2-20-2020

The Influence of Personality and Losses on Search in Decisions From Experience

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THE INFLUENCE OF PERSONALITY AND LOSSES ON SEARCH IN DECISIONS FROM EXPERIENCE

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Psychology

by
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B.A., CUNY Queens College, 2016
May 2020

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ABSTRACT

Research in decision making has focused increasing attention on understanding search behavior without focusing on how individual differences might influence people's search behavior. To increase our understanding of this topic, the present study examined how personality predicted the amount of search an individual engages in before making a risky decision. It was hypothesized that conscientiousness would be a positive predictor of search behavior and would emerge as an even stronger predictor of search behavior when choosing between options with negative outcomes. It was also hypothesized that neuroticism would be a negative predictor of search behavior and that individuals with higher levels of neuroticism would search even less before making a decision that involve losses. The analysis did not support either hypothesis with none of the personality measures being significant predictors of search behavior for either the gain or the loss condition. However, a significant difference was found between the correlation coefficients of neuroticism by decision domain with neuroticism being associated with people searching less in the loss domain when compared to the gain domain, although the correlations themselves were not significant. Suggestions for future research in understanding search behavior are provided to enhance our understanding of individual differences and decision making.

CHAPTER I. INTRODUCTION

When making many important real-life decisions, people and organizations usually have the ability to explore different options before they commit to a choice. Exploring alternatives through information search plays a vital role for both individuals and organizations when it comes to adopting new technologies (Levinthal & March, 1981) and in determining which employees to hire (Barron and Bishop, 1985). For both of these types of decisions, individuals and organizations must rely on their own prior experiences and experiential sampling in the form of testing out different technologies or conducting job interviews to help guide them in making the right decision. Given the importance of these types of decisions (acquiring new technologies or firing employees tend to be both time consuming and costly), one would think that individuals and organizations would sample extensively before making a decision. Yet, research has found that most people only rely on a small number of samples before making a decision (Hau, Pleskac, & Hertwig, 2010). Additionally, there appears to be substantial individual variability regarding how much people search before making an experiential decision (Hertwig, Barron, Weber, & Erev, 2004; Fox & Hadar, 2006; Hills and Hertwig, 2010), raising the question of whether individual differences explain variations in search behavior.

Understanding why people search differently is important because, in many organizations, adequately searching between different alternatives can be essential for employee satisfaction and a company's bottom line. Take for instance, a situation where a company must choose between different health care providers to offer to their employees. While cost is usually a factor, many important experientially based questions come into play before making this decision (e.g., what type of quality does the provider offer, what is their reputation for customer service, etc.). Organizations usually consider all of these questions before selecting a health care provider for their employees.

Choosing a health care provider is only one example of countless instances where individuals can explore different options before making a major decision. Knowing why people search differently is essential for understanding and predicting which types of people will search more or less when given the option to search between different options freely. Despite the importance of understanding why there is substantial individual variability in instances where people have the option to search between alternatives, little research exists on the relationship between individual differences and search behavior. The purpose of the current study is to help fill this gap in the literature by examining how individual differences influence a person's search behavior. I hypothesize that personality will help explain some of this variation in search because personality, and specifically the five-factor model (FFM) of personality, has been shown to correlate with a wide array of behaviors across individuals (Paunonen & Ashton, 2001). The FFM consists of five basic dimensions that can be used to describe individual variability regarding cognitive, social, and behavioral characteristics, which are relatively stable across an individuals' life (McCrae & Costa, 1994). The present study focuses specifically on the traits of conscientiousness and neuroticism in the context of search, both of which will be discussed further in a later section. Lastly, this study will also look at how choosing between options with possible negative outcomes (as opposed to options with only positive outcomes) in experiential decisions affects the relationship between personality and search.

Decisions from Experience

Every day individuals are faced with many decisions, such as deciding whether to move to a new state or to switch jobs and start a new career. In these examples, past experience and exploratory search play a pivotal role in guiding people's decisions since there is no quantitative information to refer to regarding what the best choice is. Exploratory search is defined by its uncertainty and open-endedness where there is no clear single best answer or definitive rule on when to stop searching (Athukorala et al., 2015). These kinds of decisions are known as decisions from experience (DfE) because individuals remain unaware of what the potential payoffs are for each of the different options (e.g., happiness of moving for a job vs. not moving and staying with their current job) before making a decision. This type of decision differs from Decisions from Description (DfD), which occurs when the risks and potential payoffs of different choice options are known prior to making a decision (Hertwig et al., 2004).

An example illustrating the difference between DfD and DfE is the game of roulette compared to slot machines. In roulette, assuming a person plays colors, the odds of winning are known before playing: they will have a 47.50% chance of getting red, 47.50% chance of getting black, and a 5% chance of getting green. What qualifies roulette as a game where people are constantly making DfD is that individuals remain aware of all possible outcomes (red, black and green) and also know what their respective odds are of getting each color prior to playing. On the other hand, when playing slots, individuals typically start off as being naive as to what all the possible payoff values are and are unaware of the chances of winning a prize before playing. Playing the slots classifies as a game involving DfE, because individuals remain unaware of what the potential payoffs are and because the way they learn about the frequency of the payoffs is by constantly playing and learning from experience.

In their seminal paper on understanding the difference between people's choice behavior in DfD and DfE, Hertwig and colleagues (2004) found a reversal in people's choice preferences depending on how the options were presented. In their study, the authors had two groups of participants and compared their choice preferences. The first group was known as the *description* group, wherein participants were presented with different gambles visually in a pie chart and had to choose between different gamble options. The other group of participants was the *experience* group, whom were given the same gamble options as the description group but in an experiential format, where they were not told the probability of different gamble options beforehand. The participants in the experience group were presented two sample buttons on a computer screen, allowing them to sample between the different gamble options before making a decision. One example of the implementation of this method involves a gamble where participants could choose between either a guarantee of winning $4 or have an 80% chance of winning $5 and a 20% chance of winning nothing. In the *description* group, participants generally preferred the guaranteed winning of $4 while the *experience* group typically preferred the gamble where they had an 80% chance of winning $5 and a 20% chance of winning $0. This reversal in preference is known as the description-experience gap. Understanding this gap has been of great interest to researchers because it explains individual choice preferences based on how the information is presented.

One particularly interesting finding consistently observed in studies related to the description-experience gap relates to how people reacted to rare but consequential events (Wulff, Mergenthaler-Canseco, & Hertwig, 2018). Rare but consequential events are operationally defined as gamble outcomes where the probability of a rare event occurring is below 20%, and a common event is defined as an outcome which occurs greater than 20% of the time (Hertwig et al., 2004). Additionally, Wulff and colleagues also define rare but consequential events as outcomes which are typically characterized as being either the largest positive or negative outcome value in a gamble pair. Hertwig and Erev (2009) found a difference in how participants viewed the potential impact of rare but consequential events based on if the problems were presented to participants in a DfD or DfE format. Specifically, when participants had to choose between different gamble options in DfD, they behaved as if rare but consequential events had more of an impact than warranted based on their objective probabilities before making a choice. However, when the same gambles were offered in a DfE format, participants tended to behave as if rare but consequential events had less of an impact than were warranted based on their objective probabilities.

Part of the reason why there is such a discrepancy between people's choice preferences in DfD and DfE is because of the differences in how information is presented to individuals between the two formats. Generally, DfE may be more difficult for individuals to make since DfE lacks the quantitative certainty that DfD provides. Instead, individuals must rely on exploratory search when they do not have prior life experiences to help form different mental representations of what the underlying probabilities of the different possible gamble outcomes are (Hertwig, 2015). Additionally, it is important to mention that reliance on exploratory search as a guide in DfE often comes with limitations.

First, reliance on exploratory search in DfE limits individuals both by the information they can mentally store and by the finite amount of time to make a decision (Kareev, Arnon, & Horwitz-Zeliger 2002). Limits in working memory can affect not only how many samples people rely on in DfE, but also how they perceive rare but consequential events. In a study examining the relationship between samples drawn in an experiential-based task and working memory capacity, Rakow, Demes, and Newell (2008) observed a moderate relationship between working memory capacity and the number of samples individuals drew ($r = .36$, $p < .01$). Specifically, individuals with smaller working memories tended to rely on a smaller number of samples before making DfE and they also tended to misperceive the frequency of rare but consequential events before making a choice.

Secondly, when relying on exploratory search in DfE, collecting too much information can lead a decision maker to suffer from information overload resulting in diminished decision quality (Bawden & Robinson, 2009). Buchanan and Kock (2001) studied the relationship between information overload and decision quality by surveying 108 MBA students. The survey asked participants if they usually experienced information overload and if so to what extent (mild, moderate, intense, or very intense). Afterward, participants were asked if information overload personally affected their task productivity or quality. The authors found a strong correlation between individuals who reported having a higher level of information overload and who felt that it impacted their work productivity ($r = .37$, $p < .01$) and work quality ($r = .41$, $p < .01$). In a related vein, participants who reported lower levels of information overload did not feel that it affected their work quality or productivity.

