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Induced Moods, Warning Messages, and Gambling Behavior

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INDUCED MOODS, WARNING MESSAGES, AND GAMBLING BEHAVIOR

by

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ABSTRACT

Gambling behavior is maintained by cognitive biases (Ladouceur & Walker, 1996; Sharpe, 2002) which stem from an automatic level of thinking, referred to as System 1 (Kahneman, 2011). System 2 thinking is more deliberative than System 1, but requires more cognitive effort. System 2 is only activated when necessary. Positive affect increases reliance on System 1, often leading to an increase in risky behavior. Negative affect increases reliance on System 2, often leading to a decrease in risky behavior. Researchers argue that mandatory warning messages should be implemented in gambling venues to caution patrons against the dangers of problem gambling (Blaszczynski, Ladouceur, & Shaffer, 2004; Ginley, Whelan, Pfund, Peter, & Meyers, 2017; Steenbergh, Whelan, Meyers, May, & Floyd, 2004). Pop-up warning messages (Monaghan & Blaszczynski, 2010) containing information meant to correct gambling-related cognitive biases (Ginley et al., 2017) are most effective. The current study sought to bridge a gap between the literature on gambling warning messages and literature on the effect of affect on risky decision-making. If a case is to be made for implementing mandatory gambling warning messages, it is important to examine if the effectiveness of warning messages is modulated by affect. Participants were randomly assigned to be induced with either positive or negative affect, and to either receive gambling warning messages or not receive gambling warning messages. It was hypothesized that those induced with positive affect would have higher levels of risk-taking than those induced with negative affect. It was also hypothesized that there would be an interaction effect between affect condition and warning message condition. Results showed that there was not a significant difference in risk-taking behavior between those who received warning messages and those who did not receive warning messages. There was a trend towards a significant difference based on affect condition, in that those induced with negative affect had slightly higher levels of risk-taking than those induced with positive affect. No significant interaction effects were detected.

INDEX WORDS: Gambling, Risk-taking, Warning messages, Positive affect, Negative affect, System 1, System 2.

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DEDICATION

I would like to dedicate this project to my parents, Clyde and Laura Bradley, who have always encouraged me to work hard and achieve my goals. Thank you for your love and support!

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INTRODUCTION

People are faced with opportunities to engage in risky behaviors on a daily basis. Risk-taking behaviors are typically defined as actions that are known to have potentially negative outcomes (Boyer, 2006; Reyna & Farley, 2006). These behaviors encompass a wide variety of actions including, but not limited to: drinking and driving, substance abuse, unprotected sex, and gambling. The Research Institute on Addictions (2012) found that over 80 percent of Americans participate in gambling activities every year. In addition, the 2016 Survey of Problem Gambling Services in the United States stated that 5.45 million Americans reported a problem with gambling in the past year (National Council on Problematic Gambling, 2016). Problem gambling (i.e., excessive gambling) can lead to difficulties in one's daily life, such as complications with relationships, finances, and jobs (Wang, 2016). According to the *Diagnostic and Statistical Manual of Mental Disorders: 5th Edition* (DSM-5), problem gambling can lead to a diagnosis of gambling disorder, which is currently the only behavioral addiction disorder recognized (American Psychiatric Association, 2013). To be diagnosed with a gambling disorder, at least four of the following symptoms/behaviors must have occurred during the past year: the need to gamble with an increasing amount of money to achieve a desired level of excitement, feeling restless or irritable when trying to reduce gambling, repeated unsuccessful efforts to reduce gambling, frequent thoughts about gambling, gambling when distressed, returning to "get even" (i.e., win back lost money) after losing, lying to conceal gambling activity, relying on others to help with financial difficulties caused by gambling, and/or jeopardizing a significant relationship, job, educational opportunity, or career opportunity due to gambling (Wang, 2016).

Problem gambling can have disastrous consequences, and the question remains whether effective preventative measures can be implemented. However, in order to contemplate potential preventative measures, one must consider how problem gambling develops and is maintained. For instance, gamblers often endorse various cognitive biases that contribute to their gambling behavior. In addition, affect plays

an important role in whether one chooses to engage in risky behaviors, such as gambling. The issues of cognitive biases and affect, including their relation to one another, will be further addressed.

Gambling and Cognitive Biases

From a cognitive perspective, gambling behavior is maintained by irrational beliefs or cognitive biases (Ladouceur & Walker, 1996; Sharpe, 2002). Examples of gambling-related cognitive biases include believing that future outcomes of a random event can be predicted based on previous outcomes (i.e., the gambler's fallacy), believing that certain strategies can increase the chances of winning, or attributing positive outcomes to internal factors (e.g., skill) and negative outcomes to external factors (Emond & Marmurek, 2010; Gobet & Schiller, 2011; Ladouceur & Walker, 1996; Sharpe, 2002). Though individuals tend to rely on these beliefs when they gamble, these beliefs are inaccurate. It is likely that early gambling experiences, such as big wins, contribute to the development of cognitive biases (Sharpe, 2002). These cognitive biases then cause people to focus on positive outcomes more so than negative outcomes associated with gambling behavior.

These cognitive biases stem from a reliance on automatic thought processes. Kahneman (2011) argues that there are two separate systems of thought processes. System 1 is automatic, quick, and intuitive. Also referred to as "fast" thinking, this system requires very little cognitive effort and offers no sense of voluntary control (Kahneman, 2011). Capabilities of System 1 include innate skills (e.g., perception) as well as learned skills that have become automatic through continued practice (e.g., reading). On the other hand, System 2 is slower and requires more cognitive effort and attention. Examples of System 2 capabilities include comparing items, counting the number of times someone says "like" during a class presentation, and self-control. Though both systems have their own set of capabilities, they often work together.

System 2 has limited resources and typically runs at low-effort levels unless called upon (Kahneman, 2011). System 1 generates suggestions for System 2 (e.g., beliefs, feelings, ideas), and the suggestions become actions if endorsed by System 2. Sometimes, System 2 will suppress a suggestion

from System 1 or modify it. This process usually happens with little effort. However, sometimes the process is not as simple and System 1 must defer to System 2. System 2 must be mobilized (i.e., temporarily stop functioning at a low effort level to allocate resources to the current situation) when System 1 cannot generate an answer or when an event occurs that goes against System 1's expectations (e.g., when one is surprised). System 1 is usually effective in making judgments and decisions, but it is not perfect. Therefore, it is prone to errors and biases. However, both systems are responsible when an error occurs. System 1 may have generated the suggestion, but System 2 endorsed the suggestion and allowed it to be expressed into action. System 2 may endorse an incorrect suggestion from System 1 because System 2 did not realize the suggestion was incorrect or because System 2 did not apply the appropriate cognitive effort to catch the error. Errors can stem from cognitive biases (e.g., irrational thinking) or the use of heuristics. There are several cognitive biases and heuristics that are common to gambling.

A heuristic is a simple process that allows one to find an acceptable, though potentially imperfect, answer to a difficult question (Kahneman, 2011). When System 1 has difficulty generating a suggestion, it may employ the use of a heuristic to find a simpler answer. Though heuristics can be effective, they are not foolproof. System 2 does have the ability to reject a heuristic answer; however, System 2 often chooses to employ the least amount of cognitive effort necessary. Therefore, heuristic answers suggested by System 1 are often endorsed by System 2, even if the heuristic is incorrect. The tendency to rely on System 1 instead of the effortful System 2 can likely to be attributed to the idea that humans are cognitive misers (Fiske, 1980; Macrae, Milne, & Bodenhausen, 1994). Humans tend to use cognitive simplifying tools, such as heuristics, to preserve cognitive resources when possible.

The representativeness heuristic and the gambler's fallacy. One cognitive error common to gambling is the representativeness heuristic, which involves judging probabilities based on how representative "A" is of "B" (Tversky & Kahneman, 1974). This method can lead to misconceptions of chance, which contributes to the gambler's fallacy (i.e., believing that future outcomes of a random event

can be predicted based on previous outcomes). When the representativeness heuristic is used, it is expected that a random sequence of events will be representative of the possible outcomes, even if the sequence is short. For gambling, this means that people believe that the sequence of events generated when gambling should be representative of the potential outcomes (i.e., representative sequence of both wins and losses). Therefore, people often believe a win is due when they are faced with multiple losses. Individuals tend to believe that a deviation in one direction (e.g., a loss) should cause a deviation in the other direction (i.e., a win), even though this belief violates the laws of chance (Tversky & Kahneman, 1974).

Cognitive Biases. System 1 can also give rise to cognitive biases (Kahneman, 2011). A cognitive bias can be defined as an implicit association that distorts judgment away from the norms of rationality (Holroyd, 2015). Cognitive biases are difficult to prevent because they occur at an automatic level. Though System 2 has the capacity to prevent one from acting on a cognitive bias, the fact that System 2 has limited resources can keep this from happening. In addition, it is impractical for System 2 to replace System 1 for routine decision-making, as System 2 is too slow. There are often many cognitive biases present in gamblers, which may be due to the fact that repetition (i.e., repeated gambling, in this case) increases reliance on System 1. A slot machine is a common form of gambling that is very repetitive. All that is required is for one to press a button or pull a lever repeatedly to keep the reels spinning. Mccusker and Gettings (1997) argued that they provided evidence that cognitive biases operate at an automatic level. In their experiment, problem gamblers completed a Stroop task. Participants were asked to view words presented in different colors, and say the name of the color of the word out loud. Participants viewed neutral words, gambling related words, and words pertaining to other addictions (e.g., drugs). Participants demonstrated slower reaction times (for naming the color of the word) on gambling related words than neutral words or words pertaining to other addictions. These results indicated that there was interference, which made it difficult to suppress gambling-related information. Concentrating on naming the color out loud required cognitive effort, and therefore activated System 2. However, System 1

interfered with System 2 on trials containing gambling-related words. This interference resulted in slower reaction times on these trials.

Illusion of Control. The illusion of control may stem from a misconception of luck versus chance. Though academic conceptions of luck and chance may be virtually the same, individuals tend to view chance as something that is external and uncontrollable, while luck is something internal that they can "use" (Wagenaar & Keren, 1988; Wohl & Enzle, 2002). In other words, people feel more confident about their chances of winning when they feel as though they have control over some aspect of a situation (e.g., choosing their own numbers) because they think they can use their luck to make the desired outcome more likely to happen. Interviews with gamblers revealed that most believed gambling outcomes were due to combinations of chance, luck, and skill. This demonstrates that gamblers do not perceive chance and luck to be the same. Though System 2 likely contains the knowledge (i.e., luck and chance are virtually the same, and cannot be controlled) to suppress this cognitive illusion, it often does not engage the required cognitive effort to reject the suggestion from System 1.

Gamblers exhibit a perceived illusion of control over the outcome of a game, even though the outcome is due to chance. This cognitive bias leads them to believe that certain rituals (e.g., blowing on the dice before rolling them) or strategies can increase their chance to win or that they can predict the outcome (Ladouceur & Walker, 1996; Wohl & Enzle, 2002). When participants were given the chance to choose their own lottery ticket, they reported feeling as though they had greater chances of winning and greater perceptions of personal luck than participants who were not allowed to choose their own lottery ticket (Wohl & Enzle, 2002). In addition, a positive relationship was found between perceived chance of winning and perceived personal luck. The authors attributed this to the idea that participants believed they could use their personal luck to increase their chance of winning. A similar study involved playing roulette (Dixon, 2000). Participants could choose their own chip placement on some trials and the dealer chose their chip placement on other trials. Participants placed higher bets when they could control their chip placement than when the dealer controlled the chip placement. In addition, when asked how likely

they thought their chances of winning were, participants overestimated their chances of winning when they controlled the chip placement and underestimated their chances of winning when the dealer controlled the chip placement. These studies provide evidence for the idea that illusion of control leads one to believe they can increase their opportunity to win a game of chance.

Affect

Affect plays an important role in the decision-making process, and can influence one's decision on whether to engage in a risky behavior such as gambling (Clore, Gasper, & Garvin, 2001; Kahneman, 2011; Schwarz, 2012). Affect, mood, and emotion are terms that are often used interchangeably. Mood refers to a relatively enduring affective state that does not necessarily have a known cause, emotion refers to an intense, short lived feeling with a known cause, and affect refers to a general state that encompasses both mood and emotion (Forgas, 1995). There are two main types of emotions related to decisions: integral emotions and incidental emotions. Integral emotions are produced in response to the specific decision or task at hand; however, incidental emotions are irrelevant to the decision or task at hand and are the results of unrelated factors such as affect (Lerner & Keltner, 2000).

