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# Personality and Social Psychology Bulletin

## Hungry Ghosts Eat Casino Chips: Associations between Dispositional Greed and Gambling

Journal:	<i>Personality and Social Psychology Bulletin</i>
Manuscript ID	PSPB-24-154.R1
Manuscript Type:	Empirical Research Paper
Keywords:	Risk-taking, gambling, Decision Making, impulsiveness, Dispositional Greed
Abstract:	<p>Dispositional greed is characterized as the insatiable desire for more. Although greed may be a driving force for wealth accumulation, it can also relate to increased financial difficulties and risk-taking. Across two studies in different countries, The Netherlands (Study 1, N = 1118) and England, Study 2, N = 4855), we tested the degree to which dispositional greed was associated with gambling outcomes. Greedy individuals reported greater gambling participation and more negative gambling-related consequences. Moreover, Study 2 found that greed was associated with maladaptive gambling-related cognitions (e.g., cognitive distortions, positive expectations, and the perceived inability to stop) beyond that explained by trait motor impulsiveness. Additionally, dispositionally greedy individuals reported being more focused on financial motivations for gambling, having greater confidence in winning, and less concern with realized losses. The current study demonstrates links between dispositional greed and risk-taking in a real-world context, highlighting biased decision-making cognitions for greedy individuals.</p>

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**Hungry Ghosts Eat Casino Chips:****Associations between Dispositional Greed and Gambling**

*“Gambling operates under the premise that greed can be satisfied by luck.”*

– Rita Mae Brown

*“Let’s make lots of money.”* – Pet Shop Boys

Gambling, for most partaking in it, is a pleasurable activity that provides entertainment and enjoyment. In recent years, gambling opportunities have proliferated, largely associated with the rapid growth of the online gaming industry. Nowadays, one can gamble via online gaming apps, including virtual casinos, sportsbooks, and daily fantasy sports. In the United States alone, gambling revenue took in \$54.9 billion in 2022, breaking the record set in 2021 by 13.5% (American Gaming Association, 2023). Similarly, countries such as the United Kingdom and the Netherlands have also posted large gross gambling yields £15.1b (in the year to March 2023) and €1.0b revenue from online gambling (projected for 2024), respectively (UK Gambling Commission, 2023; Statista, 2024). In contrast to those who gamble responsibly, some individuals may struggle with gambling and realize associated adverse psycho-social consequences. In the United Kingdom, for example, over 2 million adults are thought to experience some level of gambling harm (UK Gambling Commission, 2022). Problem gambling is associated with increased debts, dissolution of interpersonal relationships, and losses may exacerbate mood disorders and other harmful behaviors like alcohol, substance abuse, and suicide attempts (Wardle et al., 2018). At the pathological level, the Diagnostic and Statistical Manual-5 (DSM-5; American Psychological Association, 2013) defines Gambling Disorder as persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period, including but not limited to: gambling preoccupation, repeated attempts to control one’s gambling, needing to

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3 gamble with more money to achieve the desired excitement, chasing losses (i.e., gambling  
4 more to break even), and borrowing money to pay back gambling debts.  
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8 It follows that better understanding of not only who gambles excessively, but also  
9 what psychological processes may perpetuate these behaviors, is vital for promoting  
10 responsible gambling as well as developing potential interventions to reduce problem  
11 behavior. Numerous studies examined associations between personality and problem  
12 gambling behavior, and these have largely focused on higher-order trait dimensions such as  
13 the Big Five (Dudfield et al., 2023; Strømme et al., 2021), or on narrower traits related to  
14 risk-taking, such as those related to sensation-seeking and self-control (e.g., Canale et al.,  
15 2015; Cyders & Smith, 2008; Michalzuk et al., 2011). In contrast, the current study examines  
16 the idea that dispositional greed (Zeelenberg & Breugelmans, 2022) is associated with  
17 gambling behavior. Dispositional greed is a relevant, but overlooked, trait with respect to  
18 gambling, not only for its notable associations with the desire to acquire excessive resources  
19 (Seuntjens et al., 2015a&b), but also because of its links with impulsiveness (Seuntjens et al.,  
20 2015b, 2019) and risk-taking (Li et al., 2019; Mussel et al., 2015; Mussel & Hewig, 2016;  
21 Rodrigues et al., 2023). However, research has neither extensively examined the associations  
22 between greed and real-life risk taking, nor the psychological mechanisms that may account  
23 for such effects.  
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44 We investigated these issues in nationally representative community samples in two  
45 European nations (i.e., The Netherlands and England). Across both studies, we predicted that  
46 higher levels of dispositional greed would be positively associated with various indicators of  
47 gambling behavior and realized harmful consequences. In Study 2, we additionally tested the  
48 degree to which maladaptive gambling-related cognitions (Raylu & Oei, 2004), such as  
49 positive expectancies of the gambling experience and control beliefs, mediated these  
50 associations, accounting for trait differences in impulsiveness.  
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### **Dispositional Greed**