In a separate study looking at the effect of how multiple-choice options influence decision making, Iyengar, Huberman, and Jiang (2004) examined whether offering more 401k fund options influenced the sign-up rate of such funds by employees. Results suggested that the more funds a company offered involving multiple 401k plans, the less people signed up for them. However, if a company offered only two funds, approximately 75% of employees signed up. Additionally, for every ten funds a company added to the plan, participant sign up rates declined between 1.5% to 2%. The findings from this study indicated that when employees had too many options, they may not contribute to their 401k at all. Overall, both of these studies suggest that having too much information can be problematic, and in the long run, may inhibit the quality of subsequent decisions.

Alternatively, not collecting enough information when searching can cause people to underestimate the frequency of rare but consequential events (Fox & Hadar, 2006). Fox and Hader reanalyzed the data from the paper by Hertwig and colleagues (2004) looking at the description-experience gap and at how individual's choice preferences were affected based on if the information was presented in a DfD or a DfE format. Fox and Hader concluded that a major reason why individuals tended to underweight the importance of rare but consequential outcomes was caused by participants undersampling, which resulted in them never experiencing a rare but consequential event. One way this concept can be understood in the real world is the prevalence of many individuals who remain completely unprepared for a downsizing despite working in a recession prone industry like retail. In this example, a downsizing represents a relatively rare but consequential event, and the limited amount of time a person has worked in the retail industry without experiencing a downsizing represents an undersampling of the environment by the individual. However, before further discussing how these limitations affect decision making in DfE, it is first important to discuss how researchers examine people's search behavior in the laboratory setting.

The Sampling Paradigm

Choice behavior in DfE is typically studied using different experimental paradigms, including the sampling paradigm (Hertwig et al., 2004; Weber, Sharif, & Blais, 2004). In the sampling paradigm, participants are given two options (Option A and Option B) and are asked to choose between them. Each option contains specific payoff distributions, and participants can sample between each option for as long as they like before making a final selection. For example, say Option A pays $5, 100% of the time and Option B pays $25, 20% of the time, and $0, 80% of the time. A participant sampling from Option A three times will encounter different potential payoff values ($5, $5, $5) as compared to Option B where they would see other potential payoff values ($0, $25, $0). After an individual feels confident that they know which gamble option will pay the best, they can stop sampling and make a final choice where the computer will generate a random draw from the option they selected which participants get to keep. A representation of the sampling paradigm, along with how the same options would be presented in its equivalent DfD format, is presented in Figure 1.

One way that the sampling paradigm could be understood using an analogous real-world example is a situation where a large company is looking to hire one of two different consulting firms to help its employees plan for retirement. Assuming that other important factors such as cost are equal, a manager working for a large company must rely on other factors for determining which consulting firm to select. In this scenario, a manager might use different means of search (reading online reviews or asking former clients what their experiences have been with each firm) as a way of forecasting what their experience with each firm will most likely be before they decide which firm to hire. In the laboratory setting, this scenario represents just one of many examples regarding how DfE is made in the real world.

Using this paradigm over the past 15 years, researchers have learned a great deal about how people evaluate and make experiential decisions across a variety of different settings. Of the different paradigms that are used to study choice preferences in DfE, the sampling paradigm is the most common. Furthermore, decision-making preferences in DfE were measured using the sampling paradigm in the paper by Hertwig and colleagues (2004), which first observed the description-experience gap. In a recent meta-analysis examining over 70,000 choices made by over 6,000 participants using the sampling paradigm, Wulff and colleagues (2018) observed a robust description–experience gap when evaluating people's choice preferences. In their meta-analysis, the authors found that two major factors contributed to the size of the description-experience gap. One major determinant of the description-experience gap is limited sampling by participants with the ensuing sampling error causing participants to misunderstand the actual frequency of events in DfE. Sampling error is a statistical and not a psychological phenomenon, and it represents the difference between the sampling experience that participants observe and the objective probabilities of a gamble option. The other principal factor which influenced the size of the gap was the structure of the gambles. Specifically, the types of gambles used (Glöckner, Hilbig, Henninger, & Fiedler, 2016) and whether or not the gambles contained loss values (Lejarraga, Hertwig, & Gonzalez, 2012) have both been shown to greatly impact the amount of search people engaged in using the sampling paradigm. Additionally, prior research has found that the type of cognitive search strategy a person employs also influences an individual's search behavior (Hills & Hertwig, 2010). These findings and their relevance to understanding individual variability in search will be discussed in depth in the following sections.

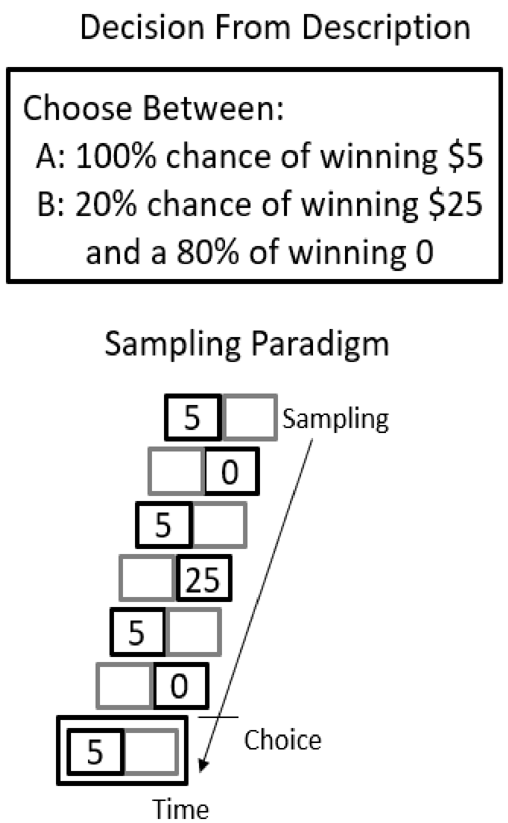

Figure 1. The sampling paradigm includes an initial phase whereby participants can sample between the two different options, which is represented by the six fictitious samples. The participant explores one of the two payoff distributions by clicking a specified sample computer key for each distribution on the computer. After participants choose to stop sampling, they will then see a choice screen which is shown with a black square surrounding it and are then asked to make a final decision for a real monetary reward. The source for this image came from Hertwig and Erev (2009).

Variability in Search

Previous research has found substantial variability in people's search behavior before making DfE. Prior research has attributed this search variability in the sampling paradigm to both external and internal factors (Wulff et al., 2018). External factors include the structure of the gambles used by researchers in the sampling paradigm as well as if the gambles involved earning or losing money. Internal factors, on the other hand, include the different types of search strategies an individual may employ as well as their emotional state during the experiment (Frey, Hertwig, & Rieskamp, 2014).

Early studies consistently reported that participants relied on limited sampling before making a final decision (Fox & Hadar, 2006; Hertwig & Pleskac, 2010). Fox and Hadar found that one of the consequences of people undersampling is their tendency to be influenced by sampling error, which, as discussed previously, is when people misattribute the frequency of events in DfE as a result of what they have personally experienced when sampling. For example, if the objective odds behind Option A in a gamble is having an 80% chance of winning $10 and a 20% chance of winning nothing and a person samples from Option A three times and sees $10 three times in a row, they will likely incorrectly assume that Option A only pays out $10 despite there being a 20% chance that they will win nothing because they have not experienced the $0 payoff when sampling. In a study conducted by Hertwig and colleagues (2004), the typical amount of times a participant engaged in search (i.e., pressed the sample key) was approximately seven times for each gamble option, and the median amount of times a participant engaged in search was approximately 15 times per scenario. Additionally, in a separate paper, Hertwig (2015) describes the data from the Hertwig and colleagues (2004) study, highlighting that 44% of rare but consequential outcomes were not encountered by participants in sampling sequences, and concluding this lack of exposure was attributed to undersampling. This undersampling by participants is consistent with recent research suggesting that a major cause for why participants tended to undersample was the result of the structure of the gambles used (Glockner et al., 2016).

Typically, previous studies have used gambles that either contained a certain option (a 100% chance of winning a certain payoff) or a risky option with one possible outcome being zero, or both within the gamble pairs. Glockner and colleagues (2016) refer to these types of gambles as reduced gamble pairs and theorizes that this type of gamble structure explains why people tend to undersample in DfE. Alternatively, in their study, Glockner and colleagues utilized a different type of gamble known as non-reduced gamble pairs wherein neither option in the gamble pair contained a certain or zero payoff value. For illustration, imagine two gamble options (A and B) with Option A representing a reduced gamble and Option B representing a non-reduced gamble. In this example, Option A (reduced) would be a gamble pair with an 80% chance of winning $4 and a 25% chance of winning nothing, while Option B (non-reduced) would be a 70% chance of winning $4.10 and a 30% chance of winning $1.10. Option A represents a reduced gamble pair because it is possible for participants to win nothing, while Option B represents a non-reduced gamble because this type of gamble avoids both a certain option (a 100% chance of winning a value) and a zero payoff option (a 20% chance of winning nothing). Using both types of gamble structures (reduced and non-reduced), Glockner and colleagues examined what effect gamble type had on search across three different studies. Results suggested that using non-reduced gamble pairs significantly increased the number of samples participants drew with a mean of 44 samples (*SD* = 31) drawn for the non-reduced gambles. Participants faced with non-reduced gambles sampled considerably more with this type of gamble structure when compared to the original study done by Hertwig and colleagues (2004), which found that participants only sampled on average 15 times for reduced gambles. Yet, as the high standard deviation indicates, there is still a substantial amount of inter-individual variability when it comes to how much participants search in DfE.