According to the affect as information approach, emotions are incorporated into information used to make decisions, whether they are relevant to the target decision/task or not (Clore et al., 2001; Schwarz, 2012). The way in which affective states influence cognitive evaluations depends on the subjective experience of the affective state (Clore et al., 2001). In other words, the way affective information is experienced (e.g., intensity of affective information or the amount of attention the affective information receives) plays an important role in one's cognitive evaluations of a judgment, decision, and/or task. Emotions provide conscious information from unconscious appraisals of situations. These emotions are used as feedback to guide decisions because they are experienced as information about a target. Affective information deals with how something makes you feel (e.g., good or bad) and/or how you feel about something (e.g., like or dislike). The value of affective information and its effect on cognitive evaluations depends on how the affective experience is attributed. Affective information only

influences judgment and decision-making if the affective information is attributed towards the object of judgment and/or the task at hand. Incidental emotions often provide affective information, but this information can be misleading (Schwarz, 2012). Feelings can be misattributed to an object/task that was not the actual reason for the feelings. Moods that result from background affective information that one is not completely aware of (i.e., incidental emotions) are often subject to misattribution. This happens because people are often much more sensitive to their feelings than where the feelings come from (Schwarz, 2012). People typically assume that their current feelings are about whatever is in their mind and/or has their attention at that moment. The use of affect as information does not require conscious attribution to an object. In other words, affect can be used as information at an automatic level (System 1), and does not necessarily require cognitive effort from System 2. System 1 is prone to errors (which System 2 often endorses), which also explains why affect can be misattributed to an incorrect source. Therefore, when individuals are gambling, they are likely relying on System 1 thinking and they may misattribute background affective information to the game (e.g., slot machine, video poker, blackjack, etc.) they are currently playing

Positive and Negative Affective Processing. Affective reactions can be experienced differently depending on the judgment, decision, or task at hand. The affective processing principle states that affective information may be experienced as performance feedback when one is performing a task (Clore et al., 2001). In this case, positive affect may be experienced as feelings of confidence about one's ability to perform the task (e.g., gambling), therefore leading to greater reliance on one's own beliefs, expectations, and inclinations.

When one is task-oriented, positive affect increases top-down processing, which relies on information such as context, one's personal knowledge, beliefs, and expectations. In other words, positive affect increases the use of System 1. Positive affect gives one a state of cognitive ease, which makes one more likely to be in a good mood, like what they see, and trust their intuitions (Kahneman, 2011). When one is experiencing a positive mood, a less vigilant thinking process is employed (i.e., System 1). On the

other hand, negative affect may be experienced as doubt about one's ability to perform the task, therefore leading to lesser reliance on one's own beliefs, expectations, and inclinations. In this case, negative affect increases bottom-up processing, which relies on data-based information from the environment instead of internal information. In other words, negative affect increases the use of System 2. Negative affect promotes a state of cognitive strain, which causes one to be more vigilant and suspicious, use more effort, and rely less on intuitions (Kahneman, 2011). When one is experiencing a negative mood, a more vigilant thinking process is employed (i.e., System 2).

Positive affect has been shown to cause individuals to overestimate the likelihood of positive events, underestimate the likelihood of negative events (Wright & Bower, 1992), and to increase risk taking (Grable & Roszkowski, 2008; Stanton, Reek, Huettal, & LaBar, 2014; Schulreich et al., 2014). Since positive affect increases reliance on System 1, it reduces vigilance. When primed with happy music, participants were more likely to choose risky lottery choices (Schulreich et al., 2014). This is consistent with the results that those in a positive mood are more willing to take financial risks (Grable & Roszkowski, 2008) and gamble recklessly (Cummins, Nadorff, & Kelly, 2009; Stanton et al., 2014). This effect has been seen outside the laboratory as well. Researchers found that factors that caused incidental positive affect (such as sunny weather and local sports teams winning games) were positively related to the number of lottery tickets sold (Otto, Fleming, & Glimcher, 2016). When people were in a good mood, they were more likely to take a risk and buy a lottery ticket. The authors posed that positive affect may facilitate an optimism bias, which was defined by Sharot (2011) as the difference between one's expectations and reality. When expectations are better than reality, it is considered an optimistic expectation. As with other cognitive biases, the optimism bias likely stems from System 1. This has important implications for gambling behavior, as problem gamblers who recently quit identified positive affect (Holub, Hodgins, & Peden, 2005) and feelings of optimism about their chances of winning (Hodgins & el-Guebaly, 2004) as factors associated with a higher likelihood of a major relapse.

Negative affect is often associated with risk aversiveness, which likely stems from an increased reliance on the more vigilant System 2. Those in a negative mood are more likely to underestimate the likelihood of positive events and overestimate the likelihood of negative events (Wright & Bower, 1992), which contributes to more risk-aversion (Yuen & Lee, 2003; Schulreich et al., 2014; Schulreich, Gerhardt, & Heekeren, 2016). When primed with negative affective stimuli (i.e., fearful stimuli), participants were less likely to accept a gamble, which indicates risk-aversiveness (Schulreich et al., 2016). Negative affect likely mobilized System 2, which increased vigilance and cognitive effort. Participants also demonstrated risk-averse behavior when primed with sad music (Schulreich et al., 2014). After listening to sad music, participants were less likely to take a risky gamble than participants primed with happy music, random musical tones, or no music. Similarly, participants were also less likely to take a risky gamble after watching a sad film clip (Yuen & Lee, 2003). When given the option between a predictable, small reward and a risky, large reward, participants in an induced sad mood were less likely to take a risk than those who watched a happy or neutral film clip.

Affect has strong implications for the judgment and decision-making process, particularly in terms of whether one chooses to engage in risky behaviors. When experiencing positive affect, System 2 is more likely to remain in a low effort mode and allow System 1 to handle the decisions at hand. Therefore, people are more likely to take risks when they are experiencing positive affect. This is because positive affect causes people to trust their intuitions and is often viewed as confidence about a decision or performance on a task. When one is experiencing positive affect while gambling, they may feel more confident that they will win, and subsequently be more likely to gamble. On the other hand, System 2 is more likely to take over and expend cognitive effort when one is experiencing negative affect. Negative affect causes people to be more vigilant and cautious about decisions and is often experienced as doubt about a decision or performance on a task. Therefore, people are less likely to take risks when experiencing negative affect. When one is experiencing negative affect while gambling, they may feel doubtful about their chance of winning and subsequently be less likely to gamble. Positive or negative

affect can arise from incidental emotions, but may be misattributed to the current decision or task at hand. This allows affect, regardless of the original source, to influence many decisions and judgments.

Gambling Warning Messages

There are many opportunities for background affective information to be misattributed to the act of gambling itself. Affective information can stem from the weather (Otto et al., 2016), feelings about how one's day has been, the gambling venue (e.g., lights, music, people, etc.), or numerous other factors. Depending on how the affective information is experienced (i.e., positively or negatively), it could potentially increase the likelihood that one will gamble. However, excessive gambling can have many negative effects on one's life. Therefore, some believe that gambling venues should have mandatory warning messages to caution patrons against the dangers associated with excessive gambling (Blaszczynski, Ladouceur, & Shaffer, 2004; Ginley, Whelan, Pfund, Peter, & Meyers, 2017; Steenbergh, Whelan, Meyers, May, & Floyd, 2004). They argue that federal regulations have been implemented to caution consumers against other potentially harmful products, such as alcohol and tobacco; therefore, these regulations should extend to gambling venues as well. Blaszczynski and colleagues (2004) note that the decision to gamble is ultimately that of the individual; however, consumers should have the right to make an informed decision and the gambling industry should not intentionally exploit consumers. There are various factors that play into creating an effective warning, including message type (static versus pop-up), timing, and content.

Static warnings posted around the venue (signs on walls, gambling machines, etc.) are ineffective (Monahgan, Blaszczynski, & Nower, 2009). These posted warnings did not reduce gambling behavior or gambling related cognitive biases and participants could not recall the content of the warnings. These findings led researchers to explore other options for displaying effective warning messages. Compared to static warnings, pop-up warning messages were found to be much more effective (Monaghan & Blaszczynski, 2010). Pop-up messages are messages that "pop up" on the screen of an electronic gambling machine (e.g., slot machine or video poker) during gameplay. These messages take up a portion

of the screen, and interrupt play for a brief period of time to display a message. Monaghan and Blaszczynski (2010) tested the comparison of these two methods (static and pop-up warning messages) on both undergraduate students and patrons of a gambling venue. All participants, including those recruited from a gambling venue, played on a simulated electronic gambling machine (EGM). Some participants received warning messages in the form of static sign posted near the machine, while others received pop-up messages during gameplay. No behavioral data was collected regarding gambling behavior or patterns. Participants who received pop-up warning messages during game play indicated via self-report measures that the messages caused them to stop playing earlier, place smaller bets, and slow their rate of betting. These effects were not reported for those who received posted warnings. Participants who received pop-up messages also had significantly higher recall of the warning message content than those who received posted warnings. This same effect was indicated through a two-week follow-up questionnaire; participants were more likely to accurately recall the content of the pop-up messages than the static signs. In a naturalistic study of online gamblers, those who received pop-up warning messages were more likely to discontinue play sooner than those who did not receive warning messages (Auer, Malischnig, & Griffiths, 2014).

It was questioned whether the fact that these pop-up warning messages caused a forced break in play was responsible for reducing gambling behavior rather than the content of the messages themselves; however, when participants were presented with blank pop-up messages, their gambling behavior was not reduced and their desire to continue playing increased (Blaszczynski, Cowley, Anthony, & Hinsley, 2016). This indicates that any observed reduction in gambling behavior is due to the content of the warning messages and not simply being forced to stop play temporarily.

Timing of the pop-up messages also appears relevant. Studies that have successfully reduced gambling behavior through messages aimed to correct cognitive biases programmed the messages to appear periodically throughout game play. When the pop-up messages appear before play and do not re-appear at all during play, they are not effective at reducing gambling behavior (Steenbergh et al., 2004).

This is likely because individuals do not maintain the same level of rational thinking while gambling as they do when they are not gambling (Pelletier & Ladouceur, 2007). This has been referred to as "double switching," meaning that people can have rational beliefs about gambling, but turn them "off" while gambling (Sévigny & Ladouceur, 2003). In other words, one might think that their chances of winning the jackpot are slim while not gambling (i.e., rational thinking switched on), but then start to think their chances to win are much better once they start gambling (i.e., rational thinking switched off). Then, once they are finished gambling, they once again believe that their chances of winning the jackpot are low (i.e., rational thinking switched on). Once again, this could be attributed to the fact that repetition (e.g., repeatedly press the "spin" button on a slot machine) increases reliance on System 1. When one is not gambling, System 2 may suppress the suggestion from System 1 that the likelihood of winning the jackpot is high. Then, with repetition of gambling, an increased reliance on System 1 could cause System 2 to not use its limited cognitive resources to suppress System 1, therefore allowing System 1 to express beliefs that the chances of winning the jackpot are high. This suggests that messages to correct cognitive biases should be presented throughout game play to help individuals maintain a rational level of thinking (i.e., rely less on System 1).

The content of the warning messages is a crucial factor. Research has suggested that warning messages intended to reduce gambling-related cognitive biases are more effective than messages that provide information about the amount of time and money spent on a gambling session (Ginley et al., 2017). For example, Floyd, Whelan, and Meyers (2006) presented participants with messages such as, "CAUTION: The result of any spin has nothing to do with previous spins" or "CAUTION: Winning is completely due to chance. No luck is involved." Several studies have shown that when presented with these messages during game play, individuals stop play earlier and place smaller bets (Benhsain, et al., 2004; Floyd et al., 2006; Jardin & Wulfert, 2009; Jardin & Wulfert, 2012; May, Whelan, Meyers, & Steenbergh, 2005). This effect has even been shown in experienced gamblers, defined as those who gamble at least twice per week (Jardin & Wulfert, 2012). Jardin and Wulfert (2009) found that warnings

that provided accurate information about gambling contingencies were more effective in reducing gambling behavior (in terms of stopping play earlier and spending less money) than messages unrelated to the game or no messages at all. When presented with messages regarding the independence of events, participants demonstrated decreased cognitive biases and increased motivation to discontinue gambling than participants who received control messages simply stating they must press "okay" to continue (Benhsain, Taillefer, & Ladouceur, 2004). However, one study found that messages aimed at correcting the illusion of control while gambling reduced cognitive biases, but did not reduce the number of games played (Cloutier, Ladouceur, & Sévigny, 2006). It should be noted that this study only measured the number of games played, and not the amount of money bet per game. It could be possible that the chosen dependent variable was not sufficient to replicate the results of previous studies. The success of previous studies that have employed gambling warning messages aimed at correcting cognitive biases indicates that this can be an effective method to reduce gambling behavior.

Cognitive biases cannot be eliminated, because they occur at an automatic level. However, their effect can be weakened. Many people are not aware of their cognitive biases because of the automaticity of System 1. Research on implicit bias reduction has found that increasing awareness of one's cognitive biases can help weaken their effect on decision-making (Croskerry, 2003; Devine, Forscher, Austin, & Cox, 2012; Jackson, Hillard, & Schneider, 2014). Being aware of cognitive biases can help introduce self-monitoring (e.g., System 2) of one's decisions, leading to fewer cognitive errors (Croskerry, 2003). If one can recognize that they are in a situation in which they are prone to experiencing cognitive biases, System 2 can be "called on" for help (Kahneman, 2011). Warning messages aimed to correct these biases could help increase awareness of common gambling related cognitive biases, and serve as a reminder that one is in a situation (e.g., gambling in a casino) where they are prone to cognitive errors. With repeated exposure to these messages, System 2 should learn to not endorse the incorrect suggestions from System 1. When presented with information that challenges beliefs of System 1, System 2 can be activated and choose to accept the contrary information.

