CONVERSION FROM FREE PLAY MODE TO CASH PLAY MODE IN SKILL-BASED ONLINE GAMING

by

THERESA R. REILLY

(Under the Direction of Adam S. Goodie)

ABSTRACT

Online social casino games, cash-incentivized skill-based games, and free-play competition games share many characteristics with gambling. Given the similarities, much research has focused on the potential harms associated with these gaming formats; however, most of the work has been correlational in nature. Previous research has shown that players tend to migrate from free versions of games to cash-incentivized competition versions, but it does not establish a causal direction. In the current work, I utilize a novel research design to investigate whether players who are assigned to a free-play gaming condition are more likely to migrate to cash-play gaming relative to a control condition. In a university sample, players who were assigned to the free-play condition were not more likely to migrate to cash-play gaming relative to those in the control or cash-play conditions. I found that perceived performance was the only variable in this study that predicted whether a player would migrate to cash gaming. Results suggest that the mechanisms by which players migrate from free-play to cash-play gaming are complex and nuanced.

INDEX WORDS: social casino, gambling, skill-based gaming, practice mode, incentives, conversion from gaming to gambling

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DEDICATION

This dissertation is dedicated to my beloved family, friends, colleagues, and many mentors who have been my foundation throughout this journey.

To my parents, whose belief in me has been the greatest gift. Your love and wisdom have been instrumental in shaping the lives of all of your children, grandchildren, and great-grandchildren. Your continuing sacrifice in support of all of our ventures makes the dream possible.

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CHAPTER 1

CONVERSION FROM FREE PLAY MODE TO CASH PLAY MODE IN SKILL-BASED ONLINE GAMING

The dangers of gambling are well-documented; however, distinguishing between gaming and gambling has become increasingly complex due to the integration of gambling-like features in traditional video games. As the line between gambling and gaming becomes more blurred, the task of determining what activities do or do not constitute gambling is becoming a pivotal task for gambling researchers. The problem is further exacerbated by online gaming platforms that operate similarly to online casinos and offer unregulated free-play modes alongside cash-incentivized games, capitalizing on legal loopholes to evade potentially critical gambling regulations. Gambling is uniquely recognized as a process addiction in the DSM 5 (American Psychiatric Association [APA], 2013), underscoring the importance of properly understanding what activities should be considered gambling, which gaming activities present potential harm, and how to best regulate those activities to protect vulnerable populations.

Determining whether cash-incentive skill-based games constitute gambling is beyond the scope of this study; however, this study will address a key concern among gambling researchers regarding the gateway theory of gaming, which suggests that free-to-play versions of games lead players to migrate to cash-incentivized gaming and casino-style games, potentially contributing to gambling problems (Delfabbro & King, 2020). The nature of migration from free play to cash play is of concern, as cash play gaming is often age-restricted, and free play is not. Current U.S. regulations allow free modes to be offered alongside cash modes, which may be appealing to vulnerable populations such as problem gamblers and minors. For example, free versions are

widely advertised on social media, and companies employ targeted advertising to recruit and maintain players (Anderson & Jiang, 2018).

As researchers continue to push for regulating cash-incentive gaming similarly to gambling, it becomes important to elucidate the relationship between free and cash versions of these games. If free versions of games are a mechanism by which players are attracted to cash-incentive games, then it will be important to regulate when, where, and how these platforms can recruit, whom they can advertise to, and how they manipulate cognitive principles to maintain player engagement. Conversely, if free modes of competition gaming do not lead players to migrate to cash gaming, then overregulation could have an adverse effect on players and impact the broader video game economy.

The following sections will outline prominent theories regarding video games and gambling and discuss the current research surrounding online casinos and cash-incentive skill-based gaming platforms - venues that are believed to be central to a recent increase in gambling-related problems among young adults and adolescents and which are associated with problematic gambling patterns (e.g., Hing et al., 2002; King et al., 2015; Kolandai-Matchett & Abbott, 2022; Starke et al., 2020).

Relevant Definitions

Gambling

Gambling is defined in many ways across many disciplines. For example, legal definitions of gambling make the distinction between wagers that carry real-world value and those that do not, such that real-world value must be present for gambling to occur. Betting is generally defined as staking money or something of material value on the outcome of an uncertain event for the chance to win something of higher value in return (Blakey, 1984; Cabot, 1999; Lipton, Lazarus, & Weber, 2005; Rose, 1986; Verbiest & Keuleers, 2003). For this study,

however, I rely on the definition of gambling more commonly used in psychological research: "the activity or practice of playing a game of chance for money or other stakes" (Gainsbury, 2015; Montiel et al., 2021; Welte et al., 2013).

Currency

In-game currency, or virtual currency, refers to any incentive that carries value within the game, such as tokens, gems, or points, but that does not carry real-world value or purchasing power external to the game. *Real-world currency* refers to cash transactions that can be withdrawn and used in an external economy. Games that offer real-world currency wagers will be herein referred to as *cash-play games*, and those that offer in-game currency wagers will be referred to as *free-play games*.

Microtransactions present a gray area between virtual currency and real-world currency. Microtransactions refer to the use of real-world currency to purchase in-game currency for purposes such as special access, extended gameplay, or customization options. In-game currency cannot be exchanged or withdrawn for real-world value.

Gaming Types

Researchers, players, and those in the industry use many terms interchangeably to describe the various structures of online gaming. Although there is a great deal of overlap, some subtle differences do exist.

Online casinos are websites that offer the opportunity to play a game of chance for any stake, whether playing against other players or the house. These venues typically offer free-stakes "practice versions" alongside cash-versions of traditional casino games, such as poker, roulette, Texas Hold'em, Blackjack, and slots. Common examples of online casinos include *Poker Stars* and *Casino World*, which provide free- and cash-play versions of their casino games.

Social casinos are a specific form of online casinos that offer traditional-style casino games but do not operate using real-world currency. Instead, players use real-world currency to purchase virtual currency, which can then be wagered in games of chance. Players win virtual currency in return, but virtual currency cannot be cashed out for real-world currency. *Big Fish Casino* is a popular social casino, which does not allow for cash wagers or withdrawals, but does offer players the opportunity to purchase in-game currency through microtransactions and participate in otherwise traditional gambling activity.

Online casino may also refer to sites that host non-traditional games that have been converted in any manner that allows wagering to take place; however, for legal purposes, many vendors make the distinction between online casinos and *skill-based gaming platforms*. Skill-based gaming platforms may offer some traditional casino games, such as slots; however, they also offer competition versions of popular casual games, such as *Candy Crush, Bejeweled Blitz*, or *FreeCell Solitaire*. Popular examples of skill-based gaming platforms include *WorldWinner* and *Solitaire Cash*.

On skill-based competition gaming platforms, similar to online casinos, players can compete in free-play mode (also referred to as demo mode or practice mode) or cash-play mode. Free-play and cash-play versions of games are identical, aside from their incentive structure. In free mode, players pay the fee using virtual currency and win virtual currency in return, which can then only be used on the gaming platform. In cash mode, players use real-world currency and win real-world currency in return, which can then be withdrawn and used in a real-world economy. Free play versions and cash play versions both involve paying an entrance fee to engage in a skill-based competition against another player, with the winner earning a prize of greater value in return. This is legally distinguished from gambling, which involves placing a

wager (or stake) on a game of chance in hopes of earning a prize (also known as the consideration) of higher value in return; however, it is understood that many gambling games involve elements of skill in addition to chance.

It is important to make the distinction between legal and practical definitions within the gaming world, as the fine line between gaming and gambling can be difficult to discern and is a major point of debate in the academic community. Some researchers contend that cash-incentivized gaming should be considered gambling due to its similarities and should be regulated accordingly. Conversely, others argue that there is insufficient evidence linking cash-incentivized gaming to gambling or addiction, and therefore, it should not be subject to gambling regulations.

Problems in Online Gaming and Gambling

A common practice in social casinos, online casinos, and skill-based competition gaming platforms is to actively recruit new players to the host site through social media, targeted advertising, in-game advertisements on other platforms, and via celebrity endorsements (McBride & Derevensky, 2009). Given that social casinos and skill-based gaming platforms are not regulated as gambling, they are not bound by the same advertising regulations as gambling platforms, which enables them to recruit through platforms that are popular with young people (e.g., social media and video game platforms) and through questionable methods such as targeted advertising.

Players who engage in free modes on these sites are then actively recruited to play cash modes through in-game advertisements, pop-ups, and special promotions. Players may see a banner after a round advertising how much they could have won had they played in cash mode, or they may be offered “free money” to begin playing in cash mode. Free money can be wagered

and used to accrue winnings, but it cannot be withdrawn, allowing the platform to engage players in cash games without losing revenue.

Many players engage in microtransactions or cash-play gaming in online casinos and skill-based gaming sites and do so without any notable problems. However, those who do gamble online are seven to ten times more likely to be problem gamblers relative to those who only gamble offline (McBride & Derevensky, 2009; Wood & Williams, 2007). Therefore, it is important to understand whether playing free versions of games on skill-based competition platforms that offer cash versions is likely to be problematic.

An unfortunate consequence of the advertising techniques in use is that vulnerable adolescents may be disproportionately targeted for recruitment. Some academics believe that targeted advertising techniques may be one explanation for a noted increase in gambling and gambling-related problems among adolescents (e.g. Grffiths, 2015). This is concerning, given that online gaming is the primary arena where adolescent gambling occurs.