Greed has a long history of being associated with socially undesirable behaviors (Zeelenberg et al., 2025). For instance, Christianity refers to greed as one of the “deadly sins”. Similarly, Buddhism refers to “hungry ghosts,” reborn beings who led a previous life characterized, in part, by greed; these beings are said to have “large stomachs and tiny mouths,” ever unable to quench their desires (Rotman, 2021). Conversely, some have lauded the consequences of greed, as it is thought to result in economic growth which might generate a surplus that benefits society (Bruhn & Lowrey, 2012; Oka & Kuijt, 2014).

Dispositional greed is defined as dissatisfaction with one’s current state, combined with the insatiable desire for more of any valued entity (Seuntjens et al., 2015a). People reporting low greediness tend to be satisfied with what they have, and not seek more. In contrast, those scoring high on greediness experience dissatisfaction with current possessions and are the most likely to display a variety of acquisitive behaviors. Although money and financial gains are associated with dispositional greed, other resources such as power, status, sex, and food could also be a target of greed (Hoyer et al., 2024a; Weiß et al., 2024). For instance, greed was related to hoarding behavior during the COVID-19 pandemic in Japan (Yoshino et al., 2021). Additionally, being greedy is associated with wanting more friends (Seuntjens et al., 2015b), and with a higher number of sex partners (Hoyer et al., 2024b).

Several scales measure differences in dispositional greed, demonstrating strong convergent validity and similar external validity (Mussel et al., 2018; Zeelenberg et al., 2022). The Dispositional Greed Scale (Seuntjens et al., 2015b; Zeelenberg & Weller, in press) is the most widely used scale, and validated for application in numerous languages and cultures. Converging evidence across various scales and samples suggests that levels of dispositional greed are normally distributed in the population (Krekels & Pandelaere, 2015; Zeelenberg & Breugelmans, 2022).

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3           Dispositional greed is related to, but separable from, traits that reflect some form of  
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5 “wanting more,” such as materialism, envy, and self-interest (Crusius et al., 2021; Krekels &  
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7 Pandelaere, 2015; Seuntjens et al., 2015a,b). For instance, materialism is often  
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9 conceptualized as a value (Richins, 2004), whilst greed represents a desire to obtain more,  
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11 regardless of whether the target is a material entity. Greed differs from envy in that it stems  
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13 mostly from wanting more (internally motivated), whereas envy is mostly driven by wanting  
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15 what others have (externally motivated; Seuntjens et al., 2015a). Additionally, Hoyer et al  
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17 (2024a) found that greed and self-interest share many of the negative relationships with  
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19 important life outcomes, but greed was positively related to household income, while self-  
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21 interest was negatively related. Greed was also positively related to the number of sexual  
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23 partners, whereas self-interest was unrelated.

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26           Dispositional greed has also been related to broad personality dimensions (e.g., the  
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28 Big Five), in which the general finding is that greedier people are less agreeable and more  
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30 neurotic (Krekels & Pandelaere, 2015, Mussel & Hewig, 2016; Sekhar et al., 2020; Seuntjens  
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32 et al., 2015b). Extraversion, openness, or conscientiousness did not show a consistent  
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34 relationship with greed. The HEXACO Honesty-Humility dimension includes a facet labelled  
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36 greed avoidance, which reflects the desire to acquire material goods and status; thus, this  
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38 scale reflects perceived happiness with materialistic goods, but not aspects of acquisition or  
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40 dissatisfaction (Ashton & Lee, 2007). Other studies find that greedier people are more  
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42 impulsive and have less self-control (Seuntjens et al., 2015b, 2019), are more easily tempted  
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44 (Hoyer et al., 2023), and score higher on psychopathic and other dark triad traits, (Mussel &  
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46 Hewig, 2016; Sekhar et al., 2020; Veselka et al., 2014).