Evidence from research suggests implementing mandatory gambling warning messages could be a viable option for preventing the development of problem gambling. Previous research has indicated that pop-up warning messages are not very disruptive and do not hinder one's enjoyment while gambling (Palmer du Preez, Landon, Bellringer, Garrett, & Abbott, 2016). To be the most effective, previous research suggests that these warning messages should attempt to correct common gambling-related cognitive biases, such as the gambler's fallacy or the illusion of control. The goal of these warning messages would be to reduce reliance on System 1 thinking, and subsequently increase reliance on System 2 thinking. If System 2 thinking is activated, then one should be more vigilant in the decision-making process.

Current Study

The current study is an attempt to merge two separate bodies of research that have not been previously explored in the context of one another. If a case is to be made for implementing mandatory gambling warning messages, their effectiveness must be examined in all contexts. As affect plays an important role in the decision-making process, it is important to examine if the effectiveness of gambling warning messages is modulated by affect. Based on previous research, the following hypotheses have been constructed:

Hypothesis 1: Those induced with positive affect will display higher levels of risk-taking behavior than those who are induced with negative affect.

Hypothesis 2: There will be an interaction effect between the affect and warning message conditions.

2a: Those in the positive affect with warning messages condition will not differ in levels of risk-taking behavior from the positive affect without warning messages condition.

2b: Those in the negative affect with warning messages condition will display lower levels of risk-taking than those in the negative affect without warning messages

condition, the positive affect with warning messages condition, and the positive affect without warning messages condition.

Previous research has already demonstrated that positive affect is associated with increased risk-taking, while negative affect is associated with decreased risk-taking. Therefore, hypothesis 1 is expected to replicate findings of existing research.

Hypothesis 2a suggests that warning messages will not reduce gambling behavior for those induced with positive affect. Positive affect increases risk-taking behaviors, likely due to more reliance on System 1. Reliance on System 1 is also increased during repetitive tasks (e.g., gambling). Though System 2 has the capacity to suppress System 1, it often chooses the easier (i.e., requires less cognitive effort) route of simply accepting System 1's suggestions due to limited resources (Kahneman, 2011). With both positive affect and repetition causing an increase in reliance on System 1, it is hypothesized that System 2 will choose to endorse System 1's suggestions to spare cognitive resources.

Hypothesis 2b suggests that participants who are induced with negative affect and receive warning messages should display the lowest levels of risk-taking. Negative affect mobilizes System 2, and causes one to be more vigilant and suspicious. With System 2 already mobilized, it is hypothesized that warning messages will increase vigilance further. In this case, System 2 should suppress any suggestions of cognitive biases from System 1 that would lead to more risky behavior.

CHAPTER 2

METHOD

Participants

A power analysis indicated that at least sixty-six participants would be necessary to detect any significant effects. The power analysis was conducted using G*Power 3.1. The parameters of the power analysis were $\alpha = 0.05$, power = 0.80, and $\eta_p^2 = 0.11$, which was the smallest reported η_p^2 in previous research (Smallwood, Fitzgerald, Miles, & Phillips, 2009). This indicated that a medium to large effect size could be expected.

A total of 104 participants completed the study, but four participants were excluded from the analyses for failing at least one attention check question. Participants included 59 women and 41 men with a mean age of 19.47 years old (See Table 1). Participants were recruited from undergraduate psychology classes at Georgia Southern University through the SONA system and participated to fulfill a course requirement.

Overview

The study was completed in-person. Each participant came into the lab individually and completed all measures on a computer. All materials in this experiment were presented through E-Prime 2.0. The study took approximately twenty minutes to complete. Half of the participants were induced with positive affect using a standardized method and half were induced with negative affect using a standardized method. In addition, half of the participants received gambling warning messages during a computerized gambling task and half received no messages. These two variables were counterbalanced to produce four distinct experimental conditions: a positive affect induced with warning messages condition (hereafter referred to as PM+); positive affect induced without warning messages condition (PM-); negative affect induced with warning messages condition (NM+); and negative affect induced without warning messages condition (NM-). Participants were assigned to one of these four conditions when they

signed up for the experiment. In each condition, participants completed self-report measures and a behavioral measure of risk-taking (See Figure 1).

Materials

Affect Measure. Participants were given the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) twice. First to establish baseline affect levels at the beginning of the experiment and then to detect any change in affect level after viewing the emotional stimuli (Appendix A). The PANAS is a 20-item scale that was developed to assess positive and negative affect. Previous research has demonstrated that the PANAS has good construct validity and reliability (Crawford & Henry, 2004). The internal consistency for the current sample was calculated for both the positive affect scale (Cronbach's $\alpha = .84$) and the negative affect scale (Cronbach's $\alpha = .86$) for the PANAS 1 and for both the positive affect scale (Cronbach's $\alpha = .87$) and the negative affect scale (Cronbach's $\alpha = .86$) for the PANAS 2.

Participants were asked to rate the extent to which they were currently feeling a variety of positive and negative emotions on a scale from 1 (very slightly or not at all) to 5 (extremely). To score this scale, the average of participants' responses on all positive affective words was calculated, as well as the average of participants' responses on all negative affective words. This resulted in each participant receiving two PANAS scores (a positive score and a negative score).

Affective Stimuli. The affective stimuli consisted of two film clips chosen from an empirically validated database of emotion eliciting film clips (Schaefer, Nils, Sanchez, & Philippot, 2010). Film clips are an effective mood induction procedure (Lench, Flores, & Bench, 2011; Rottenberg, Ray, & Gross, 2007; Schaefer et al., 2010; Westermann, Spies, Stahl, & Hesse, 1996). Film clips are low in demand characteristics, high in attentional capture, and elicit longer lasting affective states than still pictures (Rottenberg et al., 2007). Participants viewed one film clip, depending on which affective condition they were randomly assigned to. In the positive affect condition, participants viewed a scene from *Dead Poet's Society*. In this scene, students expressed their support for their teacher. This film clip was chosen because

it ranked high in positive affect and arousal (i.e., intensity). In the negative affect condition, participants viewed a scene from *Misery*. In this scene, a woman prepares to break the ankles of a man she is holding captive. This film clip was chosen because it ranked high in negative affect and arousal. Each film clip was two minutes and twenty-four seconds in length.

Behavioral Measure. To measure gambling/risk-taking behavior, participants completed a computerized game, The Balloon Analogue Risk Task (BART; Lejuez et al., 2002). The BART correlates with self-reported levels of real world risk-taking, including gambling (Wallsten, Pleskac, & Lejuez, 2005). The BART also has good test-retest reliability, meaning that a participant's performance on the task on one occasion should be representative of their performance on the task on other occasions (White, Lejuez, & Wit, 2008).

Self-Reported Risk-Taking. Participants were given the 40-item Domain-Specific Risk-Taking scale (DOSPERT; Weber, Blais, & Betz, 2002) to establish self-reported levels of real-world risk-taking behavior in financial, health/safety, recreational, ethical, and social domains (Appendix B). This scale was chosen to see if performance on the BART correlates with self-reported measures of risk-taking across different domains. Previous research has demonstrated that the BART is positively correlated with self-reported risk-taking (Wallsten et al., 2005), and the current study expected to replicate these findings by analyzing the relationship between BART performance and scores on the DOPSERT domains.

Participants were asked to rate the likelihood that they would engage in a variety of risky behaviors on a scale from 1 (very unlikely) to 5 (very likely). Participants received a total of six DOSPERT scores: a social domain score, health/safety domain score, financial domain score, ethical domain score, recreational domain score, and an overall score. The overall score was calculated by averaging participants' responses on all DOSPERT items. The scores for each of the five domains were calculated by averaging participants' responses for each DOPSERT item that fell within that domain. For example, to calculate participants' score for the social domain, only responses on DOSPERT items classified under the social domain were averaged to calculate the score. The internal consistency for the

current sample was calculated for the overall DOSPERT (Cronbach's α = .83), ethical domain (Cronbach's α = .73), financial domain (Cronbach's α = .77), recreational domain (Cronbach's α = .79), social domain (Cronbach's α = .61), and health/safety domain (Cronbach's α = .66).

Procedure

All participants recruited from the Georgia Southern University Department of Psychology were provided an informed consent upon entry to the lab. All questions about participants' roles as participants were answered at the time of participation. All measures and tasks were presented in a computerized format through E-Prime 2.0. All participants wore headphones while completing the study.

To establish baseline affect levels, participants in all conditions were given the Positive and Negative Affect Scale (PANAS) to assess the extent to which they felt a variety of emotions at that point in time. During the PANAS, two attention check questions were included. For example, one attention check question prompted participants to "press 5." These two questions were implemented to ensure that participants were paying attention during the study. After completing the PANAS, participants in PM+ and PM- conditions were primed with the positive film clip (*Dead Poet's Society*) and participants in the NM+ and NM- conditions were primed with the negative film clip (*Misery*). After viewing the film clip, participants moved on to the behavioral measure.

Participants in all conditions completed a computerized game, the Balloon Analogue Risk Task (BART), as a behavioral measure of risk-taking. Participants viewed a screen that welcomed them to the "Balloon Pumping Game" and provided them with written instructions. Participants were told that the object of the game was to obtain as many points as possible. Points were earned by pumping the balloon up without popping the balloon. Participants were told that the balloon would explode at some point, which could be as early as the first pump or not until the balloon had fully expanded. Once participants viewed the instructions, they moved on to complete one practice trial prior to moving on to the experimental trials. Participants were presented with a simulated balloon, the number of points earned on the current balloon, and the total number of points earned throughout the task (See Figure 2). Participants

were asked to “pump” the balloon (by pressing the “P” key). Participants earned ten points for each pump they made, provided they did not pop the balloon. Participants could pump the balloon as many times as they wished, or until the balloon burst. If the balloon burst, all points accumulated for that round were lost. If the participant stopped pumping (by pressing the “S” key) before the balloon burst, they kept all points earned on that round. Upon completion on the practice trial, participants moved on to complete the thirty experimental trials. The average number of pumps that participants made on each balloon that did not burst was used as the primary dependent measure of risk-taking. Higher numbers of pumps per balloon indicate higher levels of risk-taking. After each trial, a feedback screen (white background with black text) appeared (See Figure 2). The feedback screen either said “Congratulations! You won “x” points on that balloon!” or “Sorry, that balloon broke!” After one second, the feedback screen disappeared, and participants moved on to the next trial.

During the BART, half of participants received computerized pop-up warning messages. These messages contained information intended to correct/reduce cognitive biases related to gambling. There were five different warning messages. Pop-up warning messages appeared every five trials. Therefore, participants in the warning message condition received a warning message upon the completion of the fifth, tenth, fifteenth, twentieth, and twenty-fifth trials. Participants received one warning message at a time, and participants received the warning messages in the same order. After the fifth BART trial, the warning message read: “You cannot control a game of chance.” After the tenth trial, the warning message read: “This is a game of chance. No luck is involved.” After the fifteenth trial, the warning message read: “There are no strategies that will improve your chance of winning.” After the twentieth trial, the warning message read: “This is a game of chance. No skill is involved.” The last warning message appeared after the twenty-fifth trial and read: “You cannot predict whether you will win or lose.” Warning messages appeared on the feedback screen, above the feedback information. To make the warning messages salient, the messages were placed on a red octagon with white text (see Figure 2). The usual feedback information remained the same (white background with black text). Under the feedback information, participants also

saw a prompt to press space to continue. Participants were asked to press space to continue during warning message trials to ensure they had enough time to view and read the message before moving on. Those in the no warnings groups did not receive these messages and played the BART uninterrupted.

After completing the gambling task, participants completed the PANAS a second time to measure changes in affect levels after viewing the emotional stimuli and completing the BART. It was decided to place the second PANAS here instead of immediately after the film clip for several reasons. First, it was determined that it may be interesting to see if there were any changes in affect levels after the BART (i.e., if the BART itself affected affect levels), but there were concerns that having participants complete the PANAS three times (baseline levels, levels after the film clip, and levels after the BART) would cause participant fatigue. In addition, there were concerns that if participants completed the PANAS a second time prior to completing the BART, any effects of the affect manipulation may have worn off before participants started the BART. Based on previous studies that successfully induced positive and negative affect with the same film clips (Elices et al., 2012; Gartner & Bajbouj, 2014; Hinojosaa, Fernández-Folgueirasa, Alberta, Santanielloa, Pozoa, & Capillac, 2017; Karsdorp, Ranson, Nijst, & Vlaeyen, 2012; Lalot, Delplanque, & Sander, 2014; Rennung & Gõritz, 2015; Schaefer et al., 2010), it was decided that the films were validated enough to justify not placing a PANAS scale directly after the film clip. As with the first round of the PANAS, two attention check questions were included, which prompted participants to press a specific number if they were paying attention.

Once participants finished the PANAS, they completed the Domain-Specific Risk-Taking (DOSPERT) scale to measure risk-taking in five domains (financial, health/safety, recreational, ethical, and social). For this scale, participants rated the likelihood that they would engage in a wide variety of risky behaviors. As with the PANAS, two attention check questions were placed within the scale. These attention checks were worded differently to fit with the format of the DOSPERT questions. For example, one attention check question read, “If you are paying attention, please press 2.”

After completion of the DOSPERT, participants were asked four demographic questions. Participants were first asked to enter their age (in years), and then their gender. Then participants were asked to indicate, with a yes or no response, whether they had ever been given a mental health diagnosis, and then whether they currently had a mental health diagnosis. Participants were not asked to elaborate on any mental health diagnoses. Demographic information was obtained with the intention of conducting exploratory analyses to see whether age, gender, or mental health accounted for any differences in performance on the BART or self-reported risk-taking on the DOSPERT. For example, individuals who have been given a diagnosis of bipolar disorder tend to engage in more risky behaviors than individuals who have not been given a diagnosis of bipolar disorder (Mason, O'Sullivan, Montaldi, Bentall, & El-Deredy, 2014). Self-reported mental health was included in the demographics to ensure that mental health did not affect the results of the study.