Outside of reduced and non-reduced gamble pairs, another type of gamble structure which has been found to influence search is whether the gambles contain loss only outcomes. Using the sampling paradigm, Lejarraga and colleagues (2012) found that losses invoked significantly more search by participants in loss only gambles compared to gain only gambles. The authors found that on average participants increased the number of times they sampled by 25% to 29% in the loss scenario but noted that there was substantial interindividual variability with this finding. One explanation Lejarraga and colleagues gave for why people searched more in the loss condition relative to the gain condition was loss aversion. Loss aversion represents people's natural tendency to be more averse to the idea of losing money when compared to the prospect of earning an equivalent amount of money. In one study, Kahneman and Tversky (1979) found that the majority of people selected to be guaranteed a gain of $3,000 than have an 80% chance of gaining $4,000 and a 20% chance of winning nothing. However, when the same gamble was changed to a loss only situation, there was a reversal in individual preference, with more people preferring the option of having an 80% chance of losing $4,000 (otherwise losing nothing) when compared to the guaranteed option of losing $3,000. This preference reversal in decision making can be attributed to loss aversion, suggesting that people tend to have a much stronger negative reaction to the thought of losing money compared to the prospect of gaining an equivalent amount of money (Sokol-Hessner, Camerer, & Phelps 2013). Lejarraga and colleagues theorized that because participants felt more averse to the idea of losing money (as opposed to gains in money) in DfE, they increased their search efforts to find the best possible outcome to reduce their losses.

While the structure of gambles represents a key external factor that influences search behavior in DfE, there are also important internal factors that influence the number of samples that a person draws. One factor that has been used to explain some of the variability in DfE is the type of search strategy a person uses. Traditionally in DfE, individuals tend to use either a piecewise or a comprehensive search strategy before making a decision (Hills & Hertwig, 2010). Using a piecewise search strategy, individuals constantly switch back and forth between different options, whereas a comprehensive search strategy consists of individuals sampling extensively from one option before switching. An example that illustrates this type of search strategy in the context of an applied setting is how a potential employer might interview job candidates they call back for multiple rounds of interviews. Using a piecewise search strategy, an employer would call back job candidates for multiple rounds of short interviews before they called a different job candidate for their next series of interviews. Alternatively, using a comprehensive search strategy would entail an employer calling back job candidates for fewer rounds of longer interviews relative to the piecewise search strategy. For an employer, the type of search strategy that they end up using when interviewing job candidates can greatly influence how they perceive the quality of the applicants and who they ultimately decide to hire. Using a piecewise search strategy might lead an employer to hire the candidate who had the best first impression on one of the shorter interviews. On the other hand, for employers who used a comprehensive search strategy, they will most likely hire the candidate who had interviewed the best overall. In the context of the sampling paradigm specifically, Hills and Hertwig (2010) found that the type of search strategy (piecewise or comprehensive) a person employs not only influenced their choice but also how much they searched before making a decision. In piecewise sampling, participants constantly switched back and forth between gamble options when they engaged in search, and participants using this strategy tended to prefer the gamble options which displayed higher rewards in the most rounds of sampling. Alternatively, when using a comprehensive sampling strategy, participants sampled extensively from one of the gamble options before switching and generally preferred the option which yielded the highest average reward. Hills and Hertwig (2010) found that individuals who switched more when searching between the different gamble options tended to search less overall ($r = -.37$, $p < .01$). Additionally, they also found that individuals who tended to switch more between gamble options were more likely to underestimate the frequency of rare but consequential events before making a decision. In a separate study, Gonzalez and Dutt (2011) found that the number of switches or alternations between options (i.e., A-Rate) that individuals make decreases the more a person samples. As with overall search rate, previous research has found a great deal of variability in individual's alternation rates as well (Gonzalez & Dutt, 2011; Hills & Hertwig, 2010).

Lastly, in a study looking at how emotional states influence search behavior, Frey and colleagues (2014) split participants up into one of four different emotional state groups before having participants complete an experiment involving the sampling paradigm. To induce different emotional states (happiness, fear, anger, or sadness), participants were instructed to write about life events where they felt the targeted emotional state, and then were instructed to vividly recall their previously described life event for one minute prior to the first, fourth, and seventh round of the sampling paradigm. Frey and colleagues (2014) observed that participants in the fearful condition searched significantly when compared to participants in the happy condition (M_{draws}= 45 vs. M_{draws} = 28) but switched considerably less than the happy condition ($M_{switching\ frequency}$= 6% vs. $M_{switching\ frequency}$ = 96%).

Despite the past research looking at these explanations for variability in search, there is still little research examining individual differences that might explain why people search differently in

DfE. The purpose of the current study is to help contribute to the literature in understanding search behavior in DfE by examining how individual differences in personality influences search behavior. Drawing from research on personality to explain variability in search, I propose that certain personality traits will predict which individuals tend to undersample and which individuals tend to sample more when compared to the average. Furthermore, I propose that differences in personality will also help explain and account for variability in search behavior, particularly in the case of loss gambles.

The Five-Factor Model of Personality

The Five-Factor Model (FFM) has been a major staple in helping to understand personality during the last half of the 20th century. The FFM has demonstrated high reliability and validity across cultures (McCrae & Costa, 1999; Schmitt, Allik, McRae, & Benet-Martinez, 2007), and has been found to remain relatively stable over time (McCrae & Costa, 1994). For researchers, it is important to understand individual personality for a variety of reasons. Personality research has shown that individual personality characteristics play a major role in influencing many different life outcomes such as health (Roberts & Bogg, 2004), well-being (Steel, Schmidt, & Shultz, 2008), and longevity (Martin & Friedman, 2000). While many people think of the personality traits of the FFM as binary (e.g., introverted or extraverted), most people tend to fall somewhere on the continuum for each trait (i.e., slightly more extraverted or introverted than the average person).

The five personality factors of the FFM are as follows: conscientiousness, neuroticism, extraversion, openness, and agreeableness (Costa & McCrae, 1999). McCrae and John (1992) identify each dimension of the FFM broadly as follows: Conscientiousness refers to the extent to which a person is reliable, responsible, thorough, efficient, and organized. Neuroticism refers to the extent to which a person is anxious, tense, unstable, and worried. Extraversion is the extent to which a person is active, talkative, energetic, enthusiastic, assertive, and outgoing. Openness to experience refers to the extent that a person is imaginative, insightful, curious, and artistic. Lastly, agreeableness is defined by the degree a person is generous, kind, sympathetic, appreciative, forgiving, and trusting.

Conscientious individuals are known for their self-control and their ability to organize, plan, and deliberate before making a decision (McCrae & Costa, 1994; Costa, McCrae, & Dye, 1991). Because conscientious individuals have a higher level of self-control, they are also more prone to rational decision-making and tend to be less impulsive when making decisions. Looking at conscientiousness from a neurological perspective, DeYoung and colleagues (2010) found that conscientiousness was positively associated with volume differences within a person's middle frontal gyrus ($\beta = .43$, $p < .05$), which is essential for maintaining information in a person's working memory and for executing planned action. Overall, their findings provide support on a neurological level for why individuals with higher levels of conscientiousness can engage in more self-regulation and provides a partial explanation for why conscientiousness is a valid predictor of both academic and occupational performance.

Regarding the relationship between conscientiousness and health, Bogg and Roberts (2004) found meta-analytic evidence that conscientiousness was negatively related to risky health behaviors such as alcohol ($r = -.13$, 95% CI [-.14, -.12]) and tobacco consumption ($r = -.27$, 95% CI [-.28, -.26]). Alternatively, conscientiousness was positively correlated with positive health behaviors such as maintaining a higher level of fitness ($r = .13$, 95% CI [.07, .19]), again providing evidence of the link between conscientiousness and self-control. In a separate study examining the relationship between personality and credit scores, Bernerth, Taylor, Walker, and Whitman (2012) observed a significant positive relationship between a person's level of conscientiousness and their overall credit score ($r = .20$, $p < .05$). This suggests that one of the reasons why conscientious individuals may be able to maintain good credit is because they are less prone to impulsive spending and are better at controlling their finances. In a similar vein to financial planning, past research has also found a link between conscientiousness and more deliberation in general (McCrae & Costa, 1994; Costa et al., 1991). In the context of search in DfE, conscientious individuals may deliberate and plan more through the use of search when they are in the process of deciding which option to choose before they make a selection in DfE.