**Greed, Risk Taking, and Gambling**

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48           The degree to which dispositional greed is associated with real-life risk behaviors,  
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50 and specifically gambling, remains an open question. However, converging indirect evidence  
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## GREED AND GAMBLING

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3 supports this assertion. First, some studies found an association between greed and risk-  
4 taking using controlled experimental tasks. Mussel et al. (2015) reported that greedy  
5 individuals showed lower neural responses to losses (vs. gains), compared to less greedy  
6 counterparts. Similarly, Hoyer et al. (2023) reported that greed was more strongly associated  
7 with greater expected benefits from engaging in risky behaviors across different domains,  
8 rather than lower risk perceptions. Additionally, that study reported that dispositional greed  
9 was significantly associated with maladaptive risks, rather than recreational or social risks.  
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11 Second, dishonest and unethical behaviors associated with greed (Zeelenberg et al., 2025)  
12 may promote symptoms of problem gambling, namely concealing gambling losses or  
13 gambling frequency. For instance, research has found that positive greed attitudes and  
14 motivations were associated with lying and cheating in pursuit of self-interest (Piff et al.,  
15 2012).

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31 Third, related traits also hint towards associations between dispositional greed and  
32 gambling. Weller and Thulin (2012) reported that lower HEXACO-Greed Avoidance (and  
33 the broader honesty/humility dimension; Weller & Tikir, 2011) was associated with greater  
34 risk-taking (with hypothetical gambles) for both potential gains and for potential losses  
35 (although, see Seuntjens et al., 2015b, for null effects in a hypothetical mixed gamble  
36 paradigm). Further, Carver and McCarty (2013) found that materialistic values were  
37 endorsed by the heaviest casino gamblers, compared to other gambling subtypes.  
38  
39 Additionally, Eyzop et al. (2019), comparing 65 pathological gamblers to 65 matched non-  
40 problem gamblers, reported that individuals endorsing materialistic values gambled more for  
41 financial motives and were more likely to excessively gamble (c.f., Estevez et al., 2021).  
42  
43 Similarly, HEXACO Honesty/Humility predicts problem gambling behavior severity (Kim et  
44 al., 2018; Lee et al., 2013; McGrath et al., 2018; Mishra et al., 2018). Finally, dispositional  
45 greed is associated with financial motivations (Seuntjens et al., 2016; 2019), which often are  
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also reasons for gambling (Floyd et al., 2024; Tabri et al., 2022).

### The Current Research

The picture that emerges is one of greed as an impulsive, opportunistic, anti-social, and egoistic trait, rather than a beneficial one. Integrating these insights with the insatiability and acquisitiveness that are central to the greed construct, we propose that greedy people may be drawn to gambling, because it offers the potential to satisfy their acquisition goals in the quickest possible time. Subsequently, greedy individuals who *do* gamble, may do so more often and may report greater negative consequences associated with it. Across large community samples from The Netherlands (Study 1) and England (Study 2), we tested the associations between dispositional greed and gambling behaviors, such as poly-gambling activities and problem severity.

### Study 1

#### Method

##### *Participants*

Participants in this study were participants of the Longitudinal Internet Studies for the Social Sciences (LISS panel; [www.lisspanel.nl](http://www.lisspanel.nl)), a true probability sample of the Dutch population. Data collection for this sample occurs monthly, with subsets of the entire panel (over 7000 participants) being invited to complete studies and experiments. Participants in this panel receive a monetary incentive for each completed questionnaire. In the current study, we used two separate datasets from LISS: (1) data involving dispositional greed, collected in 2013 (LISS, 2013), and (2) data involving gambling behaviors, collected in 2017 (LISS, 2017). Only participants who completed both studies were included in the present study ( $N = 1118$ , 51.8% female). The majority of participants had a Dutch background (60.4%), 24.5% reported being a first- or second-generation Dutch resident of Western background, 15.1% reported being a first- or second-generation Dutch resident of non-



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Western background. The mean age of the sample was 55.24 years ( $SD = 15.96$ ), 93.1% reported achieving at least the equivalent of US high school diploma and reported a mean monthly gross income of €2700.