After all measurements were completed, the study was concluded by debriefing participants about the nature of the study. During the debriefing, all participants were led through a short breathing exercise shown to reduce negative affect (Ma et al., 2017). During this short exercise, participants engaged in diaphragmatic breathing. Participants were asked to inhale slowly and deeply, allowing their abdomen to expand. On exhale, the breath was slowly released, allowing the abdomen to contract. Participants were asked to take a few of these breaths at their own pace, and return to their normal breathing when ready. By leading participants through this exercise, we hoped to mitigate any lingering feelings of negative affect and return participants to their baseline mood levels. After completing the breathing exercise, participants were asked what they thought about the study and if they used any strategies throughout the study. Participants were also asked what they thought was being studied. This was asked to ensure no participants were aware of exactly what was being studied, which could have potentially affected their performance throughout the study. While some participants vaguely stated they believed the study was looking at mood, emotions, or gambling, no participant stated anything other than information that was given to them in the study title or on the informed consent. No participants indicated anything that would

suggest they had guessed the directionality of the hypotheses of the study. Therefore, no participants were removed from the analyses based on their answer to this question. Participants were then debriefed about the general nature of the study and given an opportunity to ask questions.

CHAPTER 3

RESULTS

Affect Manipulation Check

A two-tailed, independent samples t-test was used to ensure the two affect groups did not differ significantly on their baseline negative PANAS scores at the beginning of the experiment (See Table 1). There was not a significant difference in baseline negative affect PANAS scores for those in the negative affect condition (M = 1.74, SEM = .09) and those in the positive affect condition (M = 1.91, SEM = .11), t (98) = -1.27, p = .21. A two-tailed, independent samples t-test was also used to ensure that the two affect groups did not differ significantly on their baseline positive PANAS scores at the beginning of the experiment. There was not a significant difference in baseline positive affect PANAS scores for those in the negative affect condition (M = 3.31, SEM = .10) and those in the positive affect condition (M = 3.23, SEM = .09), t (98) = .62, p = .54.

A PANAS change score was calculated for each participant on both the positive and negative PANAS scales. These scores were calculated by subtracting the positive affect score on the PANAS 2 from the positive affect score from PANAS 1 for each participant and subtracting the negative affect score on the PANAS 2 from the negative affect score from PANAS 1 for each participant (See Table 2). A two-tailed, independent samples t-test was then used to determine whether there was a significant change in positive affect for either affect condition. The PANAS positive affect scale change score for those in the positive affect condition (M = -.05, SEM = .07) did not significantly differ from that for those in the negative affect condition (M = -.08, SEM = .09), t (98) = -.23, p = .82.

A two-tailed, independent samples t-test was then used to determine whether there was a significant change in negative affect for either affect condition. The difference in the PANAS negative affect change score between the positive and negative affect conditions indicated a trend towards significance, in that those in the positive affect condition (M = -.22, SEM = .06) had a greater reduction in negative affect than those in the negative affect condition (M = -.05, SEM = .08), t (98) = 1.79, p = .08.

Warning Messages and Affect

A 2x2 between-subjects analysis of variance (ANOVA) was conducted to examine the effect of affect condition (positive or negative) and warning message condition (messages or no messages) on risk-taking behavior, measured as the average number of pumps on trials that participants chose to stop pumping the balloon before it burst. For the main effect of affect, there was a trend towards a significant difference in risk-taking between those who were induced with negative affect (M = 28.66, SEM = 1.68) and those who were induced with positive affect (M = 24.80, SEM = 1.51), $F(1, 99) = 2.89$, $p = .09$, $\eta_p^2 = .03$. The main effect of warning message condition was not significant $F(1, 99) = .59$, $p = .44$, $\eta_p^2 = .01$, and those who received warning messages (M = 27.61, SEM = 1.55) did not differ from those who did not receive warning messages (M = 25.85, SEM = 1.68). There was no significant interaction effect detected between mood condition and warning message condition, $F(1, 99) = .25$, $p = .62$, $\eta_p^2 = .003$, indicating no significant differences between the positive affect with warning messages (M = 26.24, SEM = 2.27), positive affect without warning messages (M = 23.36, SEM = 2.27), negative affect with warning messages (M = 28.98, SEM = 2.23), and negative affect without warning messages (M = 28.35, SEM = 2.32) conditions (See Figure 3).

DOSPERT and BART

Pearson's r was used to determine whether there was a relationship between a behavioral measure of risk-taking (BART) and a self-reported measure of risk-taking (DOSPERT). The average number of pumps on the BART was negatively related to self-reported risk-taking on the social domain of the DOSPERT r (98) = -.22, $p = .03$. A higher average number of pumps on the BART was related to a lower self-reported risk-taking score on the DOSPERT social domain (See Figure 4). There was not a significant relationship between the average number of pumps on the BART and the DOSPERT financial domain r (98) = -.02, $p = .84$, ethical domain r (98) = -.08, $p = .41$, health/safety domain r (98) = -.12, $p = .25$, recreational domain r (98) = .01, $p = .90$, or overall DOSPERT score r (98) = -.12, $p = .24$ (See Table 3).

Age

Pearson's *r* was used to analyze the relationship between age and risk-taking behavior on the BART, but no significant relationship was detected r (98) = -.01, p = .96 (See Table 3). Pearson's *r* was also used to analyze the relationship between age and self-reported risk-taking behavior on the DOSPERT, but age was not related to self-reported risk-taking in the DOSPERT ethical domain r (98) = -.11, p = .27, financial domain r (98) = -.18 p = .08, health/safety domain r (98) = -.06, p = .56, recreational domain r (98) = -.05, p = .60, social domain r (98) = -.06, p = .56, or overall DOSPERT score r (98) = -.11, p = .27 (See Table 3).

Gender

Previous research has demonstrated that there are often gender differences in risk-taking, with males typically exhibiting more risk-taking behavior than females (Byrnes, Miller, & Schafer, 1999; Croson & Gneezy, 2009; Harris, Jenkins, & Glaser, 2006). A two-tailed, independent samples t-test was used to analyze the difference between risk-taking behaviors on the BART based on gender. Male participants pumped the balloon more on average (M = 29.94, SEM = 2.10) than female participants (M = 24.51, SEM = 1.20), t (98) = 2.40, p = .02 (See Figure 5). An ANOVA that built upon the above reported warning messages and affect analyses and included gender as an additional between-subjects factor revealed no significant interactions between gender and mood condition or warning message condition.

A two-tailed, independent samples t-test was used to analyze the difference between self-reported risk-taking behaviors on the DOSPERT based on gender (See Figure 6). Men reported being more likely to take financial risks (M = 2.38, SEM = .10) than women (M = 1.97, SEM = .08), t (98) = 3.07, p = .003. In addition, women reported being more likely to take social risks (M = 3.80, SEM = .07) than men (M = 3.47, SD = .08), t (98) = -3.07, p = .003. There was not a significant difference in participants' overall DOSPERT scores t (98) = .19, p = .85, or their scores on the ethical domain t (98) = -.26, p = .80, health/safety domain t (98) = -.51, p = .61, or recreational domain t (98) = .62, p = .54 based on gender.

Mental Health

A total of 21 participants reported a mental health diagnosis (14 women, 7 men), and 17 participants indicated that they currently have a mental health diagnosis (11 women, 6 men; See Table 1).

A two-tailed, independent samples t-test was used to analyze the difference between self-reported mental health and risk-taking behavior on the BART. There was not a significant difference in the average number of pumps on the BART for those who have ever been given a mental health diagnosis (*M* = 24.71, *SEM* = 2.22) and those who have never been given a mental health diagnosis (*M* = 27.27, *SEM* = 1.32), *t* (98) = -.92, *p* = .36. There was not a significant difference in risk-taking for those who currently have a mental health diagnosis (*M* = 23.23, *SEM* = 2.12) and those who do not currently have a mental health diagnosis (*M* = 27.45, *SEM* = 1.29), *t* (98) = -1.40, *p* = .17.

Two-tailed, independent samples t-tests were used to analyze the difference between self-reported mental health (in terms of having ever received a mental health diagnosis) and self-reported risk-taking behavior on the DOSPERT (See Figure 7). Participants who reported that they have ever been given a mental health diagnosis reported being more likely to take health risks (*M* = 3.14, *SEM* = .14) than participants who have never been given a mental health diagnosis (*M* = 2.65, *SEM* = .08), t (98) = 2.98, p = .004. Participants who reported that they have ever been given a mental health diagnosis also reported being more likely to take social risks (*M* = 3.92, *SEM* = .13) than participants who have never been given a mental health diagnosis (*M* = 3.60, *SEM* = .06), *t* (98) = 2.39, *p*= .02. There was a trend towards a significant difference in self-reported risk-taking on the ethical domain, in that participants who reported ever having a mental health diagnosis reported being slightly more likely to take ethical risks (*M* = 1.99, *SEM* = .14) than participants who have never been given a mental health diagnosis (*M* = 1.71, *SEM* = .06), *t* (98) = 1.96, *p* = .05. There was also a trend towards a significant difference in the overall DOSPERT scores, in that participants who reported ever having a mental health diagnosis reported being slightly more likely to take risks (*M* = 2.76, *SEM* = .08) than those who have never received a mental health diagnosis (*M* = 2.58, *SEM* = .05), *t* (98) = 1.89, *p* = .07. There was not a significant difference in

participants' scores on the financial domain t (98) = -.42, p = .68, or recreational domain t (98) = -.26, p = .80 for those who have ever had a mental health diagnosis and those who have not.

Two-tailed, independent samples t-tests were used to analyze the difference between self-reported mental health (in terms of currently having a mental health diagnosis) and self-reported risk-taking behavior on the DOSPERT (See Figure 8). Participants who reported that they currently have a mental health diagnosis reported being more likely to take social risks (M = 4.01, SEM = .14) than participants who did not currently have a mental health diagnosis (M = 3.59, SEM = .06), t (98) = 2.89, p = .005. There was a trend towards significance in self-reported risk-taking on the health/safety domain, in that those who reported that they currently have a mental health diagnosis indicated they were slightly more likely to take health/safety risks (M = 3.01, SEM = .14) than those who do not currently have a mental health diagnosis (M = 2.70, SEM = .08), t (98) = 1.74, p = .08. There was not a significant difference in participants' overall DOSPERT scores t (98) = 1.18, p = .24, or their scores on the ethical domain t (98) = 1.19, p = .24, financial domain t (98) = -.77, p = .44, or recreational domain t (98) = -.48, p = .64 for those who currently have a mental health diagnosis and those who do not.

CHAPTER 4

DISCUSSION

Hypothesis 1: Those induced with positive affect will display higher levels of risk-taking behavior than those who are induced with negative affect.

Hypothesis 1 was not supported by the results of this study. It was hypothesized that those induced with positive affect would rely on System 1 thinking and display higher levels of risk-taking than those induced with negative affect, who would rely more heavily on System 2 thinking. However, those induced with negative affect actually displayed slightly higher levels of risk-taking than those induced with positive affect, which was the opposite of the predicted results. However, the difference in the average number of pumps on the BART (i.e., level of risk-taking) between the two groups was not statistically significant. Though participants induced with negative affect had a higher average number of pumps on the BART than participants induced with positive affect, the two groups did not perform differently enough on the behavioral measure (i.e., the BART) to warrant any significant findings.

The directionality of these results could potentially be explained by the Mood Maintenance Hypothesis, which suggests that those in a positive mood tend to be more risk-aversive than those in a negative mood because they want to maintain their good mood, and feel that they have more to lose than those in a negative mood (Isen & Patrick, 1983). If the affect manipulation was successful in inducing positive affect, it is possible that participants in the positive affect conditions pumped the balloon less because the idea of losing points would hurt their positive affective state. Therefore, participants in the positive affect condition may have been more cautious in an attempt to preserve their good mood. On the other hand, those in a negative mood tend to be more risk-seeking as an attempt to change their mood (e.g., winning on a gamble would improve their mood), and because they feel that they have less to lose than those in a positive mood. If the affect manipulation was effective in inducing negative affect, it is possible participants in the negative affect conditions were attempting to repair their mood by pumping the balloon more. By pumping the balloon more, participants had an increased chance of gaining a higher

amount of points. It is possible that obtaining a high amount of points was perceived as something good that would improve their mood. On the other hand, pumping the balloon more also lead to an increased risk of bursting the balloon and losing all the points accumulated on that round. It is possible that the chance of bursting the balloon and losing points was worth the risk to those in the negative affect condition because they were already in a negative mood. However, this is stated cautiously because the difference between the positive affect and negative affect groups was not statistically significant, and these results cannot be considered in support of the Mood Maintenance Hypothesis. For example, it is possible that the directionality of the results is simply due to the affect manipulation not producing the intended results. The PANAS change scores indicated that there was no significant increase in positive affect for those in the positive affect conditions. If the film clip had been effective in inducing positive affect, it would have been expected to see an increase in positive affect for these groups. Though there was a slight reduction in negative affect for those in the positive affect conditions, the difference was not quite statistically significant. The PANAS change scores indicated that there was no significant increase in negative affect for those in the negative affect conditions. If the film clip had been effective in inducing negative affect, it would have been expected to see an increase in negative affect for these groups. If it cannot be verified that the positive affect group displayed higher levels of positive affect than the negative affect group and the negative affect group displayed higher levels of negative affect than the positive affect group, the directionality of the results cannot truly be attributed to affect levels.

