](mailto:plhn78@mail.umkc.edu) or contact via phone at XXX-XXX-XXXX.

By completing the questionnaire, you indicate your agreement to participate in the study.

## APPENDIX G

### INFORMED CONSENT FOR MTURK

Dear Participant,

You are invited to participate in a study that aims to better understand the relationship between psychological flow and personality characteristics. The investigators of this study are Tricia Hager, a doctoral candidate in the Counseling Psychology Program at UMKC, and Jake Marszalek, a faculty member of the Counseling Psychology Program at UMKC. This study has been approved by the campus Social Sciences Internal Review Board. A sample of 300 to 400 participants is being recruited to participate in this study.

You are eligible to participate if you are 18 years of age or older. Participation is completely voluntary. Participation requires approximately 30-45 minutes of time to complete a confidential and anonymous survey consisting of three measures used to look at different aspects of motivation, personality, and their proposed relationship. There will be no identifying information asked of you on any part of the survey so your responses are completely anonymous and confidential. You may choose to discontinue your participation without penalty at any time during the study, even after you have started on the survey. The alternative to participation for this study is not to participate.

As an incentive to filling out the questionnaire you will be offered \$0.40 as compensation for your time and participation to be credited through Amazon's Mechanical Turk. There are no direct benefits of participating in this study.

There are no known or anticipated risks associated with this study beyond those normally encountered in everyday life. Attempts have been made to minimize risks by maintaining confidential responses and careful selection of the included measures. However, if you experience any concerns or emotional upset as a result of participating in this study, please contact the UMKC Counseling, Health, and Testing Center at 816-235-1635.

Although it is not the University's policy to compensate or provide medical treatment for persons who participate in studies, if you think you have been injured as a result of participating in this study, please call the IRB Administrator of UMKC's Social Sciences Institutional Review Board at 816-235-5927.

While every effort will be made to keep confidential all of the information you complete and share, it cannot be absolutely guaranteed. Individuals from the University of Missouri – Kansas City Institutional Review Board (a committee that reviews and approves research studies), Research Protection Program, and Federal regulatory agencies may look at the records related to this study for quality improvement and regulatory function.

I sincerely appreciate your consideration and participation in this study. If you have any questions about the study, please e-mail Tricia Hager at [plhn78@mail.umkc.edu](mailto:plhn78@mail.umkc.edu).

By completing the questionnaire, you indicate your agreement to participate in the study.



## APPENDIX H

### ONLINE RAFFLE FORM

(This page appeared when participants completed the survey)

As a 'thank you' for your participation, you are eligible to enter into a raffle for one of four \$25 Amazon.com gift cards. If you are interested in entering the raffle, please click on the link below to enter your name and email address. This information will not be connected to your responses. Thank you!

**Click here to enter the raffle.** <Link to raffle information page>

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#### **Raffle Information**

Please provide your name and email address in the space provided:

Name: \_\_\_\_\_

Email Address: \_\_\_\_\_

Thank you for your participation!

APPENDIX I

IRB INITIAL APPROVAL LETTER

NOTICE OF EXEMPT DETERMINATION

Principal Investigator: Jacob Marszalek  
School of Education  
Kansas City, 64110

Protocol Number: 14-031  
Protocol Title: Hager Dissertation - Flow and the Five-Factor Model (FFM) of Personality Characteristics  
Type of Review: Administrative Review

Date of Determination: 07/29/2014

Dear Dr. Marszalek,

The above referenced study was reviewed and determined to be exempt from IRB review and approval in accordance with the Federal Regulations 45 CFR Part 46.101(b).

The above referenced study was determined to be exempt in accordance with the Federal Regulations 45 CFR Part 46(b)(2) as follows: "Research involving the use of educational tests (cognitive, diagnostic, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability or reputation".