**Measures<sup>1</sup>**

**Dispositional Greed Scale.** We used the 7-item Dispositional Greed Scale (DGS; Seuntjens et al., 2015b). Sample items include, “As soon as I have acquired something, I start to think about the next thing I want”, “I always want more”, (1 = strongly disagree, 5 = strongly agree);  $M = 2.01$ ,  $SD = 0.73$ , Cronbach’s  $\alpha = .88$ .

**Materialism.** We used the Material Values Scale (Richins & Dawson, 1992). Only the nine highest loaded items on the original scale were collected (see Seuntjens et al., 2015b). Sample items include “Buying stuff gives me a lot of pleasure” (1 = strongly disagree, 5 = strongly agree);  $M = 2.47$ ,  $SD = 0.66$ , Cronbach’s  $\alpha = .80$ .

**Gambling Participation.** Participants were asked: “In the past 12 months, have you participated in ANY form of gambling? This includes, but not limited to, lottery tickets, scratch cards, bingo, horse racing, sport betting, and casino gambling?” For those who responded “Yes” (63.8%), several follow-up questions were asked to characterize their gambling behavior, namely:

**Gambling Types.** Participants were provided with a list of nine common gambling activities (i.e., lottery draws, scratch cards, bingo, slot machines in pubs/restaurants/casinos, online slots/instant wins, horse/dog race betting, sports betting, in-person or virtual casino games, poker), and were asked to whether they engaged in this behavior over the past 12 months. We created a poly-gambling engagement variable by summing the number of

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1. Study materials data, codebooks, and analysis code are available for both studies at Open Science Framework, <http://tinyurl.com/585c54bd>

## GREED AND GAMBLING

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endorsed activities (range 0-9).

**Problem Gambling Severity.** Negative consequences related to gambling were measured by the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987), resulting in a score from 0 to 20. Scores 3-4 = some gambling risk, 5 or greater suggests presence of pathological gambling.

**Results & Discussion**

In this sample, 63.8% of respondents gambled on any game of chance within the past 12 months (see Table 1). Lotteries were the most popular gambling type (57.7%), and 63.5% of the respondents who gambled reported that lotteries were their only form of gambling. Scratch cards were the second most popular gambling activity (14.5%), while the other activities had endorsement rates of 5.7% or less. The overall sample played,  $M = 0.93$  ( $SD = 0.98$ ) different types of games (range 0-7),  $M = 1.46$ ,  $SD = 0.86$ , for those who reported gambling within the past 12 months. SOGS risk scores ranged from 0-3,  $M = 0.37$ ,  $SD = 0.50$ . No participants met the established threshold for probable pathological gambling risk, and only 3 (0.3%) scored  $> 1$ . Resultantly, we do not consider this measure any further.

Dispositional greed and materialism were positively correlated,  $r = .64$ ,  $p < .001$ . We then examined the correlations between dispositional greed, materialism, and poly-gambling behavior (square-root transformed to reduce skewness) for those who gambled within the past 12 months. Dispositional greed ( $r = .16$ ,  $p < .001$ ) and materialism ( $r = .12$ ,  $p = .002$ ) were both associated with poly-gambling behavior. A subsequent linear regression found that dispositional greed uniquely accounted for poly-gambling variance ( $B = 0.16$ ,  $p < .001$ ), holding materialism ( $B = 0.01$ ,  $p = .86$ ) constant,  $F(2, 711) = 9.89$ ,  $p < .001$ .