Based on these results, participants induced with negative affect most likely did not rely more heavily on System 2 thinking than those induced with positive affect as was predicted. If they had, the results should have demonstrated that participants in the negative affect condition were more risk-averse. However, it is not possible to determine the exact cause of why participants induced with negative affect were not more risk-averse. The predicted results may not have been found due to the fact that the affect manipulation did not have the intended effects, or because of an alternate explanation such as the mood maintenance hypothesis.

Hypothesis 2a: Those in the positive affect with warning messages condition will not differ in levels of risk-taking behavior from the positive affect with no warning messages condition.

Hypothesis 2a was partially supported by the results, as there was not a significant difference in risk-taking behavior between the positive affect with warning messages condition and the positive affect without warning messages condition. However, as there were no significant differences between any of the four conditions in the study, it cannot truly be concluded that the hypothesis was supported in the way outlined by the logic of the study. In other words, because no significant effects of the warning messages were found and no significant changes in affect levels were detected, it cannot be concluded that the positive affect with warning messages condition and the positive affect without warning messages condition did not differ in a statistically significant way because positive affect increased reliance on System 1 thinking and decreased reliance on System 2 thinking. Therefore, though the two conditions did not differ significantly, it was most likely not due to the predicted interaction effect between positive affect and warning messages.

In addition, the participants in the positive affect with warning messages condition pumped the balloon slightly more on average than the participants in the positive affect without warnings messages condition, though the difference between the groups was not statistically significant. However, it is interesting that those who received warning messages pumped the balloon slightly more than those who did not, as the warning messages were intended to reduce risky behavior.

Hypothesis 2b: Those in the negative affect with warning messages condition will display lower levels of risk-taking than those in all other conditions.

Hypothesis 2b was not supported by the results of this study. It was hypothesized that negative affect and the warning messages would interact to decrease risk-taking more than in the other three conditions because negative affect and the warning messages would both increase reliance on System 2 thinking. If participants were relying on System 2 thinking, they should have displayed lower levels of risk-taking (i.e., they should have pumped the balloon less). Though the difference was not statistically

significant, participants in both negative affect conditions displayed higher levels of risk-taking than those in both positive affect conditions. In addition, there was virtually no difference in levels of risk-taking between the negative affect with warning messages and negative affect without warning messages conditions.

It is possible that the negative affect manipulation did not produce the intended effects, which could explain why decreased risk-taking was not seen in those induced with negative affect. The mean PANAS score for negative affect changed very little from the first to the second PANAS for those in the negative affect conditions, which indicated that the negative affect film clip may not have been effective. If participants in the negative affect conditions were not experiencing negative affect as intended, it is possible that they were not relying on System 2 thinking. This could explain why those in these conditions exhibited slightly more risk-taking behavior.

In addition, the warning messages produced no change in behavior, in either direction, for those induced with negative affect. The warning messages followed guidelines laid out by previous research that should have helped increase their effectiveness- the messages contained information aimed to correct gambling related cognitive biases, appeared between trials, and required participants to interact with the message (by pressing "space") to continue (Ginley et al., 2017). The warning messages should have caused participants to rely more heavily on System 2 thinking, which should have made them more cautious and risk-averse than participants who did not receive the warning messages. It was expected that these messages would help participants recognize flawed thinking (due to cognitive biases), and cause increased activation of System 2 thinking. Though they were intended to help reduce risky behavior, the warning messages were ineffective.

PANAS Change Scores

PANAS change scores were calculated for those induced with positive affect and those induced with negative affect to see if the affect level of each group changed in the intended direction. It was predicted that those induced with positive affect would have a higher PANAS change score for positive

affect than those induced with negative affect. The PANAS change scores indicated that those induced with positive affect reported slightly lower levels of negative affect on the second PANAS, but they also reported slightly lower levels of positive affect on the second scale. The reduction in negative affect was greater than the reduction in positive affect; however, neither the PANAS change score for positive affect or the PANAS change score for negative affect for those induced with positive affect reached statistical significance. It was also predicted that those induced with negative affect would have a higher PANAS change score for negative affect than those induced with positive affect. Neither the PANAS change score for positive affect or the PANAS change score for negative affect for those induced with negative affect was statistically significant.

Though the scores did change slightly for each group by the second PANAS, the change was not different enough to warrant any significant findings. The PANAS change scores and the means for each group from PANAS time 1 and PANAS time 2 suggest that participants either remained around their baseline affect levels throughout the study, or they returned to their baseline affect levels prior to completing the second PANAS. This could be due to the affect manipulation not having the intended effects, the affect manipulation not producing long-lasting effects, or the BART interfering with the effects of the affect manipulation. For example, the *Dead Poet's Society* film clip may not have been effective in inducing positive affect, which could explain why there was not a significant change in positive affect for those who viewed this film clip. However, the positive affect conditions did display a slight reduction in negative affect, which could suggest that the film clip's effects may simply have worn off by the time the PANAS was administered for a second time. The effects may have just faded with time, or it is possible that the BART introduced different emotions that interfered with the effects of the affect manipulation. It is also possible that the *Misery* film clip was not effective in inducing negative affect, which could explain why there was not a significant change in negative affect for those who viewed this film clip. Once again, it is also possible that the BART interfered with the effects of the affect manipulation or any effects of the film clip simply faded with time. Unlike with the positive affect

conditions and the slight reduction of negative affect (which could potentially indicate the film clip may have had some of the desired effects), there was no reduction of positive affect for those in the negative affect conditions.

DOSPERT and BART

The BART has been shown to be correlated with traits of impulsivity and sensation-seeking and self-reported risk-taking in terms of gambling, substance use (alcohol, cigarettes, and other drugs), unprotected sex, theft, and not wearing a seatbelt (Lejuez et al., 2002). In addition, studies have found that participants' score on the DOSPERT was related to their performance on the BART (Lorian & Grisham, 2010; Pietruska & Armony, 2013). However, the current study did not find any correlations between the BART and the DOSPERT, with the exception of the social domain.

Performance on the BART was negatively related to participants' score on the DOSPERT social domain. A higher score on the social domain (i.e., greater self-reported likelihood of engaging in risky social behaviors) was related to a lower number of average pumps on the BART (i.e., lower levels of risk-taking behavior), while a lower score on the social domain was related to a higher number of average pumps on the BART. Gender could be a potential explanation of this result, as men had a higher average score on the BART than women, but women had a higher average score on the DOSPERT social domain than males. Thus, this could possibly explain the negative relationship between the two variables.

Gender

The current study found that men exhibited a higher level of risk-taking behavior than women, as evidenced by men pumping the balloon more on average than women during the BART trials. This is consistent with previous literature, which suggests that men often take risks more than women (Byrnes et al, 1999; Croson & Gneezy, 2009; Harris et al, 2006), though this may depend on the type of risk (Byrnes et al, 1999; Figner & Weber, 2011).

The current study detected significant differences between men and women on the social and financial domains of the DOSPERT, which has been demonstrated in previous studies as well (Figner &

Weber, 2011; Rolison, Hanoch, Wood, & Liu, 2013). Men indicated that they would be more likely to take financial risks than women. This relates to existing research which has demonstrated that men were more likely to take financial risks than women (Charness & Gneezy, 2012; Xie et al, 2017). Men have shown that they perceive financial risks as less risky than women, which potentially explains why men are more likely to take financial risks (Figner & Weber, 2011). This result is also consistent with the finding that men displayed higher levels of risk-taking than women on the BART in the current study. On the other hand, women indicated that they were more likely to engage in social risks. Women have demonstrated that they view social risks as less risky than men, which potentially explains why women are more willing to engage in this type of risky behavior (Figner & Weber, 2011). Byrnes et al (1999) conducted a meta-analysis that found that gender differences in risk-taking often vary by context, meaning that men may be more likely to take risks than women in certain contexts/situations and women may be more likely to take risks than men in other contexts/situations than males. In their meta-analysis, men were more likely to take gambling risks than women, which is in line with men having an increased score on the DOSPERT financial domain in the current study.

Mental Health

Participants who indicated that they have, at some point in their life, been given a mental health diagnosis had higher scores on the DOSPERT health/safety domain. Therefore, these participants indicated that they would be more likely to engage in behaviors that pose a risk to their health and/or safety than participants who indicated that they have not ever been given a mental health diagnosis. Individuals who had been given a mental health diagnosis at some point in their life were found to be more likely to smoke cigarettes than individuals who had never received a mental health diagnosis (Lasser, Boyd, Woolhandler, Himmelstein, McCormick, & Bor, 2000). In addition, a diagnosis of ADHD has shown to be related to higher levels of substance abuse (Lee, Humphreys, Flory, Liu, & Glass, 2011) and risky sexual behavior (Sarver, McCart, Sheidow, & Letourneau, 2014), while a diagnosis of depression has been shown to be related to a poorer quality diet (Appelhans et al., 2012) and a higher

likelihood of not adhering to medical treatment (DiMatteo, Lepper, & Croghan, 2000). These behaviors all fall under the health/safety risk category. However, participants were only asked whether they had ever been given a mental health diagnosis and were not asked to specify and/or elaborate on their diagnoses in the current study.

Participants who have ever been given a mental health diagnosis also had higher score on the DOSPERT social domain, meaning that these participants indicated they would be more likely to engage in social risks than those who have never been given a mental health diagnosis. However, it should be pointed out that in the current study, only a small number of participants reported ever having a mental health diagnosis, and the majority of those participants were female. Therefore, it is possible that the reason ever having a mental health diagnosis was related to a higher likelihood of engaging in social risks was because the majority of participants in that particular analysis were female. As demonstrated when gender was analyzed, females indicated that they were more likely to engage in social risks than males. This could also be the reason that those who currently have a mental health diagnosis also had a higher score on the DOSPERT social domain than those who do not currently have a mental health diagnosis. Once again, only a small number of participants fell into this category, and the majority of them were female.

General Discussion

Affect did not significantly affect risk-taking behavior. It was expected that positive affect would lead to increased level of risk-taking; however, this effect was not observed. It is possible that the positive affect manipulation was not strong enough to place the participants in a state of cognitive ease, which should have increased their reliance on System 1 thinking. System 1 thinking is fast, intuitive, and requires very little cognitive effort. As such, System 1 thinking can be prone to errors and cognitive biases. When relying on System 1 thinking, risky behavior is often increased. Therefore, if participants induced with positive affect were relying on System 1 thinking, they should have demonstrated higher levels of risk-taking than those induced with negative affect. Negative affect was expected to decrease

risky behavior; however, this was not observed either. It is possible that the negative affect manipulation was not strong enough to place the participants in a state of cognitive strain, which should have increased reliance on System 2 thinking. System 2 is slow, deliberative, and requires cognitive effort. As such, System 2 is much less prone to errors than System 1, and System 2 is often associated with less risk-taking behavior. If participants induced with negative affect were relying on System 2 thinking, they should have exhibited lower levels of risk-taking behavior than those induced with negative affect. However, participants induced with negative affect displayed slightly higher levels of risk-taking than those induced with positive affect, though the difference was not statistically significant. It is not possible to attribute the slight increase in risk-taking behavior to negative affect, as the effects of the affect manipulation were unable to be verified.

Warning messages did not significantly affect risk-taking behavior. It was expected that participants who received warning messages would display lower levels of risk-taking than participants who did not receive warning messages. It is common to experience cognitive biases (e.g., illusion of control, gambler's fallacy), which stem from System 1, when gambling. It was expected that displaying warning messages aimed to correct those cognitive biases would help increase reliance on System 2 thinking, which would in turn cause participants to be more cautious and take less risks. However, this was not the case as warning messages were not effective at reducing risky behavior. Participants who received warning messages most likely did not rely more heavily on System 2 thinking than those who did not receive warning messages.

Affect and warning messages did not interact to affect risk-taking behavior. It was expected that participants in the positive affect with warning messages condition would not differ significantly in terms of risk-taking behavior from those in the positive affect without warning messages condition. While the two groups technically did not differ in levels of risk-taking, it cannot be verified that the reason they did not differ was due to an interaction between affect and warning messages. It was hypothesized that the two groups would not differ significantly on levels of risk-taking behavior because the effects of the

positive affect manipulation would overpower the effects of the warning messages. In other words, it was expected that the feelings of positive affect would cause an increased reliance on System 1 thinking for participants in both conditions. Due to the increased reliance on System 1 from the positive affect and the fact that System 2 has limited resources and often chooses to preserve those resources, the warning messages would not be effective at activating System 2 thinking. As warning messages did not have an effect on risk-taking behavior in any condition and the effects of the affect manipulation cannot be verified, it is likely that these results do not support the expected interaction effect. It should be noted that those in the positive affect with warning messages displayed slightly higher levels of risk-taking on the BART than those in the positive affect without warning messages condition, though the difference was not statistically significant.