Additionally, conscientiousness has been linked to having higher levels of accomplishment striving, which is defined as exerting more effort to complete work assignments (Barrick, Stewart & Piotrowski, 2002). In their study, Barrick and colleagues found a modest correlation between conscientiousness and accomplishment striving ($r = .48$, $p < .01$) using a sample of employees who worked in sales. Since accomplishment striving is a facet of conscientiousness, this trait may be relevant for motivating individuals to search more so they can accomplish their goal of earning as much money as possible. Thus, I hypothesize:

Hypothesis 1: Conscientiousness will be a positive predictor of search in DfE.

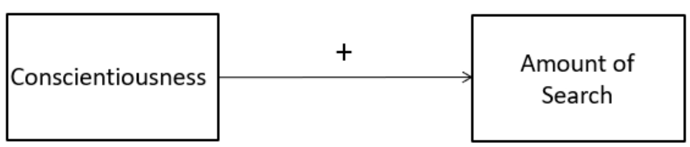

Figure 2. The hypothesized relationship between conscientiousness and the amount of search a person engages in.

Regarding how search behavior is affected by gains or losses in conscientious individuals, it is predicted that losses will motivate individuals with higher levels of conscientiousness to search more for loss gambles when compared to gain gambles. Because conscientious individuals tend to be more averse to the thought of losing their gains, it may be the case that conscientious individuals will search more to determine which option in the experiment will take the least amount of money from them. In a study looking at the relationship between conscientiousness and loss aversion, Boyce, Wood, and Ferguson (2016) examined how losses in income affected an individual's level of overall life satisfaction based on their level of conscientiousness using a large longitudinal German socio-economic dataset. Results suggested that conscientious individuals were more loss averse, with individuals who had a higher score in conscientiousness reporting lower levels of life satisfaction, and a loss in income compared to individuals with lower levels of conscientiousness. Boyce and colleagues posit that one reason why conscientious individuals reported lower levels of life satisfaction stemming from a loss in income is because conscientious individuals may be more likely to attribute a loss of income to themselves because from some perceived lack of ability. Additionally, this perceived lack of ability in the context of loss might also explain why conscientious individuals tended to be more loss averse when compared to individuals with lower levels of conscientiousness. In the context of the present study, conscientious individuals may search more in the loss domain specifically to identify which gamble option is least likely to take away their gains as to minimize any feeling of loss.

Another reason conscientiousness may exhibit more search for loss gambles compared to gain gambles is their locus of control. Generally, conscientiousness has been associated with higher levels of internal locus of control (Costa et al., 1991). Typically, previous research has classified locus of control as a hierarchical construct, where general locus of control represents the highest level of the hierarchy while domain-specific subdivisions like work locus of control are a part of the lower levels of the hierarchy (Barrick, Bowling, & Eschleman, 2010). General locus of control refers to the extent that an individual believes that they can influence their environment as a result of their actions (Rotter, 1966) and work specific locus of control indicates how much a person believes that they can attribute success at work to their own actions (Spector, 1988). General locus of control is measured on a continuum with people who believe that they can control their outcomes having higher levels of internal locus of control. Alternatively, individuals who believe that luck or some other external factor determine their outcomes tend to have higher levels of external locus of control (Twenge, Zhang, & Im, 2004). When researching the relationship between conscientiousness and external locus of control, Costa and colleagues (1991), found a strong negative correlation between conscientiousness and external locus of control (r = -.25, p < .01) indicating a positive relationship between conscientiousness and internal locus of control. Overall, the findings of Costa and colleagues (1991) suggest that individuals with higher scores in conscientiousness are more likely to attribute both their success and failure to themselves rather than their environment. Relating to a person's level of internal loci of control, previous research has also found that individuals who are more loss averse tend to engage in more protective measures to help prevent losses (Li, Kenrick, Griskevicius, & Neuberg, 2012). A person's level of internal locus of control is expected to be relevant in influencing the amount of search that they engage in as it is expected that these individuals will be trying to influence their outcomes in the experiment (money earned) by sampling more to determine the best gamble option. I predict that conscientious individuals will be more likely to engage in more search in DfE through the use of increased sampling not only because they have higher levels of internal locus of control; but also because they will be trying to use search (sampling) as a protective measure to help minimize their losses in the experiment by determining which gamble option will take the least amount of money from them.

> *Hypothesis 2*: Conscientiousness will be a stronger predictor of search in the loss condition when compared to the gain condition.

Figure 3. The hypothesized relationship showing that conscientious individuals will search more for loss gambles relative to gain gambles.

Individuals high in neuroticism are known to be more impulsive, mercurial, unstable, and temperamental (Costa & McCrae, 1999; Goldberg, 1999). When looking at individual differences in neurological structures using the Big Five Inventory (BFI), DeYoung and colleagues (2010) found that neuroticism was associated with variations in different regions of a person's brain (e.g., dorsomedial pre-frontal cortex, mid-cingulate gyrus). Based on these differences, DeYoung and colleagues (2010) suggest that these neurological variations explain why people with higher levels of neuroticism have higher sensitivities to threats, punishments and why neuroticism is associated with emotional dysregulation overall. Moreover, multiple studies have found that problem gamblers tend to have higher scores on neuroticism (Brunborg et al., 2016; Takeuchi et al., 2015), highlighting neuroticism's association with more impulsive behaviors and less rational decision making, In a survey consisting of over 10,000 individuals, Brunborg and colleagues (2016) found that problem gamblers had significantly higher levels of neuroticism and lower levels of conscientiousness compared to the general population. In another study looking at neuroticism and impulsive eating disorders, Elfhag and Morey (2008) found a modest correlation (r = .48, p < .01) between neuroticism and emotional eating. These studies suggest that individuals who are high in neuroticism tend to be more impulsive when making a decision. Therefore, in the context of the present study, neuroticism may be associated with people searching less before they make a decision as a result of being more impulsive.

Another reason why neuroticism may be linked with less search is because of its association with lower levels of internal locus of control (Judge, Erez, Bono, & Thoresen, 2002). In a meta-analysis examining the relationships between external locus of control, emotional stability, self-esteem, and generalized self-efficacy, Judge and colleagues (2002) observed a strong correlation between emotional stability and external locus of control (ρ = .40, 95% CI [.33, .48]). Due to the low levels of discriminant validity for each of these four traits, Judge and colleagues (2002) suggest that the four aforementioned traits may be representative of the same higher-order concept. This relationship between neuroticism and a lower locus of control may manifest itself in the context of the current study with neuroticism being associated with less search in DfE. Specifically, it may be the case that since these individuals will feel that they cannot influence their performance in the experiment, they might search less in DfE. Therefore, I hypothesize that neuroticism will be correlated with individuals searching less in DfE.

Hypothesis 3: Neuroticism will negatively predict search behavior in DfE.

Figure 4. The hypothesized relationship between neuroticism and the amount of search a person engages in.

Concerning how losses might affect the relationship between neuroticism and search, it is hypothesized that neuroticism will be associated with people searching less when it comes to losses relative to gains. In a previous study examining the relationship between barriers to information search among cancer patients and their physicians, Borgers and colleagues (1993) found nervousness to be a major reason why patients did not seek out information regarding their condition. Specifically, the authors found that 20% of cancer patients claimed that nervousness was a primary reason why they did not seek out more information about their condition from their physician. Given that nervousness is a facet of neuroticism, and because it is expected that individuals will be more nervous in the loss gambles of DfE since they will be losing money. I predict that individuals with higher levels of neuroticism will search even less in loss gambles when compared to the gain gambles.

Another reason why this is predicted to be the case is because past research had found neuroticism to be negatively correlated with performance when individuals were put in a high-pressure situation (Byrne, Silasi-Mansat, & Worthy, 2015). In their study, Byrne and colleagues gave participants the dynamic decision-making task wherein participants had to select between one of two different decks on a computer screen in order to gain points. The first deck was the "increase" deck where participants were given a smaller reward upfront but caused the point payout of both options to increase over time. The second deck was the "decrease" deck, where participants received a greater amount of points upfront, but the payouts from both decks decreased over time. The best deck between the two was the "increase" deck which led to the highest payout over time, but the only way for participants to realize this was to rely on their working memories and remember the payouts from both options. Researchers split participants up into two conditions, the first being the low-pressure condition where participants only had to earn as many points as possible with no monetary compensation at the end of the experiment. Alternatively, participants in the high-pressure condition were told they needed to reach a certain point threshold with a (fictitious) partner to earn compensation, and that if either of them did not reach the threshold then neither would receive a reward. In the high-pressure condition, participants were told that their partner had already achieved the goal, so winning the money was entirely dependent on them, thus serving to spur a feeling of both social and monetary pressure among participants. Lastly, researchers evaluated performance by the average number of times participants selected the “increase” deck throughout the experiment. Byrne and colleagues found that in the low-pressure condition where there was no monetary or social pressure, a person’s level of neuroticism did not influence their performance on the task. However, in the high-pressure condition where monetary and social pressure where involved, neuroticism was negatively related to performance. These findings suggest that individuals with higher levels of neuroticism are more prone to making worse decisions when placed under pressure. Given that their study and the present study are both looking at DfE using monetary rewards, I hypothesize that neuroticism will be negatively related to search in the loss condition since participants will be under more pressure during the experiment during loss trials.