Despite age restrictions and legal barriers to gambling, many adolescents report accessing gambling with little to no difficulty, primarily due to the availability of online casinos (Griffiths et al., 2009). Legitimate U.S.-based gambling sites do technically require that users meet the minimum gambling age of 18, but very few implement any means of verifying the user's age beyond asking the user to check a box stating they are at least 18 (McBride & Derevensky, 2009; 2012). The lack of age restrictions surrounding free-play mode on sites that offer cash competitions, paired with active recruitment and targeted advertising, is potentially dangerous. If free-play gaming does contribute to cash-play recruitment, problematic adolescent gambling will likely continue to increase, and those who already struggle with gambling problems will have difficulty avoiding triggering stimuli (Delfabbro et al., 2009).

Specific Concerns for Underage Gamers

Prevalence rates for adolescent gambling addiction vary widely depending on region, regulation, age restriction, cultural influence, and other factors. Rates are reported anywhere between 0.2% and 12.3% globally (Floros, 2018; NAFGAH, 2016), but studies of minors in the U.S. find that at least one-third of adolescents under the legal gambling age have engaged in gambling at some point, and 31% reported problematic behaviors associated with gambling (Lee et al., 2014). The risks that gambling poses to adolescents and emerging adults are the same as those for adults: however, adolescents are at much higher risk for becoming problem gamblers relative to adults (Morrison, 1990).

Adolescents are more vulnerable to addictions of *any* type (Morrison, 1990), including gambling, and they are more likely to gamble online relative to offline (Parke & Griffiths, 2006; Wood & Williams, 2007, Wood et al., 2007). In addition to the risks associated with participating in online gambling, mere exposure to gambling at a young age, regardless of participation, has been linked to future gambling problems (Deverensky et al., 2015). This would suggest that seeing gambling advertisements, participating in social casino gaming, or watching friends engage in casino gaming could be especially problematic for youth.

For this reason, it is important to develop a better understanding of what does and does not constitute gambling in online venues and determine what impacts free-play exposure may have on individuals' future behavior. Given that free games appear to have the power of conversion, retention, and monetization, there is an urgent need to understand how and why this relationship exists. It is unclear from existing research whether free-play modes activate gambling-related cognitions, trigger certain biases or attitudes, or facilitate a transition from free-play to cash-play gaming via some other mechanism.

The Link Between Free Mode and Cash Mode in Competition Gaming

Free-play games are identical to their cash-play counterparts, apart from differing incentive structures. The potential *wins* in free-play games carry no real-world value; thus, this form of gaming is not considered gambling and is not legally regulated as such. However, microtransactions introduce the prospect of real-world value *losses* in online casinos, and current research suggests there is a strong relationship between those who purchase microtransactions and those who will engage in cash gambling (Kim et al., 2015; Kim et al., 2017; Macey & Kinnunen, 2020).

In one study, researchers recruited 409 social casino users in the U.S. who had never gambled online and, when contacted six months later, 26% of participants reported having migrated to online gambling (Kim, et al., 2015). Notably, the only variable that predicted the transition to monetized play was purchasing microtransactions. In 2020, a Finnish study again found that free social casino gaming was positively correlated with microtransactions and both online and offline forms of gambling (Macey & Kinnunen, 2020).

Although current research suggests there may be a relevant link between free mode and cash mode in online gaming, it does not address the mechanisms behind the transition to cash-play nor clarify the directionality of the relationship.

Conversion from Free Play to Cash Play: Potential Mechanisms

Social casinos and gaming sites' primary objective is to generate revenue (Geddes, 2016; Interactive Design Foundation, 2014; Kim et al., 2015; Loftus, 1983). Many "free" sites achieve this goal by (a) securing payment through microtransactions or (b) recruiting players to participate in cash games. Casino game sites employ a variety of persuasion techniques and design tactics to attract players to cash gaming, whether through microtransactions or cash wagers. Some theoretical mechanisms that can help explain the context for player conversion

from free- to cash-play are discussed, including normalization, inflated winnings, design features, and the use of persuasion techniques.

Normalization

Normalization is the process by which behaviors come to be viewed as more "normal" or acceptable based on social observation. Normalization can change an individual's behavioral attitudes by skewing what is viewed as acceptable by society or a preferred social group. Players are more likely to be influenced by a preferred social group rather than an outgroup, so game designers strategically build a social setting into the online casino. This encourages players to build social bonds, creating an in-group within the platform, which further aids in the normalization of the gaming behavior. For example, upon creating an account, *Big Fish Casino* links new players to an existing club, which allows them to converse and share gifts with other members of their club. Players can see who else is online, what game they are playing, and they see a brief animation each time a club member wins a round. The online casino is a closed setting in which individuals are surrounded by others who are engaging in gambling behavior, and *only* by those who are engaging in gambling behavior.

In addition to normalization through socialization, players experience normalization through the game's messaging. Players in an online casino receive consistent messaging about their own and others' activity within the casino. The message is that everyone else is doing it, such that those who are not within the player's immediate experience (i.e., those not in the casino) do not contribute to the player's view of normal. In *Big Fish Casino*, players in slots receive updates about what is happening at the slot machines "next" to them, and a chat option allows them to discuss their experiences. Players in Blackjack are sat at a virtual table together,

where they can converse and trade gifts while they play. Players also see the wins and win amounts of other players who are nearby in the virtual space or playing at the same table.

Witnessing other players' activity allows for further learning of norms through social observation. According to social learning theory (Bandura, 1977), people are influenced by how others behave, but also by how the social group responds to those behaviors. If an individual witnesses a punishment for an undesirable social behavior, that individual is less likely to engage in the same behavior themselves. However, in the absence of punishment, or in the presence of a reinforcer, the individual will become more likely to emulate the behavior. In online casinos, players are routinely notified of other players' wins, but they are not notified of others' losses. Thus, players see reinforcement for engaging in online gambling and do not witness the punishment, further serving to normalize the gambling behavior through social processes.

Free-play mode may also serve to normalize gambling by "training" players through zero-risk practice games. Studies show that 90% of teens age 13-17 engage in some form of online casino gaming, and a significant number of adolescents with gambling problems have reported using online free-play gaming as practice for cash-play gaming (Anderson & Jiang, 2018; Gupta & Deverensky, 2005; Welte, 2015).

Inflated Winnings

The longer a player is engaged on a free casino site, the more likely they are to make a payment or deposit to the site (Kim et al., 2015), marking the migration from free gaming to cash gambling. Thus, it is in the best interest of the casino to keep players engaged longer, even if they are not contributing to the site financially. In-game currency is one tool that can be easily manipulated to keep a player active on a site. There is minimal cost associated with awarding extra in-game currency to players, so game designers use daily bonuses, login bonuses, and win

bonuses to boost a player's winnings. Some platforms, such as *BINGO Cash*, offer small amounts of real-world currency or bonus bucks in addition to in-game currency, but most sites offer bonuses solely as in-game currency. Bonus bucks are playable cash, which can be used to earn winnings in cash competitions, but they cannot be withdrawn as cash. As players login and collect bonuses, their "winnings" accumulate. This serves to keep them on the site, but it may also give the false impression of better skill or better odds than actually exist. A player may overestimate their skill, which could influence whether they take the larger risk of playing cash games (Frahn et al., 2015).

Other design features implemented by free sites serve to further inflate the illusion of winning while masking losses. Mechanisms such as prize pools, fake wins, and win-tracking can perpetuate an illusion of inflated winning. *Prize pool* refers to the total amount of money to be paid out to all players in a single round of a game. For example, in the "Epic Earnings" tier of *BINGO Cash*, players compete for an advertised prize pool of $117, yet the highest amount an individual can win is $45. Framing wins as larger than what an individual can attain may lure players to take a larger risk than they otherwise would.

Another feature often employed is the illusion of a gain, despite loss, which I refer to as "fake wins." A fake win occurs when a player receives a payout at the end of a round, but that payout carries less value than the initial cost to play. For example, on a cash-incentive skill-based gaming site, a player may pay an entrance fee of $2, then "win" $0.50 in return for finishing in second place. In this scenario, a player loses less currency than they expected to lose, and they experience the stimulatory feedback associated with a win, but there is no true gain. Nevertheless, the game frames the outcome as a win and makes that win salient to the player through auditory and visual reinforcement. In some free casino games, a player's total winnings

are automatically tracked, and the amount of the fake win would be included in the tracked total, further inflating the perception of winning while masking the financial loss.

Win-tracking is employed by many free casino sites to encourage continued play. Sites monitor the total amount of in-game currency that a player wins, but they do not account for entry fees or losses; thus, a player can lose substantially but still feel as though they are winning. The win amount is made salient to the player by enlarging the font, using bright colors, or adding animation. The game design draws the player's attention to the win amount repeatedly, such that over time, a player develops a sense of winning. Players may then be less likely to recognize the true value of wins or losses due to an expectation of winning paired with an overinflation of winnings. This could lead to overconfidence in one's own skill or luck, which would help persuade a player to transition into cash games.

In-game currency is a simple tool for promoting the illusion of winnings even in the event of overall losses. This practice is especially concerning in venues which strategically alter return-to-player (RTP) rates (Frahn et al., 2015). RTP refers to the average percentage of winnings paid back to players. For example, a 95% RTP indicates that, on average, for every $1 paid into a game, the house returns $0.95 and keeps $0.05. In traditional gambling, such as land-based slot machines, RTP rates are set by the manufacturer. RTP rates can be modified by an establishment's proprietor, but gambling regulations dictate that this information must be readily available to a player, in addition to the odds of winning, for any given machine. Among unregulated online casinos, however, a common practice is to manipulate RTP rates such that winnings in free-play mode are more frequent relative to cash-play mode. Players are more likely to rely on their previous experience with the game as compared to any posted RTP rates, which leads players to falsely believe they have higher chances of winning than they do. This can

instigate loss-chasing behavior, a key symptom of Gambling Disorder (American Psychiatric Association [APA], 2013).