It was also expected that an interaction effect would be observed between negative affect and warning messages. Negative affect was expected to increase reliance on System 2 thinking and thus decrease risk-taking behavior, and warning messages were also expected to decrease risk-taking behavior. Therefore, it was hypothesized that those in the negative affect with warning messages condition would display the lowest levels of risk-taking compared to the other conditions. However, group mean BART score for the negative affect with warning messages condition and the negative affect without warnings messages condition was almost the same. This indicates that the warning messages did not have an effect on participants' risk-taking behavior. In addition, both negative affect conditions had slightly higher scores on the BART than the positive affect conditions. Therefore, it is likely that neither the negative affect or the warning messages caused participants in the negative affect with warning messages condition to rely more heavily on System 2 thinking. If participants relied on System 2 thinking, lower levels of risk-taking should have been observed.

As the effects of the affect manipulation cannot be verified, it cannot be concluded whether affect has an effect on gambling warning messages. Therefore, future research in this area may still be necessary. It is not possible to determine why the hypotheses were not supported. It is possible the affect

manipulation was not effective, the effects of the affect manipulation did not last long enough, or the BART interfered with the effects of the affect manipulation. It is also possible that the hypotheses were not supported due to an alternate explanation, such as the Mood Maintenance Hypothesis. Future research would want to verify that the affect manipulation had the intended effect in order to rule out any alternate explanations. In addition, the warning messages were not effective. This may suggest that further research should be conducted to attempt to increase the effectiveness of gambling warning messages for various populations and across various settings.

Limitations and Future Directions

Affect Manipulation. Though the film clips used in this study have been shown to be effective for inducing positive and negative affect in other studies (Elices et al., 2012; Gartner & Bajbouj, 2014; Hinojosaa et al., 2017; Karsdorp et al., 2012; Lalot et al., 2014; Rennung & Gõritz, 2015; Schaefer et al., 2010), no change in affect levels were detected in the current study. There are many potential reasons for why the affect manipulation was not effective in this study.

Both film clips targeted specific positive or negative emotions. The *Misery* film clip targeted fear, while the *Dead Poet's Society* film clip targeted tenderness (Schaefer et al., 2010). Perhaps future research could try to use film clips that target more general feelings of positive and negative affect, instead of film clips that target specific emotions.

In addition, it is possible the chosen film clips were not sufficient to produce the intended effects for the particular participants in the study. For instance, during the debriefing four participants indicated that they enjoyed watching the *Misery* film clip, and two participants indicated that they found the film clip to be funny. Though only a small number of participants explicitly stated that they found the film enjoyable or funny, enjoyment and amusement were certainly not the intended effects of the film.

In the *Misery* film clip, a female character is preparing to use a sledgehammer break the ankles of a man she is holding hostage. The decision was made to cut the film clip off as the woman prepares to swing the sledgehammer, but before she actually breaks his ankles. While this part of the film clip was

included in previous studies that successfully used the clip, it was not used in the current study due to concerns that the ankle breaking scene would be too upsetting for participants. Therefore, in an attempt to minimize harm to participants, that part of the film was not shown. However, perhaps the film clip would have been more effective in inducing negative affect if the entire film clip was played. It is possible that viewing the ankle breaking part of the film clip contributed to the feelings of negative affect that were found in previous studies.

It is also possible that the effect of the affect manipulation simply wore off by the time participants took the PANAS for the second time. Perhaps the study could have benefited from placing the PANAS immediately after the film clip to verify whether or not the intended affect was induced. However, as previously addressed, placing the PANAS after the film clip would have presented other concerns (e.g., fatigue after completing the PANAS three times, effects wearing off before participants started the BART).

The BART itself could have potentially influenced participant's mood. During the debriefing, seven participants indicated that the BART was boring, and four participants found the BART to be stressful and/or frustrating. It is possible that the BART could have mitigated any affective effects of the movie clips, which could potentially explain why participants essentially returned to baseline affect levels by the time they completed the second PANAS scale.

The last potential limitation for the affect manipulation could be that participants were possibly given too much information about the study prior to the study's completion. For example, the study's title was listed on the Georgia Southern SONA system, which participants used to sign up for the study, as "Induced Moods, Warning Messages, and Gambling Behavior." While the title does not imply any directionality as far as the hypotheses, it certainly gives the main gist of the experiment away. In addition, the same study name was listed on the informed consent document. It is very possible that participants knew coming into the study to expect an attempt to change their mood.

Warning Messages. The warning messages were also not effective in this study. It is possible that the messages were not salient enough. Though the messages appeared on a bright red stop sign in the middle of the feedback screen, it is possible that was not enough to capture participants' attention. Perhaps it would have been more effective if the warning messages took up a larger portion of the screen to make them even more noticeable.

It is also possible that participants realized after the first warning message that they just needed to press "space" to continue. If this was the case, it is possible that participants were not actually attending to the messages, and simply pressing "space" to move on. The study was designed to have participants press "space" to ensure they were given enough time to read the message, and so participants who read faster did not have to wait for a long period between trials. However, perhaps future research could benefit from displaying the warning messages for a set duration.

As the BART was only thirty trials, and the warning messages were set to appear every five trials, participants were only exposed to five warning messages throughout the study. In addition, participants only saw each message once. There is a possibility that participants were simply not given enough exposure to the warning messages for them to effectively alter behavior. Previous research has demonstrated that warning messages need to appear between trials to be effective (Ginley et al., 2017), but has not focused on whether a certain frequency of warning messages is most effective. Future research could focus on testing different frequencies of warning messages to determine if this influences the effectiveness of the messages.

It could also be possible that certain warning messages may have been more effective in reducing gambling behavior than others. If participants saw the same warning message every five trials, perhaps the increased repetition and exposure to the same message could have made it more effective. In addition, if the same message was used each trial it could be determined whether that particular message was effective in reducing risky behavior or not. The current study was modeled after previous studies which used different warning messages effectively (Floyd et al., 2006; Jardin & Wulfert, 2009; Jardin &

Wulfert, 2012). However, perhaps future research could benefit from testing one specific message at a time to determine which warning messages are effective and which ones are not. Then researchers could use the warning messages that were demonstrated to be effective in reducing gambling behavior in future research.

The last potential limitation for the warning messages could be the chosen behavioral measure, the BART. Though the participants had a chance to win or lose points during the task, there was no monetary value associated with the points. Participants therefore may not have felt like that had much to win or lose during the task. The BART was chosen because it is a validated measure of risk-taking behavior and performance on the BART has been shown to be positively correlated with self-reported gambling behavior (Wallsten et al., 2005). However, there was not a significant correlation found between performance on the BART and self-reported financial risk-taking in the current study. Therefore, it is possible the BART was not the best measure of gambling behavior for the current sample.

Sampling Issues. It is possible that the current sample size was not large enough to detect any significant effects. The current sample size allowed for twenty-five participants per condition. Some researchers argue that a minimum of fifty participants per condition is necessary to detect significant effects (Simmons, Nelson, & Simonsohn, 2013). However, the current sample size was selected based on a power analysis conducted prior to data collection, which concluded that a minimum of sixty-six participants should have been enough to detect any significant effects. In addition, data collection for this study occurred at the end of the spring semester. It is possible that not all participants gave their full attention to the study due to the end of the semester approaching. Therefore, the current sample of undergraduate students may not have been ideal for detecting the effects of this study. In addition, future research may benefit from using a sample of current gamblers to test these effects.

In conclusion, more research needs to be conducted to conclude if gambling warning messages are a viable option for reducing gambling behavior. Future research should attempt to identify an effective set of warning messages and determine if the frequency of warning messages influences their

effectiveness. It may be beneficial to examine these effects on a population of current gamblers. In addition, future research should continue to examine warning messages in the context of positive and negative affect. Future researchers should ensure they can effectively induce participants with positive or negative affect, and that the effects of the affect manipulation last long enough for participants to complete the study. Exploring these avenues will help strengthen the literature on gambling warning messages and determine if a case can be made for implementing mandatory warning messages in gambling venues.

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Table 1

Demographic Information

	Mean
Age	19.47
Gender	**Frequency**
Men	41
Women	59
Ever given a mental health diagnosis	
Yes	21
No	79
Currently have a mental health diagnosis	
Yes	17
No	83

Table 2

PANAS Score Information

	Mean	Std. Error of the Mean
PANAS Time 1 Score- Positive		
Positive Affect Condition	3.23	.08
Negative Affect Condition	3.31	.10
PANAS Time 1 Score- Negative		
Positive Affect Condition	1.91	.11
Negative Affect Condition	1.74	.09
PANAS Time 2 Score- Positive		
Positive Affect Condition	3.17	.10
Negative Affect Condition	3.23	.11
PANAS Time 2 Score- Negative		
Positive Affect Condition	1.69	.10
Negative Affect Condition	1.69	.10
PANAS Change Score- Positive		
Positive Affect Condition	-.05	.07
Negative Affect Condition	-.08	.09
PANAS Change Score- Negative		
Positive Affect Condition	-.22	.06
Negative Affect Condition	-.05	.08

Table 3

DOSPERT Correlations with Age and the BART

	Age	BART	Ethical	Financial	Health/Safety	Recreational	Social	Overall
Age	1	-.005	-.111	-.175	-.055	-.053	.061	-.111
BART	-.005	1	-.083	-.020	-.116	.013	-.219*	-.120

Note. * = significant correlation

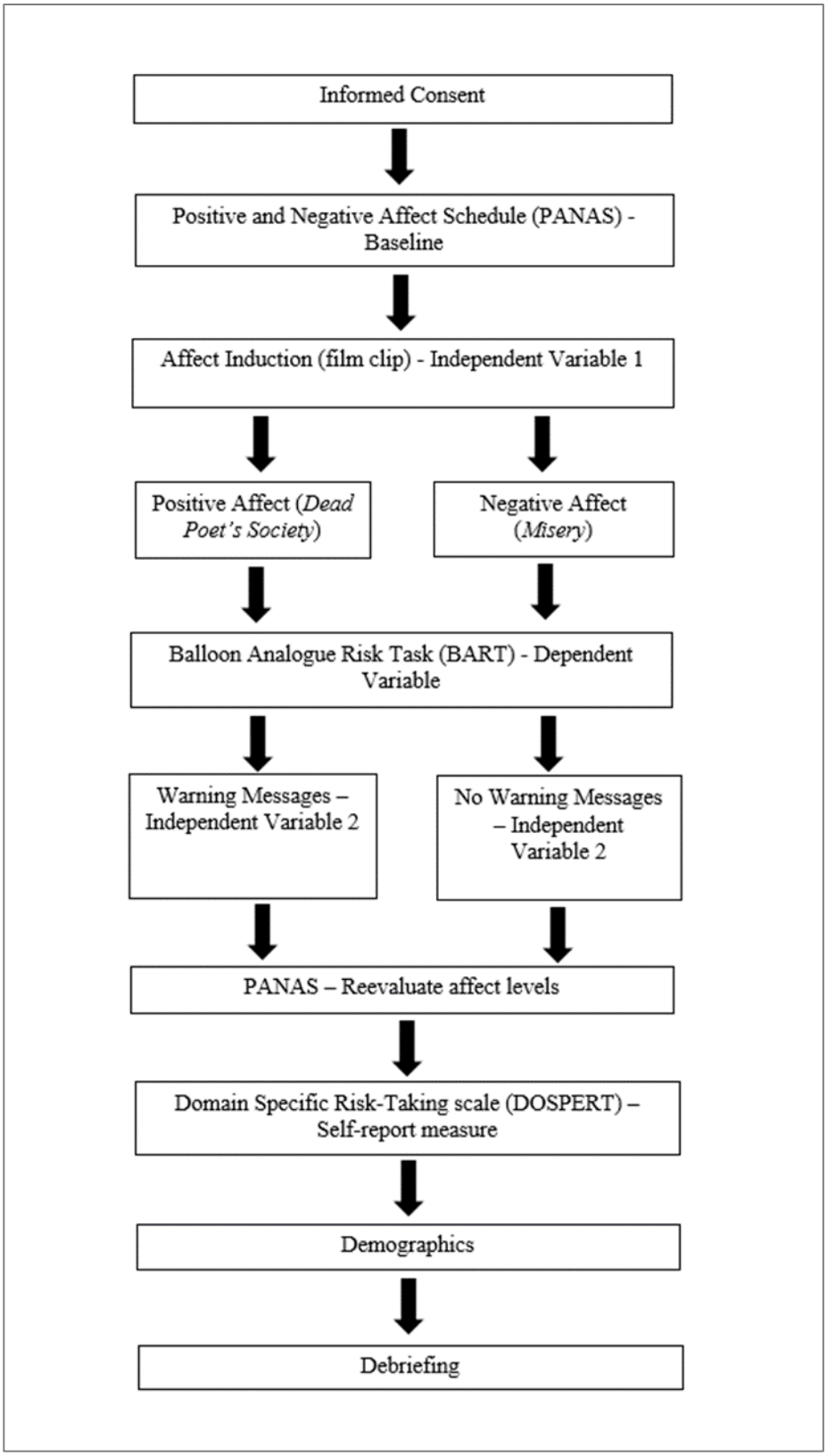

Figure 1. Flowchart representing the procedure of the study.