Hypothesis 4: Neuroticism will be a stronger negative predictor of search in the loss condition when compared to the gain condition

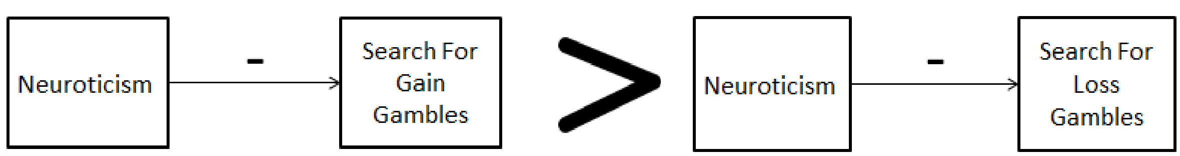

Figure 5. The hypothesized relationship showing that individuals with higher levels of neuroticism will search less for loss gambles relative to gain gambles.

Finally, I will discuss the remaining three personality traits of the FFM regarding why I do not hypothesize relationships between these traits and search behavior. Extraversion has been associated with positive affect (DeNeve & Cooper, 1998), assertiveness and excitement seeking (DeYoung, Quilty, & Peterson, 2007), and transformational leadership (Bono & Judge, 2004). In the context of information search for new employees, a longitudinal study (Wanberg & Kammeyer-Mueller, 2000) found that neither extraversion or openness was related to proactive job information seeking behavior (as defined by the search for job and organizational information). For this reason, it is not hypothesized that the presence of loss gambles will influence the relationship between extraversion and search in DfE.

Weller and Thuli (2012) had participants complete a decision-making task involving both gains and losses to see which personality traits of the HEXACO model correlated with risky and loss avoidant decision making. The HEXACO model of personality is an alternative model of personality which is similar to the FFM with the addition of honesty-humility as a sixth factor (Ashton et al., 2004). In their study, Weller and Thuli gave participants two choice options: a risky option (50% chance of losing $100 and a 50% chance of losing $0), and a safe option (100% chance of losing $50). Participants were given 12 trials with half of the trials consisting of positive choice options and half consisting of negative choice options. The authors did not find a significant relationship between extraversion and risk-taking for either the loss or gain decisions. For these reasons, it is not predicted that extraversion will be associated with search in either the gain or the loss condition.

Openness to experience describes an individual's tendency to be creative, introspective, imaginative, resourceful, and insightful (John & Srivistava, 1999). As stated previously, Wanberg and Kammeyer-Mueller (2000) did not find a relationship between the personality trait of openness and proactive job information-seeking behaviors in their longitudinal study. Secondly, when looking at the relationship between openness and search, Weller and Thuli (2012) did not find a significant relationship between openness and risk-taking for the gain or for the loss condition. Since openness has not been linked to search in previous research, and because no relationship has been found between openness and losses, it is not hypothesized that there will be a link between openness and search in either of the conditions.

Lastly, it is not predicted that there will be a relationship between agreeableness and search in DfE. Previous research which has looked at the relationship between personality and information-seeking behavior did not hypothesize about or find a relationship between agreeableness and information seeking (Tidwell & Sias, 2005). It is also not predicted that there will be any relationship between agreeableness and search in either the loss or the gain domains. In their study, Weller and Thuli (2012) did not find a significant relationship between agreeableness and risky decision making for the loss or the gain condition. For these reasons, it is not hypothesized that agreeableness will be related to either information search in the present experiment or that there will be a relationship between agreeableness and search for either the gain or the loss conditions.

CHAPTER II. METHODS

Participants

Participants were recruited from LSU's student population using the SONA participant pool. Two hundred twenty-four[1] participants took part in this study, of whom 54 were removed from the final analysis. Forty-one cases were removed for failing the attention check, one case was removed for missing data, nine were removed for not paying attention during the sampling task (as defined as sampling less than three times on average), and three cases were removed for being extreme outliers (6 *SD*s above the mean) leaving the sample for analyses at 170 participants. The average age of the 170 participants was 19.8 years old (*SD* = 2 years), of which 83% were female. Ethnically, most participants were Caucasian (72%), followed by African–American (12%), Asian-American (7%), Hispanic (7%), and 2% of individuals chose not to specify their race and the demographic questionnaire that participants took can be found in Appendix A. Participants were given research credit for their participation as well as monetary compensation based on their performance in the experiment. Overall, for participants who won money and chose to accept it, the average payout was around $2.00.[2]

Measures

Personality Traits. Personality scores on the FFM were assessed using the Big Five Personality Inventory (John & Srivastava, 1999). The BFI consists of 44 items which comprise of 5-dimension subscales, with the number of questions per subscale varying from between eight to ten

[1] A power analysis ($1-\beta = .80$, $\alpha = .05$) using the computer program G*power (Faul & Erdfelder, 2007) indicated that a total sample of 92 people would be needed to detect a medium effect size (f^2=.15). This estimation of effect size was based on Frey, Hertwig, & Rieskamp, (2014) who found a medium effect size when looking at how the emotional state of fear affected people search behavior in DfE.

[2] The money for this study came from an LSU strategic grant. As part of the requirements of this grant, participants were required to provide their SSN to be compensated, and as a result, many participants declined to be paid for their performance.

items each. All of the items on the BFI are scored using a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). Past research has found moderate to high levels of internal reliability for each of the five subscales ranging from α = .79 to α = .88 as well as high levels of convergent and discriminant validity with other Big Five instruments (John & Srivastava, 1999). Some examples of sample items include “gets nervous easily” (neuroticism), and “does a thorough job” (conscientiousness). The BFI along with its scoring key can be found in Appendix B.

The Sampling Paradigm. The present study utilized the sampling paradigm described previously. The gambles consisted of 20 non-reduced choice pairs where 10 of the gambles were gain only, and the other 10 gambles were loss only. Specifically, non-reduced choice pairs were selected as past research suggests participants tend to sample more when these types of gambles are utilized (Glockner et al., 2016). Additionally, because of this increase in sampling by participants, there is a greater chance that researchers will be able to pick up meaningful individual differences in search behavior before participants make a final choice. Within each condition, half of the gamble pairs had equal expected values (EV), and the other half of the gambles were gamble pairs with unequal EVs. The EV of a gamble pair represents the anticipated value of what that gamble pair is mathematically worth and for the gambles with unequal EV the gamble pair with the higher EV represents the distribution with the better-anticipated payoff. Additionally, the EV for gamble pairs for the gain and loss domains were roughly equivalent to each other to ensure that participant’s search behavior was not influenced by the EV of each domain. The order in which participants were presented the gambles was randomized without replacement, and the gamble pairs which were used are a modified version of Pinto and Harman (2017) where loss gambles were also included. The full list of gambles that were used in the experiment can be found in Appendix C.

Procedure

Before beginning the experiment, participants took a demographic questionnaire (Appendix A) and the BFI (John & Srivastava, 1999) on Qualtrics. To address careless responding, an attention check question was added to the BFI which asked participants if they believed the sky was purple. After completing the questionnaire, participants were then presented with the sampling paradigm on E-Prime 3.0 on the computer. E-Prime recorded the amount of search (samples drawn) participants engaged in before they made a final choice. Before starting the experiment, participants were given a set of instructions explaining the sampling paradigm to them. Participants then went through a trial round where the instructor explained the sampling paradigm to the participants and where they could ask any questions related to the sampling paradigm before beginning the experiment. Participants were given 20 different gamble pairs using the sampling paradigm, and gamble pairs were randomized without replacement. After each choice, participants were told by the program how much money they either gained or lost, and the program calculated the running total at the end of the experiment.

CHAPTER III. ANALYSIS

Descriptive statistics, including the variable means, standard deviations, and correlations between variables can be found in Table 1. In this study, search behavior was operationally defined as the average amount of samples participants drew for all 20 gambles. Across the 20 trials of the experiment, participants sampled 15.76 times on average (*SD* = 7.48) per gamble. Broken down by gamble type, participants sampled for a mean of 15.21 times (*SD* = 7.52) for the gain gambles and a mean of 16.31 times (*SD* = 7.97) for the loss gambles. Participant's personality scores for conscientiousness and neuroticism were as follows: the average conscientiousness score was 3.67 (*SD* =.65), and the average neuroticism score was 3.19 (*SD* = .78). Both of the personality traits of conscientiousness and neuroticism also showed adequate reliability (conscientiousness, α = .79), (neuroticism, α = .82).

Table 1. The means, standard deviations, and correlation coefficients for the different personality traits with search behavior.