Design Features

Game designers must decide how user experience (UX) will be driven by the representation of in-game currency; thus, they must determine how to represent the value of in-game currency as it relates to real-world currency. In-game currency, by definition, carries no true value. Game designers can set the amounts and increments however they desire, unrestricted by market values. Designers often choose to use larger amounts for in-game currencies, due to the principles of numerical cognition. Brain imaging research shows that humans and non-human animals are limited in their capacity to comprehend the value of large numbers (Hyde & Spelke, 2009). Large numbers are abstract, approximate, and difficult to understand, whereas small numbers are concrete and more precise. Large numbers are mentally represented in a symbolic manner, whereas small numbers are mentally represented as objects. Object-directed attention facilitates rational decision making regarding small numbers, but large numbers are left prone to mental comparison and manipulation (Hyde & Spelke, 2009). Representing in-game currency as large values leaves a player vulnerable to justification and integration of cognitive biases when assessing the value of a win or a loss. Inability to accurately assess magnitude introduces an element of suspended reality that may play a role in a player's decision to engage with cash-play features.

Visual hierarchy is an aspect of graphic design and game design that refers to how elements are arranged to facilitate UX, with important elements featured more prominently (Bank, 2014; Pernice, 2017). Visual hierarchy functions as an environmental nudge, guiding the user to a desired action. For example, in *21 Blitz*, cash games are the first option a player sees

upon logging in. Higher-stake games are listed toward the top, and players must scroll down to find lower-stake games or free games. This places a barrier, albeit a small one, between the player and the free option. It may also prime the player through repetition, thereby leading to cash choices in the future.

Visual hierarchy concepts are used to alter the salience of certain features, notably to emphasize wins and disguise losses. In *Jackpot World*, a banner is placed over the player's profile which advertises the player's total win balance for the day. This banner is emphasized by color, size, placement, and animation. In smaller font, beneath the banner, the player can view their current remaining balance. The total win balance advertised to the player includes everything a player has won, but it does not account for losses or the entry fees that must be paid to play. Thus, a player can experience substantial losses, while receiving a message that highlights their wins - a message that is designed to take advantage of one's peripheral route in cognitive processing, as proposed by the Elaboration Likelihood Model of persuasion (See *Persuasion Techniques* subsection).

Visual hierarchy can also assist with actively recruiting players to cash games. During free-play games, players are routinely rewarded with bonuses and reminded in prominent displays that the winnings could have been in cash form, had they paid a cash entrance fee. Players are encouraged to play for cash and sometimes receive an amount of money "on the house" to jump-start their transition into cash-play. Once active on the site, there are fewer barriers to cash gambling, and temptation increases as players are met with messaging about prospective winnings (King et al., 2010; McBride & Derevensky, 2009).

How messages about prospective winnings are perceived depends partially on the principles of framing, as first described by Kahneman and Tversky (1979, 1984; Tversky &

Kahneman, 1981). According to their theories, the way a message is framed influences how a user will engage with, process, and remember the information. The human brain is hardwired to operate at maximum efficiency. As such, it relies on shortcuts during decision-making to reduce cognitive load. When a designer frames a message in an accessible way, it will reduce cognitive load for the user. If the user trusts the source, they will more readily accept the message (Iyengar 1991; Price & Tewksbury 1997l; Yocco, 2014). Depending how players understand and evaluate a message in this context, the message may be more likely to influence future opinions, attitudes, and actions on a particular issue (Oxford University Press, 2013). Framing is an inherent part of advertising and marketing, as the purpose of these fields is to select and make salient certain pieces of information. This is true for online casino design, as well, as they attempt to market cash-play games to free-play users.

Persuasion Techniques

I have already discussed more subtle forms of persuasion, such as framing, priming, and nudges, but broader theories of overt persuasion can also help explain why online casinos and cash-incentive skill-based gaming platforms are especially fine-tuned for converting players from free-mode to cash-mode. Considering theories of media-based persuasion techniques, the Oxford Handbook of Media Psychology (2013) states, “the psychological theories of how people process [such] messages are relatively indifferent to the messages’ particular forms” (p. 285). In other words, a message conveyed via social casinos should trigger the same thought patterns and cognitive mechanisms that have been researched for other forms of media persuasion.

Cognitive response models (CRM) are especially helpful for understanding the persuasive effectiveness of social casinos. These models examine the interactive exchange between user and platform, as they consider players to be active consumers of the game, rather

than passive viewers of advertising (Oxford, 2013). CRMs, such as the Elaboration Likelihood Model (ELM) of persuasion, can explain how the strategic design of online casinos facilitates the recruitment of players to cash gaming easily, relative to if they did not play online at all or did not play on sites that offer cash modes (Oxford, 2013; Petty and Cacioppo, 1986). ELM has been found to effectively explain phenomena in laboratory research studies; thus, it is well-established theoretically (e.g., Eagly & Chaiken, 1993). ELM states that there are two possible routes of persuasion: a central route and a peripheral route. When deciding, either intentionally or unconsciously, to be persuaded by a message, a user's internal state will have a significant impact on which route they use.

When players use the central route of cognitive processing, they examine logic, facts, and weigh the value of potential outcomes. As such, the central route offers the most stable change in attitudes but requires a high level of cognitive processing (Petty & Cacioppo, 1986). Alternatively, the peripheral route does not require a rational argument, and people can be persuaded to action by the literal bells and whistles instilled in the game design. The peripheral route activates emotional responses rather than logical ones, so features such as sex appeal and celebrity endorsements can be more effective. This route can persuade people more easily due to lower cognitive requirements, but the change in attitude is more temporary relative to if advertisers can persuade a player via the central route (Petty and Cacioppo, 1986).

Those in the business of persuading others would likely prefer to access an individual's central route of cognitive processing; however, if they cannot make a rational argument, methods that tap into the peripheral route become a useful tool. Whether gambling is a rational activity has been discussed at length across decades of research (for example, Conlisk, 1993; Marfels, 2001; Rosett, 1965; Stetzka & Winter, 2021) with no clear consensus. Those who believe

gambling to be irrational argue that, despite some winnings, *most* people experience negative returns (Stetzka & Winter, 2021). Proponents of gambling as rational suggest that players gamble for purposes other than earning money, such as risk love or entertainment value; thus, gambling is not irrational (Conlisk, 1993). Ideally, good UX design would appeal to both central and peripheral routes of processing to recruit both rational and irrational players or, more accurately, to recruit those who are primed for either rational or irrational choice at that moment (Geddes, 2016).

Whether a person will use the peripheral or central route depends on many factors, but motivation and ability are key. Those who are already playing in a free casino are likely to be a motivated audience that is easy to target. In addition, online casinos are designed to enhance ability: they make platforms easy to use with few barriers to access. They also appeal to a *player*'s ability by highlighting wins and occluding losses, as described earlier. High motivation and high ability facilitate decision-making using the central route. If either motivation or ability are impaired, the peripheral route is activated. Then simple, albeit irrelevant, cues can become invaluable for influencing player choices. To induce peripheral processing, designers add elements that cognitively tax the player, relying on concepts such as overstimulation and choice overload. For example, when a player logs into *Bingo Cash* for a new session, before they have the option to begin gameplay, they are inundated with a series of poster-style ads for each available cash game and each ongoing event. These ads are highly stimulating with salient design characteristics, and they must be closed individually before the next one pops up. By the time a player crosses this barrier to access the game, they are cognitively taxed. Because cognitive overload makes it more difficult to assess logical information, they are more likely to

defer to the peripheral route. Ultimately, it becomes easier to lure these players to a cash game by irrelevant but flashy elements of the UX design.

Expectancy value theories, such as the Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975) can also apply when trying to understand how games persuade players to switch from free-to cash-play games. TRA states that (a) *personal attitudes* toward a behavior and (b) *social norms* surrounding a behavior contribute to a user's behavioral intention, which in turn drives a behavioral outcome (Fishbein & Ajzen, 1975). *Personal attitudes* are a function of (a) beliefs about behavioral outcomes and (b) evaluations of those behavioral outcomes (Oxford, 2013). *Social norms* are a function of the user's perception of others' opinions about engaging in that behavior, as humans are socially motivated to comply with norms and conform to others' expectations. Many research studies support the ability to predict behavioral intention from a combination of attitudes and norms, which ultimately drive behavioral outcomes (e.g., Sheppard et al., 1988; for a meta-analysis, see Kim & Hunter, 1993). Persuasion techniques influenced by TRA might seek to put more emphasis on norms as the mechanism behind an attitudinal shift, which would draw a player who would not otherwise gamble to engage in cash-play gaming. As discussed earlier, normalization is a key feature of online gaming, which lends credence to TRA as a helpful explanation of why players switch from free- to cash-play games (see *Normalization* subsection in *Conversion from Free-play to Cash-play: Potential Mechanisms*). According to TRA, normalization increases persuasiveness and changes the player's attitudes about gambling, thereby changing the action the player will take to engage in gambling (Oxford, 2013).

The current research

Well-designed online casinos have the potential to heavily influence gamers' choices by manipulating cognitive principles, and skill-based competition gaming platforms employ the

same design techniques to achieve the same result. By design, both are effective in persuading individuals to initiate cash transactions, regardless of whether the player can earn cash in return. Due to the apparent similarities, some researchers refer to this as the ”gamblification” of video games (Zendle et al., 2020). The gamblification of video games is a popular topic, as the advent of online casinos and cash-based skill gaming platforms has removed barriers to gambling-like activity, exposing more people to gambling mechanisms, and potentially leading to higher rates of gambling problems in the future.