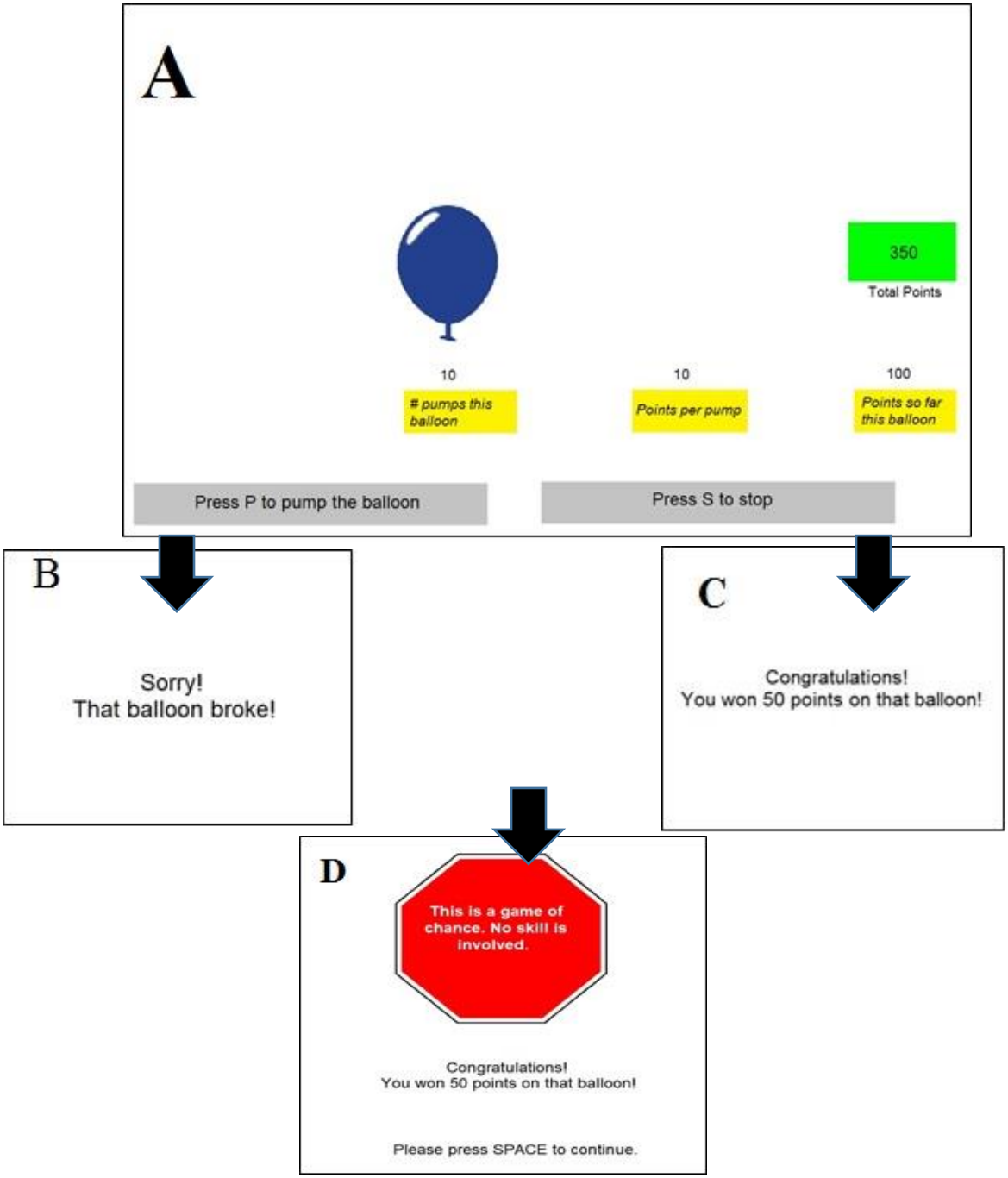

Figure 2. Visual representation of the BART trials. (A) depicts the BART trials. (B) shows the negative feedback screen, which appeared after trials in which the participant popped the balloon. (C) shows the positive feedback screen, which appeared after trials in which the participant stopped pumping the balloon and collected their points. (D) depicts the feedback screen with a warning message for those in the warning messages conditions.

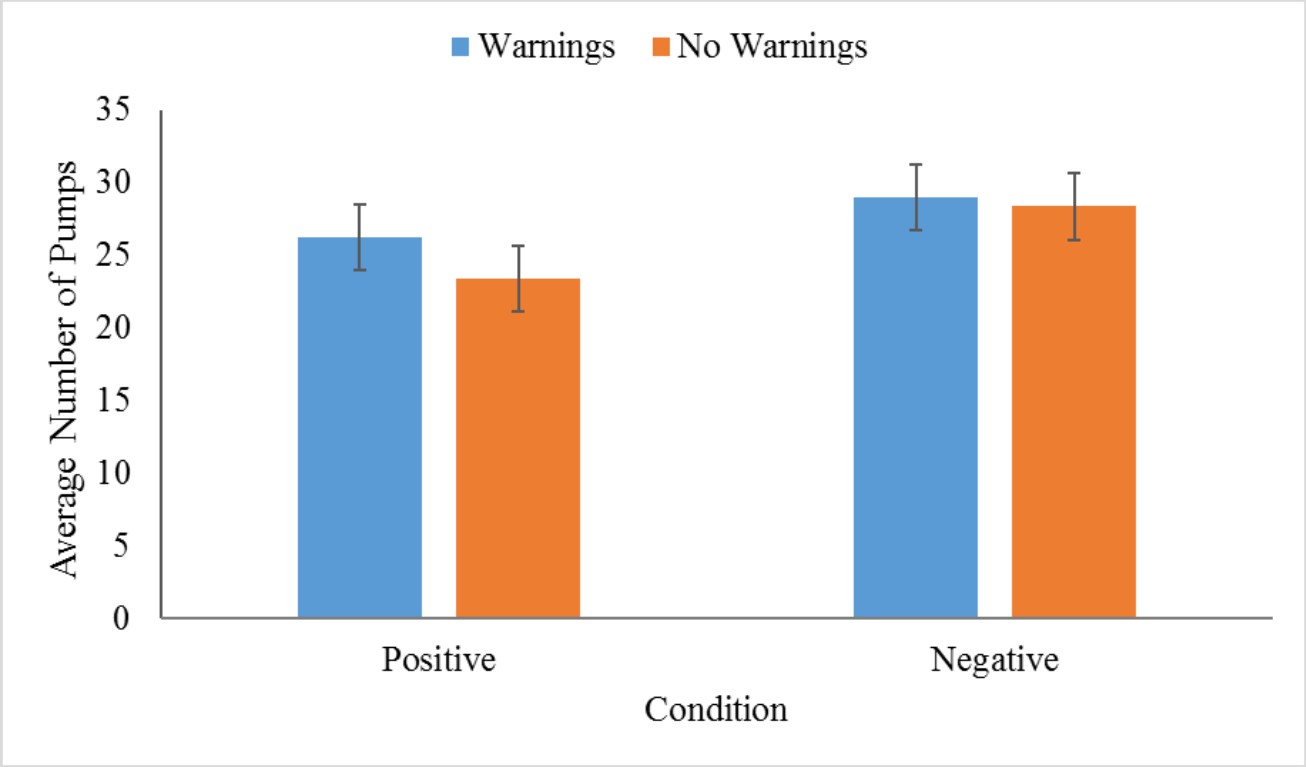

Figure 3. Visual representation of the average number of pumps on the BART and standard errors for each of the four conditions: positive affect with warning messages, positive affect without warning messages, negative affect with warning messages, and negative affect without warning messages.

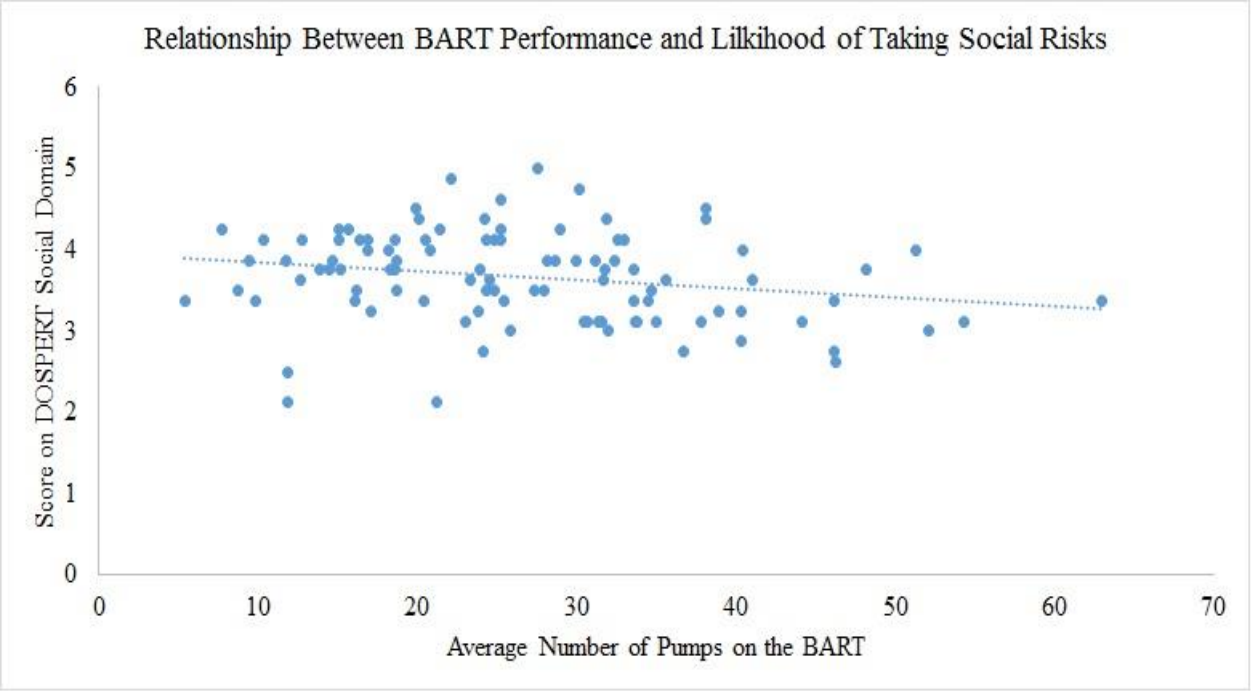

Figure 4. Visual representation of the negative correlational relationship between average number of pumps on the BART and the DOSPERT social domain. *Note*. Pearson's r = -.22

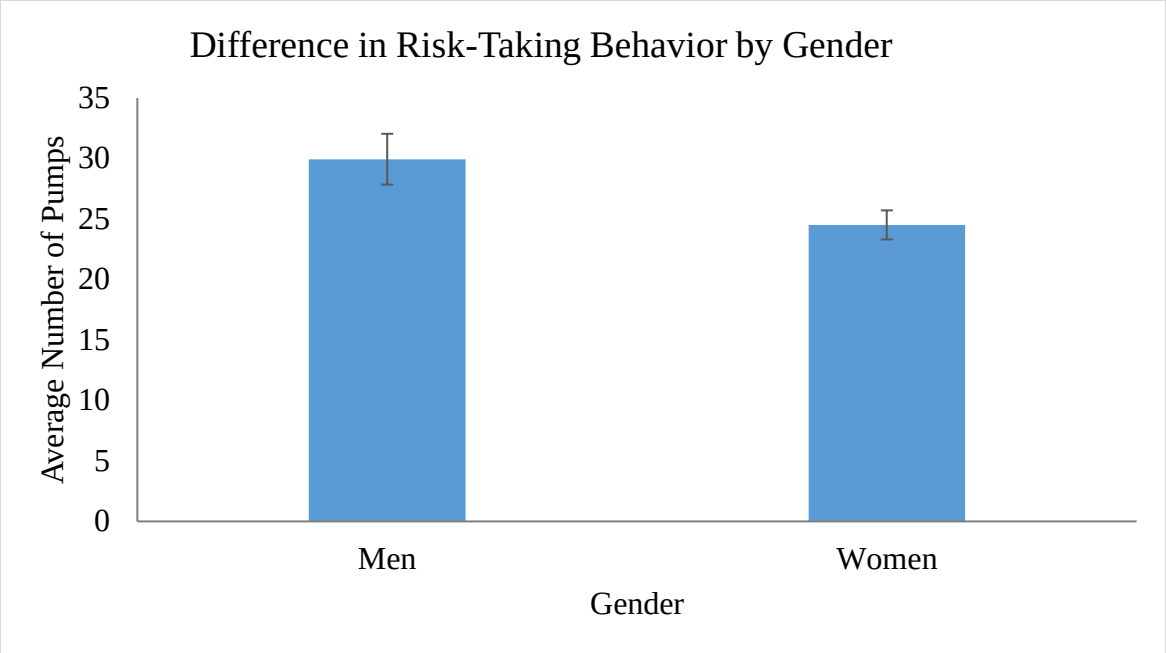

Figure 5. Visual representation of the means and standard deviations of performance on the BART based on gender.