	Variable	*M*	*SD*	1	2	3	4	5	6	7
1.	Conscientiousness	3.67	.65	(.79)						
2.	Neuroticism	3.19	.78	-.14	(.82)					
3.	Openness	3.45	.61	-.03	.13	(.72)				
4.	Extraversion	3.27	.87	.07	-.25**	.07	(.89)			
5.	Agreeableness	4.05	.49	.18*	-.30**	.13	.11	(.66)		
6.	Search Total	15.76	7.48	-.04	.06	-.05	-.12	-.05	-	
7.	Search Gain	15.21	7.52	-.06	.11	.00	-.14	-.09	.96**	-
8.	Search Loss	16.32	7.97	-.02	.00	-.09	-.10	-.01	.97**	.87**

Note. *N* = 170. **p* < .05, ***p* < .01. Numbers in parentheses denote the reliability estimates for each personality trait.

Next, I conducted a series of confirmatory factor analyses (CFAs) to confirm the factor structure of each personality trait using the *lavaan* package (Rosseel, 2012), in the free statistical software R 3.5.1 (R Development Core Team, 2018). Five CFAs were conducted examining each personality trait individually. The goodness of fit threshold for these indices were CFI $\geq$ 0.90, SRMR $\leq$ 0.08, RMSEA $\leq$ .08 (Hair, Ringle, Hult, & Sarstedt, 2013). Overall, each personality trait exhibited adequate fit (see Table 2). All of the personality traits nearly met or exceeded the aforementioned cutoffs with the exception of the CFI for openness (.84). The personality traits of conscientiousness and neuroticism both indicated adequate fit with both personality traits meeting the threshold for goodness of fit for CFI, SRMR, however, both personality traits were slightly above the threshold score for RMSEA with scores of .083 and .105 respectively.

Table 2. Confirmatory Factor Analysis Model Fit.

	χ^2	*df*	SRMR	CFI	TLI	RMSEA	CI
Conscientiousness	370.65	36	0.062	0.906	0.875	0.083	(.054, .112)
Neuroticism	390.39	28	0.058	0.897	0.856	0.105	(.073, .137)
Openness	390.10	45	0.069	0.835	0.788	0.098	(.074, .122)
Extraversion	739.40	28	0.050	0.954	0.936	0.098	(.066, .131)
Agreeableness	189.20	36	0.058	0.930	0.907	0.048	(.000, .082)

Note. N = 170. *df* = model degrees of freedom. RMSEA = root mean squared error of approximation. SRMSR = standardized root squared mean residual. CFI = Comparative Fit Index. TLI = Tucker-Lewis Index. CI = 90% confidence interval.

Prior to testing the hypotheses, all assumptions were checked, which were met with the exception of normality. The assumption of normality was violated with the Shapiro-Wilk test for normality obtaining a significant value indicating that all of the variables did not follow a normal distribution. To compensate for this violation, each variable was transformed using Templeton's (2011) two-step method which transforms continuous variables into normal variables in SPSS, and the correlations between variables after the transformation can be found in Table 3. After the transformation for normality, linearity was checked using scatterplots, which exhibited a linear relationship between the Big 5 personality traits and overall search behavior as well as for both search domains. The assumption of homoscedasticity was also checked and met by analyzing scatter plots, and there was no multicollinearity in the data with Variance inflation factors (VIF) falling within the normal range. All hypotheses were tested using the transformed dataset after all assumption checks were met.

Table 3. Correlation coefficients for personality traits with search behavior after the transformation for normality.

	Variable	1	2	3	4	5	6	7
1.	Conscientiousness							
2.	Neuroticism	-.13						
3.	Openness	-.03	.12					
4.	Extraversion	.09	-.26**	.09				
5.	Agreeableness	.19*	-.32**	.14	.11			
6.	Search Total	-.01	.02	-.05	-.12	-.04		
7.	Search Gain	-.01	.10	-.14	-.14	-.10	.95**	
8.	Search Loss	-.02	-.03	-.06	-.10	.02	.96**	.85**

Note. $N = 170$ *$p < .05$, **$p < .01$

Following the assumption checks, Hypothesis 1 was tested using a standard linear regression examining the relationship between conscientiousness and overall search behavior. The relationship was non-significant ($F(1, 167) = .018$, $p = .90$), thus Hypothesis 1 was not supported. Next, Hypothesis 2 was tested by comparing the differences in search behavior based on the average amount of samples drawn for the loss and gain gambles. Specifically, this hypothesis was tested using a one tailed Z test for a comparison of nonindependent Pearson correlation coefficients (Meng, Rosenthal, & Rubin, 1992) in the R package *cocor* 1.01 (Diedenhofen & Musch, 2015). This test converts a Pearson's r to a Z score, which identifies if there is a statistically significant difference between two different correlations that share the same predictor variable. No significant difference between the correlation coefficients of conscientiousness by decision domain (gains or losses) was found ($z = .24$, $p = .41$), thus Hypothesis 2 was not supported.

Subsequently, a second linear regression was used to look at the relationship between neuroticism and overall search behavior (Hypothesis 3). The relationship was not significant (F(1,

166) = .099, p = .75), thus Hypothesis 3 was not supported. Hypothesis 4 was tested by using the Meng, Rosenthal, and Rubin, (1992) test, which did present a significant difference when comparing the correlation coefficients of neuroticism by decision domain (z = 3.07, p < .01) and Figure 6 illustrates the differences between the correlations. While the relationship between neuroticism and search for the gain condition (r = .10, p = .19) as well as the loss condition (r = -.03, p = .74) were not statistically distinguishable from a correlation of zero, a significant difference was found between the correlations of neuroticism and search between decision domains in the predicted direction. Since the correlations between neuroticism and search based on decision domain were significantly different from each other, it is possible that neuroticism influences search differentially in gain and loss environments. Therefore, since a significant difference was found between the correlation coefficients of neuroticism by decision domain Hypothesis 4 was partially supported, however the small effect size and inconsistent results from the previous hypotheses point to the possibility of a type I error and a replication of this result with more power would be advisable.

A supplemental analysis was also conducted to examine whether personality traits were correlated with average alternation rates (see Table 4). Alternation rates were calculated by counting the number of times that an individual switched sampling between the two different gamble options and then dividing that number by the overall amount of sample draws that an individual took during the trial. An individual's average alternation rate was then computed by taking a person's alternation rate for each of the 20 trials and then averaging it and a person's alternation rate is relevant for looking at their overall search strategy (piecewise or comprehensive). Across all 20 trials, participants switched sampling between gamble options 6 times on average (SD = 5.79) before making a decision. Broken down by domain, people switched sampling between gamble options 5.91 times (*SD* = 5.77) on average for the gain domain and switched on average 6.23 times (*SD* = 6.04) for the loss domain. The findings of the analysis revealed that none of the factors of the FFM significantly correlated with alternation rates overall or within each domain specifically and that none of the personality traits of the FFM were relevant in predicting they type of search strategy that an individual would use.

Table 4. Correlation coefficients for personality traits with alternation rates.

	Variable	1	2	3	4	5	6	7
1.	Conscientiousness							
2.	Neuroticism	-.14						
3.	Openness	-.03	.13					
4.	Extroversion	.07	-.25**	.07				
5.	Agreeableness	.18*	-.30**	.13	.11			
6.	A-Rate Total	.04	-.01	.04	.13	.08		
7.	A-Rate Gains	.04	-.01	.02	.13	.09	.99**	
8.	A-Rate Loss	.03	-.01	.04	.14	.07	.99**	.98**