A common concern in gambling studies is that monetized video games and social casinos may pose similar harms as gambling due to similarity in auditory and visual stimulation, site design and navigation, and gameplay mechanisms (e.g., Delfabbro et al., 2009; Gainsbury et al., 2015; Hollingshead et al., 2021; King et al., 2010). Many game-based gambling practices have raised concerns for their similarity to gambling based on structural features, such as the potential to win money and elements of chance. These practices include the use of microtransactions, loot boxes, and other forms of random reward mechanisms to maintain player engagement. Among researchers, random reward mechanisms embedded in video games have been described as “psychologically akin to gambling” (Drummand & Sauer, 2018) and criticized for their psychologically exploitative aspects (Griffiths, 2015; Griffiths et al., 2009; Johnson, 2020; Nielsen, 2018).

Research specific to cash-play skill-based gaming as it pertains to gambling is complex and evolving. Studies have indicated that cash-based gaming shares several characteristics with traditional gambling, including the potential for financial loss, excitement, and risk-taking behavior. Many players begin playing in free casinos without the intention of making cash transactions, but research shows that over one-quarter of people who play in free mode are likely

to make the transition to cash games (Kim et al., 2017). However, this study relies on surveys of participants who choose to game online, therefore making it difficult to discern whether those who are prone to gambling are also drawn to casino-style gaming, or if free versions are responsible for converting players to cash games.

Competitiveness is thought to be a risk factor for gambling problems, and spending money on competitive video games is linked to problem gambling (Zendle et al., 2020). However, other studies have found that the link between random reward mechanisms and problem gambling exists even in the absence of real-world currency (Zendle et al., 2020), suggesting that free-play competitive gaming is potentially as problematic as cash-play.

Although research suggests a clear relationship between free-play gaming and cash-play gaming, much of the published work relies on correlational studies and theoretical perspectives to draw the link between cash gaming and gambling. Relying on correlational is problematic because the directionality of the relationship is unclear. Theory suggests that free-play gaming could lead to cash-play gambling via several mechanisms, such as reinforcement, persuasion, social norming, and design techniques that appeal to cognitive biases; however, it is also possible that those who are likely to gamble would be drawn to cash-gaming due to the similar features. Experimental manipulations are necessary to determine whether free play causes players to migrate to cash-based games.

An additional drawback is that gambling research tends to rely on self-report data collected from surveys, clinical settings, and controlled research studies. Self-report data is especially problematic in gambling studies, as public perception of what constitutes gambling varies, potentially skewing results and making it difficult to draw meaningful conclusions. For example, self-report measures that ask participants how frequently they gamble or how recently

they have gambled would be affected by whether the participant perceived their activity as gambling. Survey studies have shown that there is a high-level agreement in public perception about what constitutes gambling in traditional gambling settings; however, there is a high level of disagreement regarding activities such as paying to enter tournaments for cash prizes and playing games against other people for money (Arthur & Delfabbro, 2017; Arthur et al., 2016; Macey & Hamari, 2018; Williams et al., 2017).

Examining cash-based and gambling-like games on a superficial level using traditional definitions can make it extremely difficult to explain why some games fit into one category while others fit into another. Researchers have pointed out that the introduction of real-world currency in competitive gaming, regardless of skill or luck, mirrors key gambling features (Griffiths, 2018). If players can cash out, then they are meeting the definition of gambling by wagering real-world money in hopes of getting a higher financial reward in return. One aim of this study is to begin examining the functional aspects of these games rather than structural characteristics to determine how best to distinguish between them.

Previous experimental studies investigating migration from free-play to cash-play modes in online gaming have maintained high internal validity by designing their own carefully controlled games (e.g., Frahn et al., 2014). These games give each participant an identical experience, can be programmed to replicate specific circumstances, and can be manipulated to analyze specific aspects of the game. Researchers benefit from being able to investigate specific elements in the gaming structure that may be harmful, such as inflated win rates, odds ratios, and fake wins. For example, the results of an experimental study using this design revealed that exposure to inflated win rates in free-play demo modes leads players to engage in higher risk-

taking (Frahn et al., 2014), a critical finding for the argument supporting more cash-gaming regulations.

Experimental studies such as this one yield valuable causal information not available from correlational measures, but they have been criticized for lacking ecological validity (Breen & Zuckerman, 1998). Video games designed for laboratory purposes are lacking in many of the key elements that researchers believe most contribute to gaming problems (see *Design Features* subsection). Monetized, skill-based gaming platforms are dedicated to designing games and websites that maximize user engagement by capitalizing on principles of user experience (UX) design. These platforms invest heavily in optimizing UX, engagement, and retention, creating a dynamic and interactive environment that would be challenging for researchers to replicate without substantial resources. Moreover, participants in these studies play for in-game currency rather than real-world currency, further compromising the effectiveness of these experimental games as a means of studying gambling behavior.

My study seeks to experimentally investigate the phenomenon of conversion to cash-play gaming from free-play gaming to determine causal direction using an existing popular gaming website to preserve ecological validity. The study design addresses the incentive structure of online monetized gaming, a venue that is believed to be central to the current increase in gambling-related problems among young adults (e.g., Griffiths et al., 2009; Hamilton, 2011; Gainsbury et al., 2015; Macey & Kennunen, 2020; Montiel et al., 2021). Specifically, I will use an experimental design to determine if free-play gaming on platforms that offer cash-play options will lead an individual to participate in cash-incentive gaming.

I hypothesize that participants who engage in free-play gaming will choose cash-play in a later phase at a similar rate relative to those who engaged in cash-play gaming; however, if free-

play leads players to engage in cash-play, both groups should choose cash-play at a higher rate relative to those in the control condition. In addition, I will explore variables that are commonly believed to contribute to gambling and gaming behavior, including user engagement, enjoyment, performance, and gambling attitudes. Players reporting higher engagement, more enjoyment, better performance, or more positive attitudes should be more likely to migrate to cash-play gaming. I will control for these variables in a logistic regression to establish whether it is the gaming mode or individual differences driving the participant's choice to engage in free-play or cash-play competitive gaming.

CHAPTER 2

METHOD

Participants

Participants were recruited through the University of Georgia's (UGA) SONA system, an online platform widely used by academic institutions for scheduling research studies and managing the research participant pool. Participants were eligible to participate if they were over the age of 18 and reported no history of gaming- or gambling-related problems. In total, we recruited 138 participants from the SONA system; one withdrew, and two were unable to complete the study due to encountering technical issues.

The final study sample consisted of 135 university students (72.6% female) between the ages of 18 and 25 (M = 20.95, SD = 1.33). All students were enrolled at the University of Georgia (63.7% first-year students; 36.3% returning students) and were compensated with 1.5 hours of course research credit.

Participation by race/ethnicity was: 61.5% (n = 83) White non-Hispanic; 10.4% (n = 14) Black or African American; 14.8% (n = 20) Asian or Pacific Islander; 5.2% (n = 7) Hispanic or Latino; 0.7% (n = 1) Native American or American Indian; and 7.4% (n = 10) Multiethnic. Politically, 32.6% (n = 44) identified as liberal or very liberal, 23% (n = 20) identified as conservative or very conservative, 25.2% (n = 34) were moderate, and 19.3% (n = 26) declined to respond.

Materials

Computer and Software

Participants completed all phases of the study on a designated lab computer that was purchased specifically for this study. We coordinated with on-campus technology support to

ensure the computer had only the necessary software installed, including browser access and the Xbox Game Bar. This was an extra precaution put in place to prevent data scraping, targeted advertising, or the presence of nonessential metadata which may alter the user's experience.

The computer was connected to the internet using a Virtual Private Network (VPN), which was disconnected and reconnected between participants. Additionally, we cleared the browser history, cache, and cookies between participants. Clearing each of these ensures that no data from one participant is carried over to the next, helping to maintain privacy and data integrity.

We used Xbox Game Bar software, integrated into the Windows 10 OS, to record participants' gameplay. This software is designed to allow users to easily record and share their online gaming sessions. Recordings captured only onscreen activity and computer audio; participants' likeness, voice, and ambient sounds were not recorded. We recorded onscreen activity for the demo session, Phase 1, and Phase 2, pausing the recordings between periods of active gameplay.

Gaming Site

We used an existing website that hosts a variety of online games in both a free and paid version. These games include skill-based games, such as *Bejeweled Blitz* and traditional casino-style games such as slots. The site is a popular platform, having awarded over $2 billion in prizes to date. In addition, they host non-competitive versions of some games through a partner site, which served as a control condition.

Game

We chose a game unique to the site to minimize participants' previous experience with it. We chose a skill-based card game that included casino-style design elements and required

similar skills to Blackjack. All participants played the same game, regardless of condition; however, the incentive structure and post-game feedback differed across conditions.

Participants in the control condition played a non-competitive, non-timed version of the game. Participants in the free-play condition played a competitive, timed version of the game for points. Participants in the cash-play condition played a competitive, timed version of the game for a cash prize.

Upon completion of each hand, those in the control condition will see only their own score (Figure 1); those in the free-play condition will see their score relative to a competitor (Figure 2); and those in the cash-play condition will see their score relative to a competitor as well as the cash amount won ($0.05 for 2nd place, $0.80 for 1st place; Figure 3). The entrance fee is set to $0.60 per game initially for the cash play condition; however, participants may choose to change their entrance fee as they play. In competition mode, gameplay typically lasts 2-3 minutes per game, with a 5-minute limit. In the control condition, gameplay typically lasts about 2 minutes with no enforced time limit.