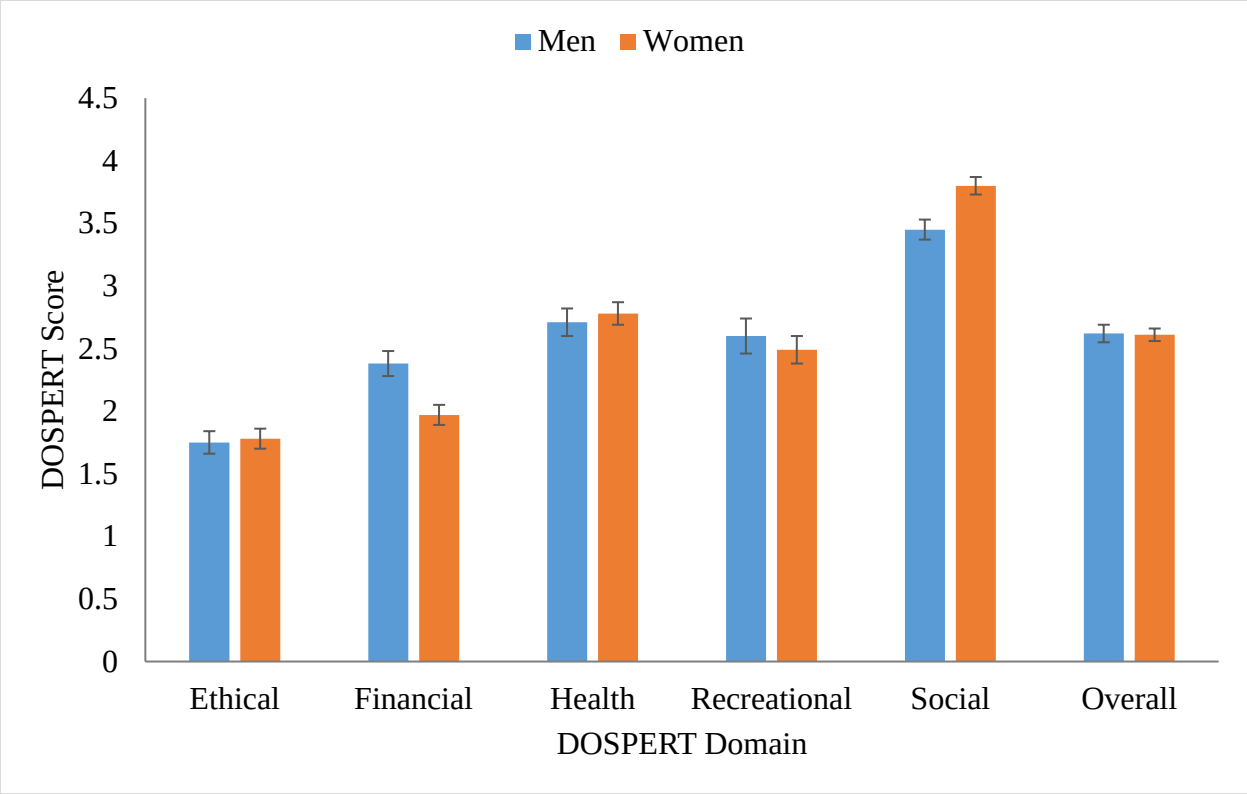

Figure 6. Visual representation of the means and standard errors of the scores on the DOSPERT domains based on gender.

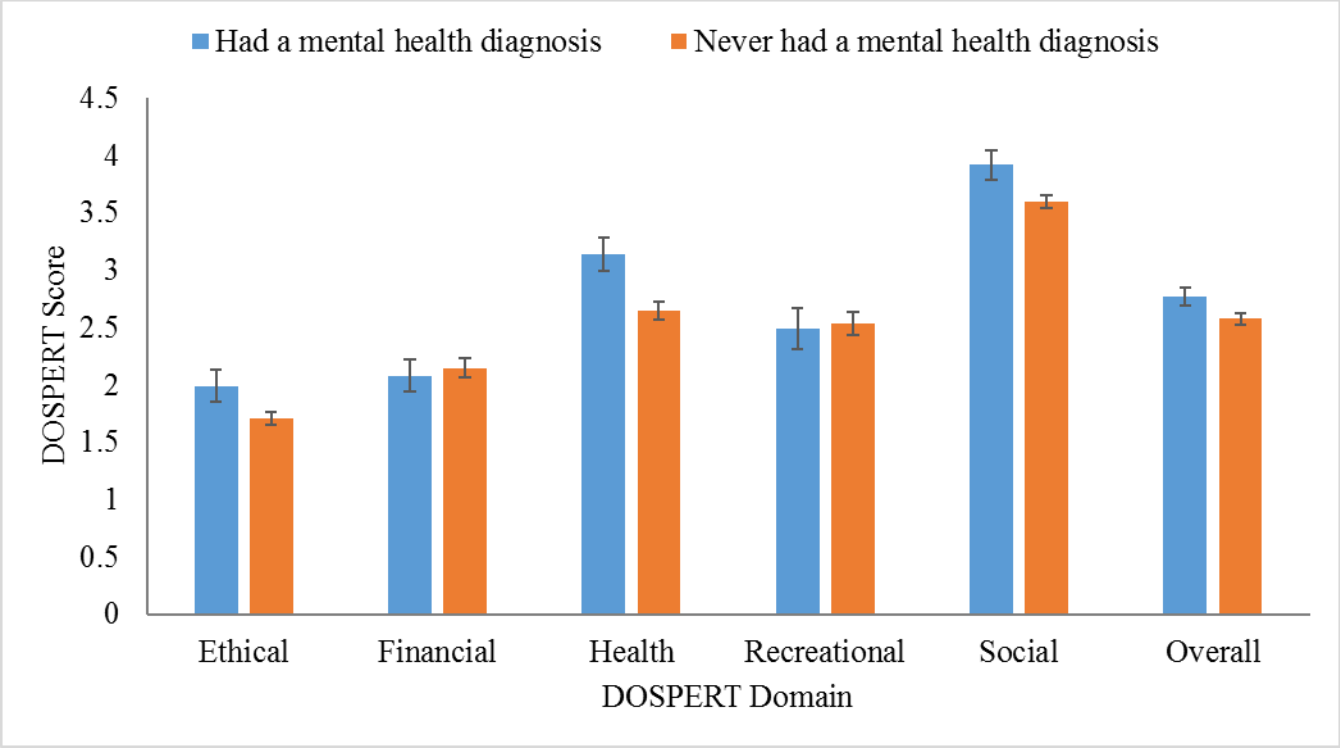

Figure 7. Visual representation of the means and standard errors of the scores on the DOSPERT domains based on whether one has ever received a mental health diagnosis.

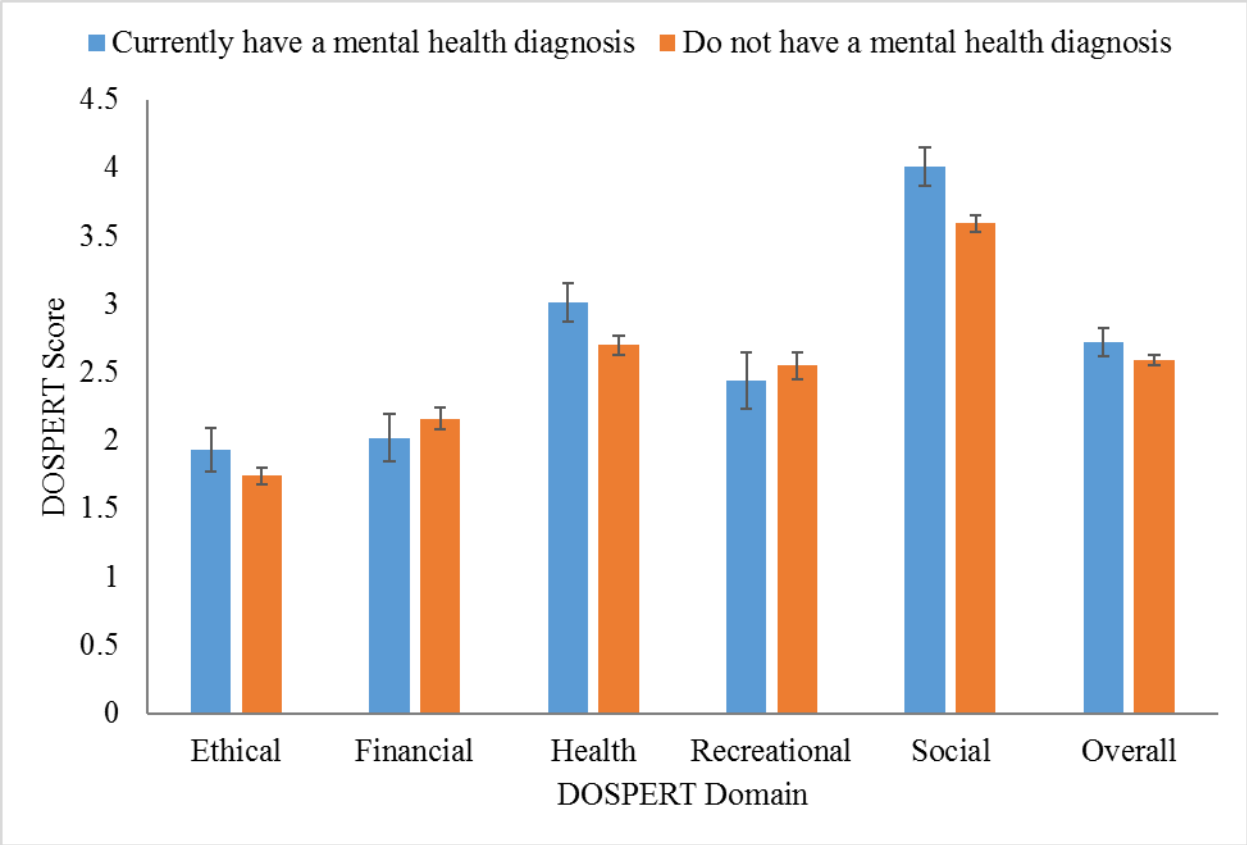

Figure 8. Visual representation of the means and standard errors of the scores on the DOSPERT domains based on whether one currently has a mental health diagnosis.

APPENDIX A

The following scale consists of a number of words that describe different feelings and emotions. Read each item and then select the number that corresponds with the choice that best describes how you are feeling right now. That is, indicate to what extent you currently feel this way. Remember, there are no right or wrong answers so please give us your honest opinion.

Interested	1	2	3	4	5
	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Distressed	1	2	3	4	5
	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Excited	1	2	3	4	5
	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Upset	1	2	3	4	5
	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Strong	1	2	3	4	5
	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Guilty	1	2	3	4	5
	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Scared	1	2	3	4	5
	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
Hostile	1	2	3	4	5
	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Enthusiastic

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Proud

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Irritable

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Alert

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Ashamed

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Inspired

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Nervous

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Determined

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Attentive

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Jittery

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Active

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

Afraid

1	2	3	4	5
Very slightly or not at all	A little	Moderately	Quite a bit	Extremely

APPENDIX B

You will now read statements describing a variety of behaviors. Read each item and then select the number that corresponds with how likely it is that you would engage in that behavior. Remember, there are no right or wrong answers so please give us your honest opinion.

Admitting that your tastes are different from those of your friends. (S)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Going camping in the wilderness, beyond the civilization of a campground. (R)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Betting a day's income at the horse races. (F)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Buying an illegal drug for your own use. (H)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Cheating on an exam. (E)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Chasing a tornado or hurricane by car to take dramatic photos. (R)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Investing 10% of your annual income in a moderate growth mutual fund. (F)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Consuming five or more servings of alcohol in a single evening. (H)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Cheating by a significant amount on your income tax return. (E)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Disagreeing with your father on a major issue. (S)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Betting a day's income at a high stake poker game. (F)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Having an affair with a married man or woman. (E)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Forging somebody's signature. (E)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Passing off somebody else's work as your own. (E)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Going on a vacation in a third-world country without prearranged travel and hotel accommodations. (R)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Arguing with a friend about an issue on which he or she has a very different opinion. (S)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Going down a ski run that is beyond your ability or closed. (R)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Investing 5% of your annual income in a very speculative stock. (F)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Approaching your boss to ask for a raise. (S)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Illegally copying a piece of software. (E)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Going whitewater rafting during rapid water flows in the spring. (R)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Betting a day's income on the outcome of a sporting event (e.g., baseball, soccer, or football). (F)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Telling a friend if his or her significant other has made a pass at you. (S)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Investing 5% of your annual income in a conservative stock. (F)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Shoplifting a small item (e.g., a lipstick or a pen). (E)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Wearing provocative or unconventional clothes on occasion. (S)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Engaging in unprotected sex. (H)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Stealing an additional TV cable connection off the one you pay for. (E)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Not wearing a seatbelt when being a passenger in the front seat. (H)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Investing 10% of your annual income in government bonds (e.g., treasury bills). (F)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Periodically engaging in a dangerous sport (e.g., mountain climbing or sky diving). (R)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Not wearing a helmet when riding a motorcycle. (H)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Gambling a week's income at a casino. (F)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Taking a job that you enjoy over one that is prestigious but less enjoyable. (S)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Defending an unpopular issue that you believe in at a social occasion. (S)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Exposing yourself to the sun without using sunscreen. (H)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Trying out bungee jumping at least once. (R)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Piloting your own small plane, if you could. (R)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Walking home alone at night in a somewhat unsafe area of town. (H)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

Regularly eating high cholesterol foods. (H)

1	2	3	4	5
Very unlikely	Unlikely	Not sure	Likely	Very Likely

*H= health/safety domain, S= social domain, F= financial domain, R= recreational domain, E= ethical domain

**Domain abbreviations were not presented to participants during the study.