Note. $N = 170$ *$p < .05$, **$p < .01$

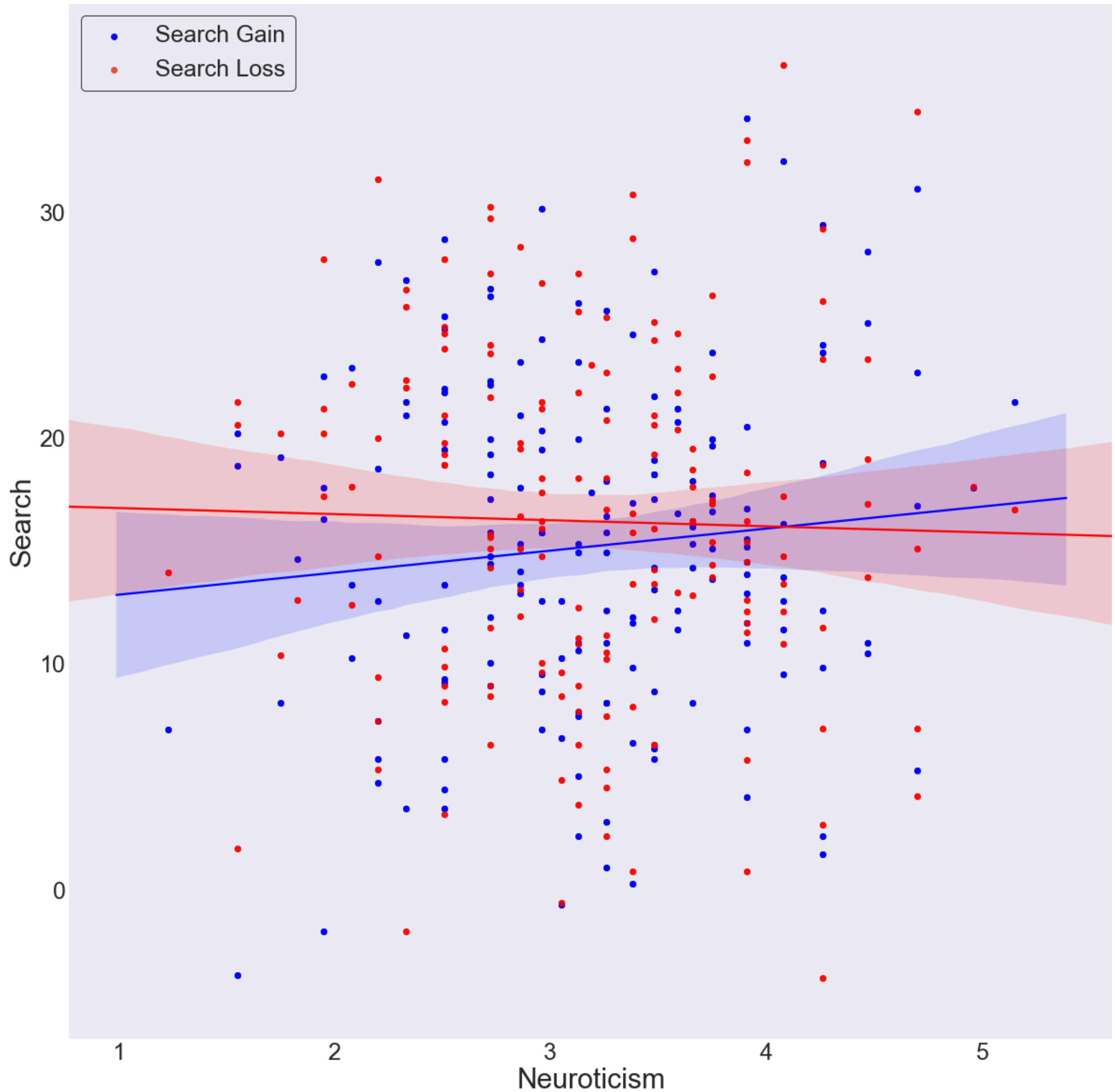

Figure 6. The difference between the correlations of neuroticism and search based on decision domain within the gain domain neuroticism was positively associated with search, and in the loss domain, there was almost no relationship between neuroticism and search.

CHAPTER IV. DISCUSSION

Many major organizational decisions, such as determining which new technologies to purchase or deciding which applicants to hire, rely on experiential sampling, such as employers identifying different technologies before selecting one to purchase, or interviewing different applicants before making a selection decision. Understanding individual differences in search is also important for instances where only losses or costs are involved, such as selecting a primary healthcare provider for the company. Yet, despite the importance of understanding differences in individual search behavior, little research has addressed this topic directly. The purpose of the current study was to contribute to the literature on individual differences by examining how differences in personality predicted search behavior for different types of DfE. The results of the present study did not indicate that the personality traits of conscientiousness or neuroticism were predictive or relevant for influencing the amount of search that people engaged in before making DfE.

While past research has found that conscientiousness is linked to more deliberate decision making (McCrae & Costa, 1994; Costa et al., 1991), it is possible that more deliberation did not translate itself into more sampling by participants. Instead, conscientious individuals may have started deliberating between the different options once they finished sampling between choices, and as a result, did not sample more than the average participant. Another reason why conscientiousness was theorized to be positively correlated with search was because of its association with higher levels of accomplishment striving (Barrick et al., 2002), in that conscientious individuals may be more focused on accomplishing their goal of trying to earn as much money as possible in the experiment and therefore increase their search behavior as a result. However, because the earnings in the experiment were minimal, (participants on average only earned $2.00) conscientious individuals may not have been focused on earning as much money as possible and as a result, accomplishment striving may not have been as relevant in this experiment.

Regarding the relationship between conscientiousness and search in the loss domain, it was hypothesized that conscientious individuals would search more in the loss domain relative to the gain domain in DfE. Based on previous research linking conscientiousness and loss aversion (Boyce et al., 2016) and its relation to higher levels of internal locus of control (Costa et al., 1991), I hypothesized that conscientiousness would be more strongly associated with search in the loss domain. As the results of the present study were not consistent with previous literature regarding the relationship between loss aversion and conscientiousness, one possible explanation for this inconsistency might be the magnitude of losses that individuals faced. Specifically, Boyce and colleagues (2016) measured loss aversion by looking at how losses in income affected a person's overall level of happiness in a longitudinal study. Alternatively, the present study measured loss aversion by looking to see if participants increased the number of times they pressed the sample button in an experiment involving a few dollars. This difference in the magnitude of loss may explain why no relationship was found. Additionally, it was also hypothesized that within the loss domain, conscientious individuals would engage in more protective measures through the use of search to help prevent losses to their previously earned gains, which was also not supported in the present study. It might be the case that participants did not believe that drawing more samples in the experiment would help them make a better decision, and as a result, they may not have viewed increased sampling as a way to reduce their losses.

Neuroticism, like conscientiousness, was also unrelated to overall search behavior. It was previously hypothesized that neuroticism would be associated with less search overall because past research has found a link between neuroticism and impulsive decision making in a variety of different contexts (Brunborg et al., 2016; Elfhag & Morey, 2008). However, based on the results of the present study, it appears that impulsiveness did not play a role in determining the amount of search that people engaged in before making DfE in the current sample. While a significant difference was observed between the correlation coefficients of neuroticism and search based on decision domain. Future work is needed to explore if losses influence the relationship between neuroticism and search within DfE since neuroticism was not found to be a significant predictor of search in either condition.

The present study contributes to the current literature on individual search behavior by providing initial evidence that the personality traits of conscientiousness and neuroticism do not play a significant role in influencing the amount of search people engage in within DfE using the sampling paradigm. Additionally, conscientiousness and neuroticism were not associated with participant alternation rates and were not correlated with the amount of switching between options participants performed within the sampling paradigm. Lastly, when broken down by decision domain, neither conscientiousness or neuroticism were found to be significant predictors of search in either the gain or the loss conditions despite a significant difference emerging between the correlation coefficients of neuroticism and search across conditions. These null findings may still be relevant for many organizations, as they suggest that overall conscientiousness and neuroticism are not a defining factor for a job that requires search based on DfE. This study also contributes to personality literature by exploring how different personality traits react to losses relative to gains and suggests other avenues of research using individual differences that may explain why there is substantial variability in search when it comes to DfE.

Limitations

One of the limitations of this study was that the sample population was primarily comprised of female undergraduate psychology students. The sample population in the study was close to 80% female, which may have had an impact on search behavior. As previous research has found that women tend to be more risk-averse than men (Borghans, Golsteyn, Heckman, & Meijers, 2009) this risk aversion may have caused a higher overall sample rate which would make it more difficult to pick up on any individual differences. Another potential limitation of the sample population is that prior research has found that females aged 21-30 tend to have higher levels of neuroticism than both men of similar ages and women who are over 30 (Srivastava et al., 2003). Because the sample for this study was primarily females in their early to late twenties, this increased level of neuroticism across the board may have also made it harder to pick up on individual differences between neuroticism and search overall and for each condition. Lastly, Hau, Pleskac, Kiefer, and Hertwig (2008) found in Study 2 of their paper that increased financial incentives led to individual searching significantly more in the high incentive condition when compared to the number of samples participants drew in the regular sampling paradigm. Specifically, for the high incentive condition, the payout ratio was multiplied by 10 for each gamble, and they found that individuals in the high incentive condition sampled considerably more (M_{draws} = 33) when compared to the standard payout condition (M_{draws} = 11). Since high incentives were not used in the present study, the use of regular incentives may have served as a limitation on two counts. First, participants may not have been as driven to earn as much money as possible because they only had a chance of winning up to $5 in the experiment. Alternatively, had high incentives been used, participants may have been more focused on maximizing their earnings since they would have a chance of earning 10 times the amount of money in the experiment. In this scenario, higher levels of conscientiousness and accomplishment striving might have been relevant in increasing the amount of search individuals drew with the goal of maximizing their earnings in the experiment. Secondly, had higher incentives been used, it is more likely that individuals may have been much more nervous during the experiment in general and especially for the loss only trials. In this case, it is possible that individuals with higher levels of neuroticism would have sampled less as a result of them being more nervous and that a more explicit relationship between neuroticism and search within the loss condition would have been found.