Measures

User Engagement Scale

The User Engagement[1] Scale (UES) was designed to measure the overall quality of user experience (UX) in online shopping applications (O'Brien & Toms, 2008). The instrument uses a five-point Likert Scale (*1 = strongly disagree, 5 = strongly agree*) and is designed to measure both affective and cognitive dimensions of user engagement across six factors:

[1]O'Brien and Toms first defined engagement in 2008 as a theoretical construct, concluding that engagement includes the attributes of aesthetics, affect, focused attention, challenge, control, feedback, interest, and motivation (O'Brien and Toms, 2008; 2010).

1. Focused Attention (FA; α = .92) consists of 7 items
2. Perceived Usability (PUs; α = .92) consists of 8 items
3. Aesthetics (AE; α = .90) consists of 5 items
4. Endurability (EN; α = .87) consists of 5 items
5. Novelty (NO; α = .59) consists of 3 items
6. Felt Involvement (FI; α = .71) consists of 5 items

The UES has been tested for validity across a range of digital contexts with "very good" or "excellent" Cronbach's alpha ratings (0.69 - 0.95; O'Brien & Toms, 2010). Overall, the inventory has been found to be highly reliable in many digital applications beyond the original e-shopping intention (O'Brien & Toms, 2013).

For this study, I chose a revised version of the User Engagement Scale (UESz) as the measure of participant engagement (Wiebe et al., 2014). The UESz is adapted from the UES to assess user engagement specific to a video gaming context. The UESz is a 28-item, 5-point Likert Scale (*1 = Not very true*, *5 = very true*) that uses terminology specific to video games across four factors:

1. Focused Attention (FAz; α = .88) consists of 8 items
2. Perceived Usability (PUz; α = .89) consists of 8 items
3. Aesthetics (AEz; α = .88) consists of 5 items
4. Satisfaction (SAz; α = .88) consists of 7 items

The UESz demonstrated better psychometric properties for testing video game engagement relative to the original UES (α = .91; Wiebe et al., 2014) and is a more comprehensive tool for measuring the holistic nature of the gamer's experience relative to the UES (See Appendix A for the complete questionnaire).

Items from the PUz subscale were inversely coded, and scores were summed to create an index for each of the four subscales (FAz, PUz, AEz, SAz). Scores were summed across all four subscales to yield a total UESz index score. Higher scores indicated a higher level of engagement with the game and lower scores indicated a lower level of engagement.

Gambling Attitudes and Beliefs Scale

The General Attitudes and Beliefs Scale (GABS) was designed to measure cognitive biases, irrational beliefs, and affective attitudes toward gambling (Breen & Zuckerman, 1994; Breen & Zuckerman,1999). The GABS is a 35-item instrument that measures participant responses on a 4-point Likert Scale (*1 = strongly agree, 4 = strongly disagree*). Higher scores indicate a more positive attitude toward gambling and lower scores indicate a more negative attitude toward gambling. The GABS has been shown to have a good level of internal consistency (α = .81), and it demonstrates convergent validity with other indices of gambling pathology, such as the widely-used South Oaks Gambling Screen (SOGS; Hing & Breen, 2001; Breen & Zuckerman, 1999; Strong et al., 2004). Overall, it is a dependable tool for measuring latent attitudes and beliefs toward gambling.

For this study, I chose a revised version of the Gambling Attitudes and Beliefs Scale (GABSz; Strong et al., 2014). The GABSz is a 10-item, 6-point Likert measure (*1 = strongly disagree*, *6 = strongly agree*) adapted from the GABS specifically to assess gambling attitudes among a college sample. The revised GABSz was selected to match our target population and retains the good psychometric properties of the original GABS (α = .93; Strong et al., 2004a; Strong et al., 2004b). Additionally, it gives unique information about a college population not available from the GABS or SOGS (See Appendix B for the complete questionnaire).

Items 1-3 were reverse coded, and item responses were summed to yield a total GABSz index score. Lower scores indicated a more positive attitude toward gambling, and higher scores indicated a more negative attitude toward gambling.

Additional measures

At the end of each phase, participants were asked to rate their overall enjoyment of the game and their perceived performance. Both questions were rated on a scale of 1-10, such that higher scores indicated more enjoyment and a perception of better performance.

We documented the remaining cash balance for participants engaging in cash play at the end of Phase 1 and Phase 2.

In addition to the established psychometric instruments described, we added a dichotomous (yes/no) survey of lifetime gambling experience (LGE), which asked participants to indicate which types of gambling they had participated in across their lifetime from a list of 21 items.

We asked participants, “Which statement best describes your belief about the benefit or harm that gambling has for society?” to measure participants’ perception of gambling risk. Responses included (a) the harm far outweighs the benefits, (b) the harm somewhat outweighs the benefits, (c) the benefits are about equal to the harm, (d) the benefits somewhat outweigh the harm, or (e) the benefits far outweigh the harm. The question was scored such that lower scores indicated more perception of risk and higher scores indicated less perception of risk, with a score of three being neutral.

When signing up for the study, participants responded to a general demographic questionnaire that included age, sex, race/ethnicity, and political leaning.

Procedure

I used a novel experimental design to examine the effects of non-monetary incentives relative to monetary incentives on the decision to engage in cash-play gaming on a popular online gaming platform. Participants were randomly assigned by a random number generator to one of three experimental conditions - control (XX, $n = 50$), free-play (FP, $n = 48$), or cash-play (CP, $n = 37$). After engaging in the informed consent process, we began the experimental manipulation. Total active gaming time was around 45 minutes for each participant. Researchers asked brief questions after each phase regarding the participants' gameplay, and participants completed two formal questionnaires online. Finally, participants withdrew any cash balance from the gaming platform and were debriefed. Due to the sensitive nature of the study, I implemented thorough informed consent and debriefing processes to ensure participants' safety and autonomy were preserved.

Informed Consent

As part of the informed consent process, researchers told participants that they would be participating in a study on video game engagement and that they may encounter gambling or gambling-like games during their session. At this time, we reminded participants that their participation was voluntary and that they could withdraw without penalty. No participants withdrew from the study stating concerns about gaming or gambling.

Researchers also notified participants at this time that they would play on an existing online gaming website and were subject to the site's policies (collectively, the terms of service, terms and conditions, and privacy policy, herein referred to as the "policies"). The UGA legal team reviewed the policies and determined that there were no unusual terms and no privacy risks to the participants outside of what they would experience on a typical gaming site. We informed

participants that the UGA legal team had carefully reviewed the policies; however, we also allowed time for participants to review the policies themselves. One participant withdrew from the study, stating privacy concerns.

We worked closely with the legal team to ensure the study design was compliant with the policies and that neither we nor our participants would be at risk for violating those policies during the course of the study.

Experimental Manipulation

After the informed consent process was complete, the researcher assisted the participants in creating an account for the gaming website and then directed them to the proper version of the game depending on their randomly assigned condition. During periods of active gameplay, on-screen activity was recorded using the Xbox Gamebar software. The manipulation occurs in two phases (See Figure 4).

Before Phase 1 began, all participants first played a free-play demo version of the game, which automatically loads for first-time users as part of the site's design. The demo guides players through the rules and scoring of the game, then allows the participant to play in a simulated round of the game. For those in the cash-play condition, we then gave them a $5 Mastercard gift card and asked them to add the money to their account balance on the site. The gaming platform matches the $5 deposit with $1 in bonus cash.

After the demo hand was complete, players began Phase 1 of the study. Participants were left alone in the lab space to play the game for 20 minutes. Those in the cash-play condition were instructed to only play cash games. If their cash balance reached $0.00 before the 20 minutes had elapsed, Phase 1 ended. For all other participants (XX and FP), Phase 1 ended after 20 minutes

of gameplay. There was some variation in the total time spent playing, as we allowed participants to finish the hand they were on at the 20-minute mark.

After Phase 1 gameplay was complete, the researcher entered the room, paused the Gamebar recording, and asked the following questions:

1. On a scale of 1-10, how would you rate your overall **performance** on this game, with 1 being the poorest and 10 being the best?
2. On a scale of 1-10, how would you rate your overall **enjoyment** on this game, with 1 being the poorest and 10 being the best?
3. About how many rounds do you think you won?
4. About how many games do you think you played in total?

Phase 2 of the study is identical to Phase 1, except that players are given the *choice* of which version of the game (free-play or cash-play) they would like to play. Participants are told that they will again play the same game for 20 minutes; however, this time we will provide them with a $25 Mastercard gift card. The participant chose whether to (a) keep the gift card and finish the study in free-play competition mode, retaining a guaranteed $25, or (b) add the gift card to their gaming account and finish the study in cash-play competition mode, retaining whatever their balance was at the end of Phase 2. They were given the following instructions based on condition:

- In the control condition, participants were told “You just played this game in a non-competition mode. This time, you may choose whether to compete for points or cash.”
- In the free-play condition, participants were told “You just played this game in a free-play competition mode, competing against another player for points. This time, you may choose whether to compete for points or cash.”

- In the cash-play condition, “You just played this game in a cash-play competition mode, competing against another player for cash. This time, you may choose whether to compete for points or cash.

Then, all participants were handed a physical $25 Mastercard gift card and instructed, “If you choose to compete for cash, you will load the gift card to your account, and whatever your balance is at the end of the session will be yours to keep. The website will match your $25 deposit with $X bonus cash, for a starting balance of $X. Bonus cash can be used during gameplay, but it cannot be withdrawn. If you choose to compete for points, you will keep the $25 gift card and continue to play in a non-cash, points competition mode. Which option would you prefer?”