This determination includes the following documents:

**Attachments**

Hager, Tricia - Dissertation Proposal Approval CITI completion 8-27-13  
Hager, Tricia - Dissertation Proposal (Defense Final) Text\_for\_Listserv\_Emails\_06-19-14  
Curriculum\_Vita-Marszalek\_4-9-2014  
Hager, Tricia--Vita Internship Apps  
NEOPIR\_06-19-14  
Informed\_Consent\_07-03-14  
Dispositional\_Flow\_Scale\_06-19-14  
Demographic\_Questionnaire\_07-03-14  
Hager - CITI Completion Report - 07.29.14

You are required to submit an amendment request for all changes to the study, to prevent withdrawal of the exempt determination for your study. When the study is complete, you are required to submit a Final Report.

Please contact the Research Compliance Office (email: [umkcirb@umkc.edu](mailto:umkcirb@umkc.edu); phone: (816)235-5927) if you have questions or require further information.

Thank you,

Mary Oconnor  
SSIRB

APPENDIX J

IRB AMENDMENT APPROVAL LETTERS

NOTICE OF EXEMPT AMENDMENT

Principal Investigator: Jacob Marszalek  
School of Education  
Kansas City, 64110

Protocol Number: 14-031  
Protocol Title: Hager Dissertation - Flow and the Five-Factor Model (FFM) of Personality  
Characteristics  
Type of Review: Exempt

Date of Determination: 11/17/2014

Dear Dr. Marszalek,

A member of the UMKC Research Compliance Office reviewed the following:

- Additional sites listed for recruitment.
- Consent Mturk 11/3/14
- Consent PsychPool 11/10/14
- Advertisement for Psych. Pool 11/10/4

Your amendment is approved and the study retains its exempt status. As with the initial determination, changes to the study must be promptly reported. When the study is complete, you are required to submit a Final Report.

Please contact the Research Compliance Office (email: [umkcirb@umkc.edu](mailto:umkcirb@umkc.edu); phone: (816)235-5927) if you have questions or require further information.

Thank you,

Simon MacNeill  
UMKC IRB

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NOTICE OF EXEMPT AMENDMENT

Principal Investigator: Jacob Marszalek  
School of Education  
Kansas City, 64110

Protocol Number: 14-031

Protocol Title: Hager Dissertation - Flow and the Five-Factor Model (FFM) of Personality Characteristics  
Type of Review: Exempt

Date of Determination: 11/19/2014

Dear Dr. Marszalek,

A member of the UMKC Research Compliance Office reviewed the following:  
- Tricia Hager new email address updated

Your amendment is approved and the study retains its exempt status. As with the initial determination, changes to the study must be promptly reported. When the study is complete, you are required to submit a Final Report.

Please contact the Research Compliance Office (email: [umkcirb@umkc.edu](mailto:umkcirb@umkc.edu); phone: (816)235-5927) if you have questions or require further information.

Thank you,

Simon MacNeill  
UMKC IRB

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## VITA

Patricia L. Hager was born on September 17, 1985 in Jefferson City, Missouri. She attended public schools throughout her elementary, middle school, and high school education, graduating from Pleasant Hope High School (Pleasant Hope, Missouri) in 2004. Mrs. Hager next completed her Bachelor of Science in Psychology at University of Central Missouri (Warrensburg, Missouri) in 2008, graduating summa cum laude and from The Honors College.

After graduation, Mrs. Hager continued her education at the University of Missouri – Kansas City (Kansas City, Missouri) beginning a Ph.D. program in Counseling Psychology. She was awarded a Masters of Arts in Counseling and Guidance in 2011. After six years of graduate study and one year of internship at Truman Medical Center Inpatient Behavioral Health Units (Kansas City, Missouri), Mrs. Hager will complete her Ph.D. in Counseling Psychology (August 2015).

The next phase of Mrs. Hager's journey leads to accepting a post-doctoral psychologist position at William Jewell College (Liberty, Missouri) in Counseling Services. After completing her post-doctoral hours, Mrs. Hager plans to become a Licensed Psychologist in Missouri.

Mrs. Hager is a member of the American Psychological Association.