Future Research

The goal of the present study was to examine whether conscientiousness and neuroticism predicted search behavior in DfE within different contexts. While the results of this study did not indicate that either conscientiousness or neuroticism was relevant for explaining the high levels of interindividual variability in search within DfE, there are many other avenues of research that have yet to be explored. Future research should look at different measures of individual differences, such as risk propensity (Sitkin & Pablo, 1992), need for cognition (Cacioppo & Petty, 1982) and tolerance for ambiguity (Herman, Stevens, Bird, Mendenhall, & Oddou, 2010). Risk propensity may be relevant in influencing search behavior within DfE, with people who are less tolerant for risk searching more in the loss condition to try to figure out the frequencies of the different gamble options. Secondly, need for cognition might also be relevant for explaining individual differences in search using the sampling paradigm. Need for cognition is an individual difference which refers to a person’s tendency to engage in and enjoy activities related to effortful thinking. In the context of the sampling paradigm, individuals with higher levels of need for cognition may sample more in their effort to try to figure out the amounts and frequencies of the different gamble options. Lastly, tolerance for ambiguity may be relevant for both explaining individual variability in the amount of search people engage in and for explaining alternation rates in search. Tolerance for ambiguity refers to the tendency of individuals to perceive ambiguous situations as desirable (Bunder, 1962). In the context of search, it is predicted that individuals with lower tolerances for ambiguity will not only search more but that they will also alternate more between options so that they have a better sense of the frequencies for the different gamble options.

Conclusion

Understanding why individuals search differently when it comes to making DfE is a question that has often been sidestepped by previous literature. Knowing which type of person searches more in experientially based decisions can be very beneficial for organizations to know for selecting the right candidate in a job where they must search between different alternatives. To this end, the goal of the current study was to see if the personality traits of conscientiousness or neuroticism could help explain individual variability in search within DfE overall and in situations involving both exclusively gains or losses. Overall, the present study did not find that either conscientiousness or neuroticism were predictive of overall search in DfE, and neither of these personality traits were predictive of search in either the gain or the loss only condition. While a significant difference was found between the correlation coefficients of neuroticism and search based on decision domain future work is needed to confirm this exploratory finding as neither correlation was found to be predictive of search.

APPENDIX A. DEMOGRAPHIC QUESTIONNAIRE

1. What is your ethnicity?

   Asian

   African American

   Hispanic or Latino

   Native American

   White

   Other

2. What is your gender?

   Male

   Female

   Other

3. What is your age?

APPENDIX B. THE BIG FIVE INVENTORY (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree strongly	Disagree a little	Neither agree nor disagree	Agree a little	Agree Strongly
1	2	3	4	5

I see Myself as Someone Who...

____1. Is talkative

____2. Tends to find fault with others

____3. Does a thorough job

____4. Is depressed, blue

____5. Is original, comes up with new ideas

____6. Is reserved

____7. Is helpful and unselfish with others

____8. Can be somewhat careless

____9. Is relaxed, handles stress well

____10. Is curious about many different things

____11. Is full of energy

____12. Starts quarrels with others

____13. Is a reliable worker

____14. Can be tense

____15. Is ingenious, a deep thinker

____23. Tends to be lazy

____24. Is emotionally stable, not easily upset

____25. Is inventive

____26. Has an assertive personality

____27. Can be cold and aloof

____28. Perseveres until the task is finished

____29. Can be moody

____30. Values artistic, aesthetic experiences

____31. Is sometimes shy, inhibited

____32. Is considerate and kind to almost everyone

____33. Does things efficiently

____34. Remains calm in tense situations

____35. Prefers work that is routine

____36. Is outgoing, sociable

____37. Is sometimes rude to others

____16. Generates a lot of enthusiasm

____17. Has a forgiving nature

____18. Tends to be disorganized

____19. Worries a lot

____20. Has an active imagination

____21. Tends to be quiet

____22. Is generally trusting

____38. Makes plans and follows through with them

____39. Gets nervous easily

____40. Likes to reflect, play with ideas

____41. Has few artistic interests

____42. Likes to cooperate with others

____43. Is easily distracted

____44. Is sophisticated in art, music, or literature

Scoring:

BFI scale scoring ("R" denoves reverse scored items):

Extraversion: 1, 6R, 11, 16, 21R, 26, 31R, 36
Agreeableness: 2R, 7, 12R, 17, 22, 27R, 32, 37R, 42
Conscientiousness: 3, 8R, 13, 18R, 23R, 28, 33, 38, 43R
Neuroticism: 4, 9R, 14, 19, 24R, 29, 34R, 39
Openness: 5, 10, 15, 20, 25, 30, 35R, 40, 41R, 44

APPENDIX C. SAMPLE GAMBLES

The gambles chosen were based off Pinto & Harman, (2017) and where modified to include gambles that contain roughly equivalent expected values (EVs) for the gambles with losses. Each gamble presented was randomized without replacement. For each option presented, the first number represents the outcome (money earned or lost), which is then followed by its subsequent probability, and the numbers in parenthesis represent the second outcome followed by its probability. Additionally, bolded and underlined options indicate the option with the higher expected value for the choice problem where the expected value is not equal across options.

Choice Problem	Options #1	Options #2	EV Option #1	EV Option #2	Equal EV?	Mean and SD Search Per Gamble	Percentage of Choice for Option #1
Gamble #1	<u>**1.25, .40 (0.25, .60)**</u>	0.45, .95 (0.10, .05)	0.65	0.43	No	15.43 (11.21)	94%
Gamble #2	0.75, .40 (0.20, .60)	<u>**0.90, .90 (0.15, .10)**</u>	0.42	0.83	No	12.65 (7.42)	10%
Gamble #3	<u>**1.10, .45 (0.25, .55)**</u>	1.50, .05 (0.40, .95)	0.63	0.46	No	18.03 (13.97)	66%
Gamble #4	0.50, .75 (0.15, .25)	<u>**0.95, .60 (0.10, .40)**</u>	0.41	0.61	No	14.55 (13.97)	15%
Gamble #5	<u>**0.75, .80 (0.20, .20)**</u>	0.50, .70 (0.35, .30)	0.64	0.46	No	14.46 (10.67)	87%
Gamble #6	0.60, .75 (0.30, .25)	0.30, .50 (0.45, .50)	0.53	0.53	Yes	14.49 (8.78)	89%
Gamble #7	1.20, .40 (0.20, .60)	0.85, .30 (0.50, .70)	0.60	0.61*	Yes	17.06 (12.65)	69%
Gamble #8	0.70, .25 (0.30, .75)	0.50, .65 (0.20, .35)	0.40	0.40	Yes	16.11 (11.27)	62%
Gamble #9	0.80, .70 (0.10, .30)	0.70, .80 (0.15, .20)	0.59	0.59	Yes	14.26 (11.27)	66%
Gamble #10	1.00, .50 (0.20, .50)	0.70, .75 (0.30, .25)	0.60	0.60	Yes	15.04 (11.96)	69%
Gamble #11	-1.10, .40 (-.35, .60)	<u>**-.45, .90 (-.20, .10)**</u>	-0.65	-0.43	No	15.95 (12.10)	32%
Gamble #12	<u>**-0.55, .40(-.30, .6)**</u>	-0.85, .95 (-.25, .05)	-0.43	-0.82	No	16.75 (11.40)	88%
Gamble #13	-1.15, .45 (-.20, .55)	<u>**-1.40, .05 (-.40, .95)**</u>	-0.63	-0.45	No	17.53 (12.88)	56%
Gamble #14	<u>**-.45, .80 (-.25, .20)**</u>	-90, .60 (-.20, .40)	-0.41	-0.62	No	16.11 (11.37)	64%
Gamble #15	-.80, .75 (-.20, .25)	<u>**-.60, .65 (-.20, .35)**</u>	-0.65	-0.46	No	17.34 (11.84)	11%
Gamble #16	-.65, .75 (-.15, .25)	-.60, .65(-.40, .35)	-0.53	-0.53	Yes	17.99 (13.67)	61%
Gamble #17	-1.15, .40 (-.25, .60)	-.80, .45 (-.45, .55)	-0.61	-0.61	Yes	14.98 (9.18)	65%
Gamble #18	-.65, .30 (-.30, .70)	-.55, .60, (-.20, .40)	-0.41	-0.41	Yes	14.77 (9.88)	6%
Gamble #19	-.80, .65 (-.20, .35)	-.75, .65 (-.30, .35)	-0.59	-0.59	Yes	16.74 (12.64)	55%
Gamble #20	-.90, .60 (-.15, .40)	-.75, .75 (-.15, .25)	-0.60	-0.60	Yes	15.01 (10.11)	37%

Note. EV = expected value

APPENDIX D. COPY OF IRB APPROVAL

ACTION ON EXEMPTION APPROVAL REQUEST

TO: Michael Hay Psychology

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: September 25, 2018

RE: **IRB#** E11218

TITLE: The Influence of Personality and Losses on Search in Decisions from Experience

New Protocol/Modification/Continuation: New Protocol

Review Date: 9/25/2018

Approved X **Disapproved** ________

Approval Date: 9/25/2018 **Approval Expiration Date:** 9/24/2021

Exemption Category/Paragraph: 2a

Signed Consent Waived?: No

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable):

By: Dennis Landin, Chairman DLandin

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.

8. SPECIAL NOTE: When emailing more than one recipient, make sure you use bcc. Approvals will automatically be closed by the IRB on the expiration date unless the PI requests a continuation.

** All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at http://www.lsu.edu/irb*

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