For this portion of the manipulation, researchers were trained in proper procedures for masking their potential influence on the participants’ decisions. The researcher was in the room with the participants, but they were located behind them out of direct eyesight. They were instructed to fix their attention on their clipboard and try to avoid eye contact. Researchers were trained to deliver the instructions and the question in a consistent, non-expressive manner, paying attention to their intonation and body language. Throughout the duration of data collection, I conducted routine spot-checks to ensure all researchers were maintaining neutrality during this key moment of manipulation. I also emphasized the importance of not influencing the participant’s decision in any way, for reasons of both data integrity and ethical integrity, over the course of many scheduled trainings, meetings, and emails. Participants often had follow-up questions, and the researchers were trained to give as much information as possible but to only give objective responses. They were instructed to avoid using any gambling-related terminology such as risk, wager, bet, win, loss, etc. Most often, it was sufficient to default to our pre-

determined neutral response of "Whatever your balance is at the end of the 20-minute session will be yours to keep."

Participants who chose cash-play were instructed to add the entire gift card amount to their balance. For those who had begun the study in cash-play mode, this amount was added to their existing balance. Participants who chose free-play were instructed to keep the gift card. Then, all participants were left alone to play the game for about 20 minutes. After Phase 2 was complete, researchers again asked the same four follow-up questions. In addition, they asked participants what they believed the study was about.

Finally, participants were directed to complete two questionnaires (UESz and GABSz) via Qualtrics while the researcher left the room. Questionnaires were pre-loaded on the computer for the participant in a counterbalanced fashion.

Debriefing

The debriefing process involved allowing time for participants to ask questions, a discussion of how to use their gift cards, and information on how to retain or close their gaming account, depending on their preference. We gave all participants a resource with tips for safer gambling, warning signs of problematic gambling patterns, and contact information for receiving gambling help. They were then told that they had earned 1.5 hours of research credit toward their course requirements as compensation, thanked for their participation, and allowed to leave.

Main Data Analysis

To determine whether there was a significant difference between the experimental condition and Phase 2 game choice, I conducted a Chi-Square test of Homogeneity. Additionally, I used a Chi-square test to determine if any condition was more likely to switch gaming modes in Phase 2. Independent samples t-tests were used to determine if those who chose free play

differed significantly from those who chose cash play based on enjoyment, perceived performance, user engagement, gambling attitudes, and demographic variables. ANOVA was used to determine if there was a difference in enjoyment, perceived performance, or user engagement based on assigned conditions. Descriptive statistics were calculated for Lifetime Gambling Experience (LGE), Gambling Attitudes and Beliefs (GABSz), User Engagement (UESz), and gambling risk. Logistic regression was used to assess whether game choice could be predicted when controlling for Phase 1 performance, enjoyment, and demographic variables.

CHAPTER 3

RESULTS

All statistical analyses were performed using SPSS 28.0. Of the 135 participants who participated in the experimental procedure, survey data was collected for 129. Six participants were unable to complete surveys due to encountering technical issues. Of the 129 participants who submitted surveys, there were no missing data points.

Descriptive Statistics

Lifetime Gambling Experience (LGE)

Over 90% of survey respondent (n = 117) reported at least one form of gambling in their lifetime. Of those who had previously gambled, 63 had gambled on internet gaming (48.8%), and 24 had gambled in land-based casinos (18.6%). One-quarter of participants (n = 32, 24.8%) had gambled in online casinos. The most popular forms of gambling included games of personal skill (n = 79), scratch tickets (n = 76), board games (n = 60), and internet games (n = 53). Sports betting was popular, with 53 participants (41.1%) gambling in fantasy leagues, tournament brackets, group betting pools, or betting on sporting outcomes.

Gambling risk

When asked to assess the benefits of gambling compared to the risks, participants did not report gambling as an especially harmful activity. Most participants (n = 104) reported that the benefits of gambling either somewhat or far outweigh the harms (42.7% and 38% respectively, M = 4.18, SD = .79). Only five participants (3.7%) reported that the harms somewhat outweigh the benefits, and no participants reported that the harms far outweigh the benefits. The remaining 16 participants (11.9%) had a neutral opinion of gambling harms as compared to the benefits.

Gambling Attitudes and Beliefs (GABSz)

Overall, participants had generally neutral attitudes toward gambling as measured by the GABSz (M = 3.65, SD = .45). Eight participants (6.2%) had overall negative attitudes toward gambling as indicated by a score of less than three on the GABSz index, and 23 participants (17.8%) had overall positive attitudes toward gambling as indicated by a score of greater than four on the GABSz index. The remaining 98 participants (76%) had neutral scores between three and four.

Agreement was highest among Item 1 (*Gambling is an important part of cultural life*, M = 5.02, SD = .992), Item 5 (*Gambling is a good form of entertainment*, M = 4.12, SD = 1.2), Item 8 (*Gambling makes me nervous*; M = 4.42, SD = 1.38) and Item 10 (*I prefer not to gamble*, M = 4.48, SD = 1.57). Only 14 participants (10.9%) agreed at least somewhat that gambling is "no big deal," whereas 105 participants (81%) somewhat or strongly disagreed with this statement, suggesting that despite neutral attitudes, participants are aware of potential risks associated with gambling.

User Engagement Scale (UESz)

Participants reported average levels of engagement with the chosen game during the study as measured by the UESz (M = 3.04, SD = .73). The highest scores were for aesthetics (AEz) and focused attention (FAz) subscales *(*M = 3.5, SD = 1.13, M = 3.56, SD = 1.14, respectively), whereas perceived usability (PUz) and satisfaction (SAz) subscales had below-average engagement scores (M = 2.28, SD = .95, M = 2.71, SD = .73, respectively).

Game Outcomes

Of the 135 participants, 56 (41%) chose cash-play during Phase 2. Among those who chose cash-play, the average amount players withdrew from the original $25 gift card was

$19.14 ($n$ = 53, SD = $4.65). Among the 53 players who chose cash-play, one ended the study with a positive balance ($25.04) and 52 (98%) ended with a negative balance. The remaining 79 participants (58.5%) chose to complete the study in free-play mode and retained their $25 gift card.

At the end of Phase 1, performance ratings for the control, free play, and cash play conditions differed significantly, such that those in the free play and cash play conditions both reported perceiving better performance relative to the non-competition control condition (M = 3.84, SD = 2.01, M = 6.48, SD = 1.37, M = 6.61, SD = 1.59, respectively, $F(2)132 = 13.16$, p <.001, R^2 = .17.) There was no difference in perceived performance between players in the free play and cash play conditions (p = .678).

At the end of Phase 2, performance ratings for those who chose free play or cash play did not differ (M = 6.15, SD = 1.37, M = 6.41, SD = 1.51, respectively; $t(133) = 1.04$, p = .15, d = .18). However, those who chose cash play during Phase 2 reported higher levels of enjoyment relative to those who chose free-play (M = 6.86, SD = 1.53, M = 6.37, SD = 1.55, respectively; $t(133) = 1.8$, p = .037, d = .31).

Phase 2 Game Choice

In Phase 2, 79 participants (58.5%) chose cash play, and the remaining 56 participants (41.5%) chose free play. There was no difference in Phase 2 game choice between conditions (X^2 (2, 135) = 2.26, p = .324). No significant differences were found between those who chose free play and those who chose cash play for gender ($t(133) = .435$, p = .332, d =.076), race ($t(233)$ = 1.117, p = .133, d = .195), political leaning ($t(133) = .764$, p = .365, d = .061), or age ($t(133)$ = 1.04, p =.150, d = .182). Phase 2 game choice does not appear to be driven by gambling attitudes

($t(98) = 1.16$, $p = .125$, $d = .24$), user engagement ($t(78) = .99$, $p = .163$, $d = .22$), or perceived level of gambling risk ($t(127) = .08$, $p = .467$, $d = .015$).

Phase 2 game choice was associated with perceived Phase 1 performance, such that those who perceived better performance during Phase 1 were more likely to choose cash play during Phase 2 ($M_{free} = 5.13$, $SD_{free} = 1.55$, $M_{cash} = 5.98$, $SD_{cash} = 1.73$, $t(133) = 3.01$, $p = .002$). There was no relationship between the level of enjoyment participants reported in Phase 1 and the game choice they made for Phase 2 ($M_{free} = 5.94$, $SD_{free} = 1.55$, $M_{cash} = 6.08$, $SD_{cash} = 1.98$, $t(133) = 0.47$, $p = .318$).

Among those who were assigned to the cash-play condition in Phase 1, the relationship between participants' account balance at the end of Phase 1 and the game choice they made for Phase 2 was approaching significance, such that those who ended Phase 1 with a higher balance may be more likely to choose to continue playing in cash mode during Phase 2 ($M_{free} = \$2.62$, $SD_{free} = \$1.59$, $M_{cash} = \$8.51$, $SD_{cash} = \$16.55$, $t(35) = 1.67$, $p = .052$).

Conversion Rates

Of those assigned to the control condition, 32 (64%) chose to continue in free-play mode and 18 (36%) chose to convert to cash-play. Of those assigned to the free-play condition, 24 (50%) chose to continue in free-play mode and 24 (50%) chose to convert to cash-play. Of those assigned the cash-play condition, 23 (62%) chose to switch to free-play mode and 14 (38%) chose to continue in cash-play mode. Overall, 65 participants (48.1%) chose to change game modes in Phase 2 relative to their assigned condition in Phase 1, and 70 participants (51.9%) continued to play in the same condition they had been assigned in Phase 1. There was no difference between groups in whether a player was more likely to continue in the assigned gaming mode or convert to a different gaming mode ($X^2(2) = 5.93$, $p = .052$).

Logistic Regression Analysis

A binomial logistic regression analysis was conducted to predict Phase 2 game choice (free play, cash play) based on Phase 1 condition, Phase 1 enjoyment, Phase 1 performance, gambling attitudes, user engagement, or political leaning. The overall model was not significant ($X^2(12) = 12.01$, $p = .44$). The model only explained 20% (Nagelkerke R^2) of the variance in game choice. Individually, only performance showed a significant relationship with game choice ($X^2(1) = 9.12$, $p = .003$), suggesting that no other variables influenced whether a participant chose to compete in free-play or cash-play gaming.

I planned to assess whether any of our variables were related to high-risk gaming behavior, evidenced by choosing games with higher entrance fees and higher prizes. However, only four participants altered their entrance fees throughout the course of the study, rendering this analysis unfeasible.

CHAPTER 4

DISCUSSION

Although engagement in cash-incentivized gaming is a popular pastime, many researchers have expressed concern about whether this type of gaming may serve as a gateway to gambling (Griffiths, 2013, Parke et al., 2013). This is especially concerning, as cash-incentivized gaming sites utilize unregulated free-play mode gaming to attract and maintain new players with the ultimate goal of converting free-mode players to cash games, driving site revenue.

My hypothesis that engaging in free-play gaming would lead players to engage in cash-play gaming was not supported, suggesting that free-play mode may not lead players to switch to cash gaming, although according to previous research, there may be a correlational relationship between cash-gaming, free modes, and gambling due to similar structures appealing to similar players (e.g., Anderson & Jiang, 2018; Delfabbro et al., 2009; Griffiths et al., 2009).

My results are in line with an emerging body of research that suggests that the link between cash-play gaming and gambling may not be as direct as previously thought. One study found an inverse relationship between gaming and gambling, suggesting that problematic gaming and problematic gambling are distinct phenomena (Macey & Hamari, 2018), and many studies have found weaker correlations between gaming and gambling than anticipated (e.g., Gainsbury et al., 2015; Kim et al., 2015; Kim et al., 2017). However, it is difficult to fully understand the extent to which researchers are finding a weak or non-existent link between practice modes, cash gaming, and gambling, as null results are less likely to be published or cited relative to work with significant findings.

The only significant finding I found was that player performance in Phase 1 was related to whether participants would choose cash gaming in Phase 2. This finding is in line with

research that finds players tend to continue cash gaming and place riskier wagers if they perceive better performance (Frahn et al., 2014). Frahn's study (2014) was conducted to examine the effect of inflated win rates, or return-to-player (RTP) rates, in free gaming modes – a technique often used by gaming platforms to increase player confidence and attract players to cash versions of the game. RTP rates over 100% are common among free-play versions of games. This rate is sustainable in free mode, as no revenue is changing hands; however, in cash modes, an RTP rate over 100% indicates an overall financial loss for the gaming platform, allowing gamers to win more than they wager. Players who engage in free modes with inflated RTPs are not only more likely to continue gambling and to do so in more risky ways, but they are also unlikely to change their risky behavior in response to the new, lower RTP rates.

As discussed, much correlational research has found evidence for gambling-related harms in cash-play video gaming, and many published papers have asserted strong theoretical perspectives for why cash-incentive gaming would lead to gambling-related harms. However, other research studies have found contradictory evidence and null results, suggesting that competing in cash gaming is *not* psychologically akin to gambling. More robust studies using experimental methods further call into question concerns surrounding cash gaming, as they have failed to find a causal link between competitive gaming and gambling outcomes in controlled studies (e.g., Frahn et al., 2014; Kim et al., 2017). Competing findings may arise for many reasons, including study design, measurement tools, sample populations, cultural attitudes, and regional gaming regulations. This suggests that the relationship between cash-based gaming and gambling may be complex and nuanced, requiring consideration beyond the apparent structural similarities.

Existing experimental studies aim to isolate individual variables, such as the RTP rates, to assess potential risks in structural features of online gaming. In contrast, this study employs an ecologically valid design to evaluate the broader function of free-play practice mode in skill-based gaming contexts. The lack of a causal link between free-play mode and cash-play mode in this study highlights the likelihood that psychological, social, and contextual factors may influence the connection between gaming and gambling, more so than the incentive structure of the game.

Despite emerging research finding weak links between non-gambling skill-based gaming and traditional gambling outcomes, there are still inherent dangers in skill-based competitive gaming that require researchers' attention. Video games of any type need to be monetized, and modern online adaptations of casual and casino games allow for quick, repetitive, small purchases, which raises concerns about their seemingly addictive properties. Due to a lack of regulation in free-play gaming modes, the online gaming environment is characterized by unethical recruitment practices and algorithmic manipulation. Gaming sites utilize algorithms to target recruitment efforts, and there is little oversight in how or where this recruitment occurs, which could lead to unintentionally targeted advertising to vulnerable populations, such as problem gamers and adolescents. After new players are recruited, the site's design takes advantage of innate cognitive biases to maintain player engagement, adding another layer of potential risk.

Limitations

In an attempt to preserve ecological validity, this study encountered many limitations. Throughout the design process, elements had to be altered or adapted in response to changes in the gaming platform, which was beyond my control. Without the ability to control the elements

of the gaming site, not every player experienced identical conditions; however, they did experience conditions that would be consistent with real-world gaming.

Approximately halfway through data collection, the host site we used for the experimental manipulation instituted protocols that made it impossible to continue collecting data. Therefore, I only collected data from 135 of my planned 300 participants. This smaller sample size left me with inadequate power, compromising my ability to detect effects.

Due to the nature and timing of the site's changes, our team speculated that the modifications were specifically aimed at terminating our study. For example, some changes that appeared on the website were only present when accessing the site from a university-owned IP address. We had suspected that early changes were targeted to our study; however, we were able to overcome those changes without compromising the study design. However, later changes rendered it impossible to continue collecting data.

Conclusion

For researchers charged with understanding and protecting people from gambling harms, where to draw the line between gaming and gambling becomes one of the most relevant and timely topics in online psychology.

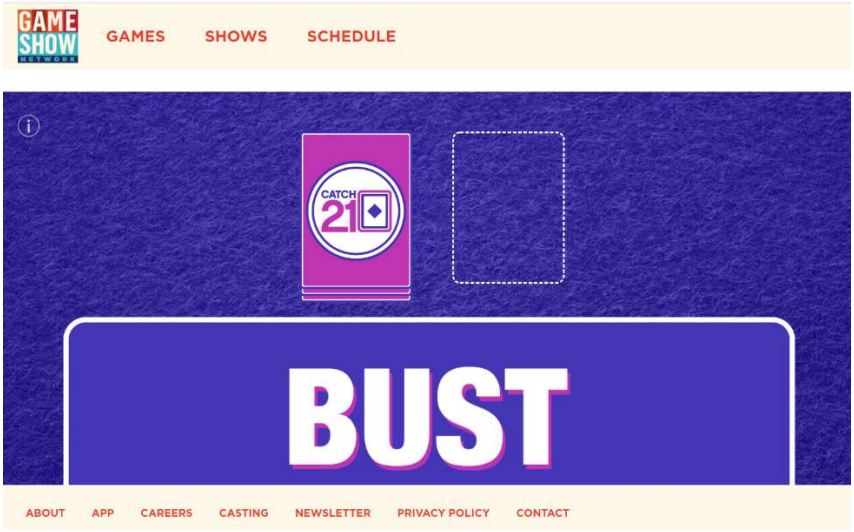
Some research finds that versions of cash gaming operate similarly to gambling, which suggests a need for regulation to protect vulnerable populations. Regulation would allow for greater oversight, such as ensuring that random reward mechanisms are truly random, enforcing consistent RTP rates between free and cash modes, monitoring the use of targeted advertising, and controlling algorithmic influence, which may unfairly affect vulnerable people. Placing limitations on gaming companies could yield more ethical gaming structures, allowing for valid entertainment to continue while minimizing risks.

Conversely, some research finds that cash gaming and gambling are distinct phenomena, suggesting that regulating gaming as gambling would be an overstep. A common tactic in business is for larger companies to lobby for regulations, making it more difficult for smaller competitors to carry out business and allowing the larger competitor to take a majority market share. Besides concerns surrounding free-market rights, pushes to regulate gaming as gambling may be premature given the current empirical evidence, leading to wasted resources and efforts that could be better directed toward other interventions. In addition, outsized regulation can stigmatize the gamer and eradicate a valid pastime, potentially causing additional harm in a misguided attempt to reduce it.

On one side, there is a push for policy change to prevent harm, and on the other side, there is pushback, stating that policy change would cause more harm than it would prevent. Given the current research and previous findings, it seems that some forms of limited regulation could be beneficial for both companies and players. Notably, policies that enforce greater transparency could minimize risks while still allowing cash-gaming to continue. It is possible, or even likely, that these games may deserve their own category which overlaps both gaming regulation and gambling regulation, but it is unlikely that cash games are identical to gambling to the extent they should be regulated as such. Continued research should use experimental designs to elucidate the functions of gaming sites, rather than focusing on superficial similarities to drive categorization efforts.

Figure 1

End-of-Game Outcome for Control Condition



Note. Upon completion of a hand in the control condition, participants will not see a score or any other achievement marker.

Figure 2

End-of-Game Outcome for Free-Play Condition

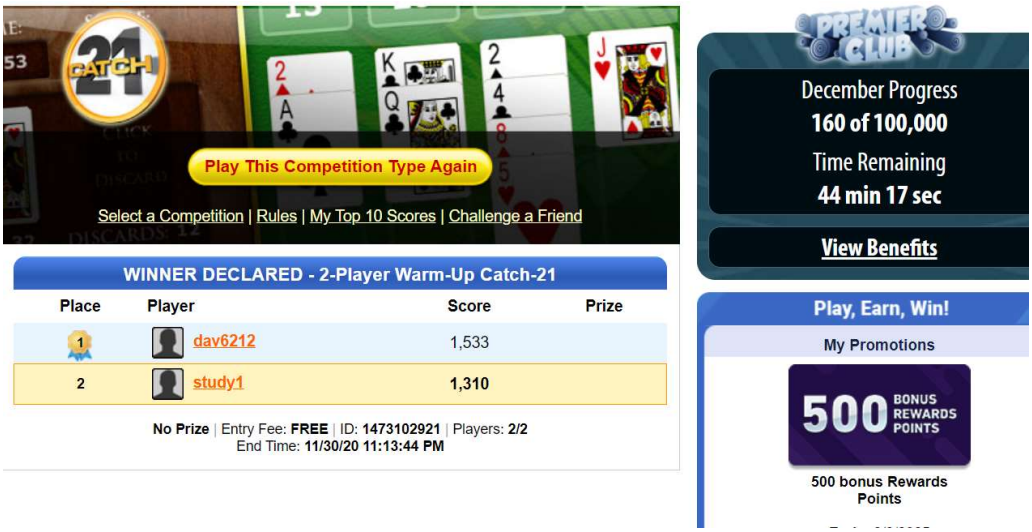


Figure 3

End-of-Game Outcome for Cash-Play Condition

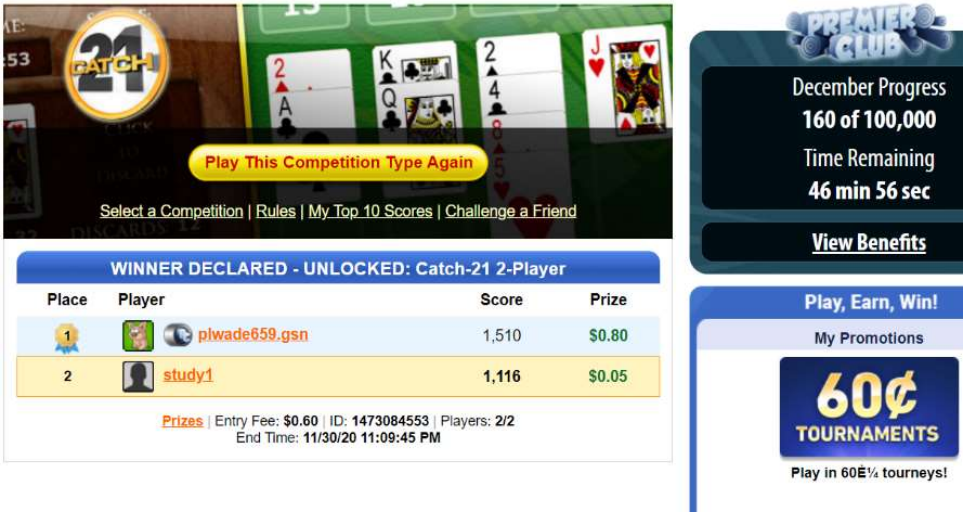
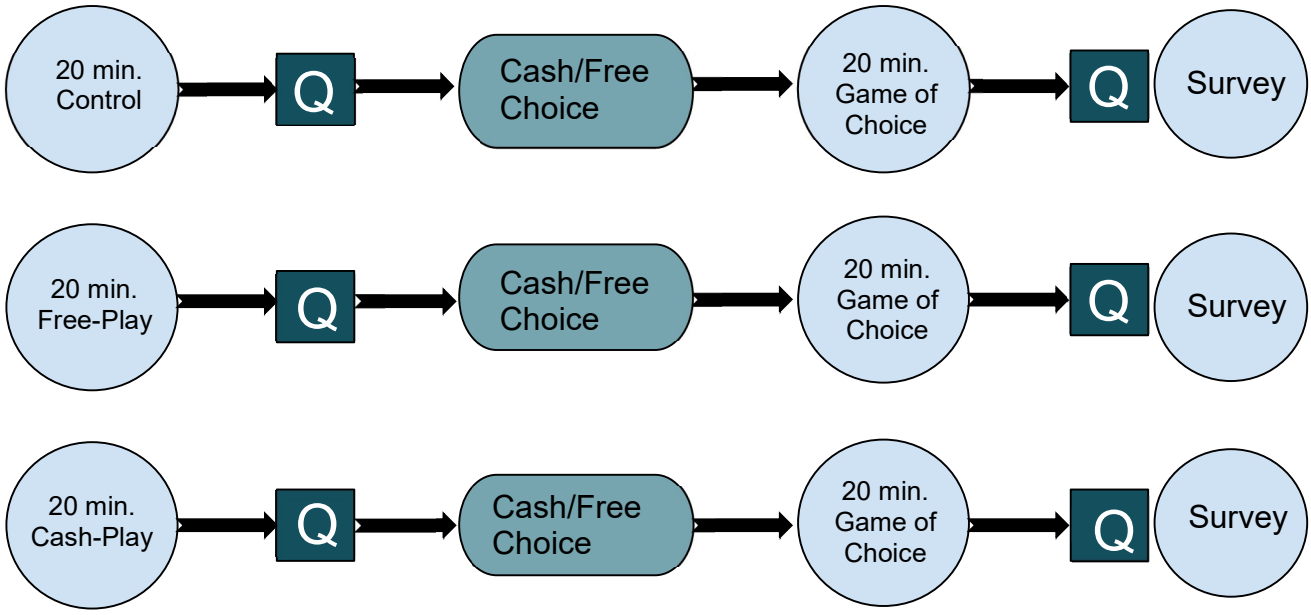


Figure 4

Diagram of Study Design



- Participants are randomly assigned to a control, free-play, or cash-play condition
- Those in the free-play condition will compete against an online player for a points incentive; those in the cash competition will compete against an online player for a cash incentive; those in the control condition play a non-competitive online game.
- Participants will play for 20 minutes in their assigned condition and then will be asked about their perceived performance and level of enjoyment of the game.
- Next, they will be asked to choose between a points competition or cash competition game.
- Participants will play for 20 minutes in the chosen condidion and then will be asked about their perceived performance and level of enjoyment of the game.
- Finally, participants will complete two surveys: The Gambling Attitudes and Beliefs Scale (GABSz) and the User Engagement Scale (UESz). Surveys will be presented in a counterbalanced fashion.

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Appendix A

User Engagement Scale (UESz) – Revised for Video Games

How true are the following statements for you?
Measured on a Likert scale from 1 (*Not very true*) to 6 (*Very true*)

1. When I was playing the game, I lost track of the world around me.
2. I blocked out things around me when I was playing the game on this website.
3. The time I spent playing the game just slipped away.
4. I was absorbed in my gaming task.
5. I was so involved in my gaming task that I lost track of time.
6. During this gaming experience, I let myself go.
7. I lost myself in this gaming experience.
8. I was really drawn into my gaming task.
9. I felt discouraged while on the website.
10. I felt annoyed while visiting the website.
11. Using the website was mentally taxing.
12. I found the website confusing to use.
13. I felt frustrated while visiting the website.
14. I could not do some of the things I needed to do on the gaming website.
15. The gaming experience was demanding.
16. This gaming experience did not work out the way I had planned
17. I liked the graphics and images used on the website
18. The website appealed to my visual senses
19. The website was aesthetically appealing
20. The screen layout of the website was visually pleasing.
21. The website was attractive.
22. The content of the gaming website incited my curiosity.
23. I would continue to go to this website out of curiosity.
24. I would recommend playing the game on the website to my friends and family.
25. Playing the game on this website was worthwhile.

26. I felt interested in my gaming task.
27. My gaming experience was rewarding.
28. This gaming experience was fun.

Subscales

1. FA – Focused Attention
    a. Based on Flow Theory (focused concentration, absorption, temporal dissociation)
    b. Items 1-8
2. PU - Perceived Usability
    a. Both affective (frustration) and cognitive (effortful) aspects of use of the system.
    b. Items 9-16
3. AE – Aesthetics
    a. Visual appearance
    b. Items 17-21
4. SA – Satisfaction
    a. Involvement, focused attention, and overall satisfaction
    b. Items 22-28

Appendix B

General Attitudes and Beliefs Scale – Revised (GABSz)

1. Gambling is an important part of cultural life
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
2. Gambling is a harmful form of entertainment
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
3. Gambling is dangerous for family life
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
4. *Gambling is not a big deal
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
5. *Gambling is a good form of entertainment
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
6. *People tend to overreact or exaggerate the dangers of gambling
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
7. *I enjoy gambling
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
8. *Gambling makes me nervous
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
9. *It bothers me that other people gamble
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*
10. *I prefer not to gamble
    a. Likert scale from 1 *(strongly agree)* to 6 *(strongly disagree)*

Appendix C

Lifetime Gambling Experience (LGE)

Please select the types of gambling you have participated in across your lifetime, prior to today. Please only select items for which you have bet money or possessions.

1. Slot machines at a casino
2. Slot machines not at a casino
3. Table games such as poker, roulette, craps, and blackjack at a physical casino
4. Table games such as poker, roulette, craps, and blackjack in an online casino
5. Table games such as poker, roulette, craps, and blackjack with friends, family, or others but not at a casino
6. Video games or games on the internet, not including online casino games
7. Video poker or video keno
8. Live keno
9. Raffle tickets
10. Bingo
11. Dice games
12. Scratch tickets or pull tabs
13. Government-sponsored lottery games, such as PowerBall, Mega Millions or Daily Numbers
14. Races
15. Games of personal skill, such as pool, bowling, basketball, or video games
16. Fantasy sports leagues if, and only if there was an entry fee to play
17. The outcome of any sporting event - amateur, college, or professional. Do not include tournament brackets such as March Madness.
18. Group betting pools, such as college basketball, tournament brackets, or “delivery” dates for babies
19. High risk trading of stocks, commodities, or futures
20. Non-monetary betting, such as wagering a list of chores
21. Some other game, activity, or event not listed above