Finally, we explored whether dispositional greed would be stronger for those who gambled via activities other than solely lottery draws, which are typically lower stakes than other gambling activities, in addition to lotteries. An independent-samples  $t$ -test comparing

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lottery only gamblers with other gamblers revealed significant mean-level differences in both dispositional greed ( $M_{\text{lottery only}} = 1.96, SD = 0.71; M_{\text{poly-gamblers}} = 2.20, SD = 0.74$ ),  $t(711) = 4.34, p < .001. d = 0.34$ , and materialism ( $M_{\text{lottery only}} = 2.43, SD = 0.64; M_{\text{poly-gamblers}} = 2.61, SD = 0.63$ ),  $t(711) = 3.52, p < .001. d = 0.27$ , with the effects being stronger for greed.

These results provide preliminary evidence that dispositional greed is associated with gambling behavior, above and beyond individual differences in materialism. These effects suggest that dispositional greed may be associated with seeking out more gambling opportunities. However, the low base rates of both actual gambling behavior other than lotteries and prevalence of problem gambling severity in this sample limit our ability to make firm conclusions. Additionally, it is important to note that although the endorsement of gambling was assessed, the frequency of each activity was not, further limiting the conclusions.

**Study 2**

The purpose of Study 2 was fourfold. First, because greed and gambling measures in Study 1 were four years apart, we sought to examine these associations in a larger, contemporaneous sample. Second, the Dutch sample did not include problem gamblers. It is also notable that, at the time of the Dutch assessment, online gambling was not yet legal in the Netherlands (only becoming legal in late 2021). To address these limitations, we tested these associations in a larger study, in a larger gambling market, namely England, which has a much more established gambling culture and industry and is currently the largest gambling market in Europe in terms of online gross gambling revenues (European Gaming & Betting Association, 2022). Third, we tested the degree to which maladaptive gambling-related cognitions, which have been implicated in perpetuating gambling behavior (Raylu & Oei, 2004), would mediate the associations between greed and gambling outcomes. Finally, because Study 1 revealed that the association between gambling and greed was not explained

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3 by materialism, we turned our attention to the degree to which greed-gambling associations  
4 were independent of individual differences in impulsiveness, another trait associated with  
5 dispositional greed.  
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### 10 **Maladaptive Gambling-Related Cognitions**

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12 Although many greedy individuals may never gamble, for those that do, we propose  
13 that those with high dispositional greed may be more likely to develop maladaptive  
14 gambling-related cognitions which may perpetuate gambling once engaged, and potentially  
15 exacerbate problems. The problem gambling literature suggests that a host of maladaptive  
16 cognitions predict problem gambling severity (e.g., Blaszczynski & Nower, 2002; Goodie &  
17 Fortune, 2013; Leonard et al., 2021; Shaw et al., 2023). Some of these beliefs can be  
18 considered cognitive distortions, relating to over-reliance on associative processing, such as  
19 endorsing the gambler's fallacy, the "hot-hand" bias, the belief in illusory correlations, which  
20 in the context of gambling may be the belief that lucky objects may influence gambling  
21 outcomes, or memory biases that may selectively forget losses and highlight wins (Scoboria  
22 & Wilson, 2011). Additionally, self-serving biases may also operate, such an illusion of  
23 control (Langer, 1975), in which an individual's perceived abilities make them feel in control  
24 of random events.  
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42 Raylu and Oei's (2004) Gambling Related Cognition Scale (GRCS) is the most  
43 widespread in the literature and includes five separate maladaptive cognitions. The *Illusion of*  
44 *Control* scale reflects beliefs that irrelevant factors, such as luck, can influence gambling  
45 outcomes, whereas the *Predictive Control* scale relates to erroneous beliefs about one's skill  
46 level, and also includes rational decision-making errors such as those present with gambler's  
47 fallacy and hot-hand biases. *Interpretative Bias* reflects an individual's tendency to  
48 reappraise gambling outcomes in a manner that would continue gambling, including memory  
49 biases for losses, or attributing losses to bad luck. Other cognitions in the GRCS may not  
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3 directly reflect cognitive errors or biases but may indirectly reflect biased thinking. The  
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5 *Gambling Expectancies* scales ascribe accentuated positive motivational beliefs about  
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7 gambling experiences, in which the gambler feels happier when gambling, or tries to reduce  
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9 stress through gambling. As Raylu and Oei (2004) note, if an individual views gambling in a  
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11 positive way and as the only means to cope with stresses of daily life, it may lead to  
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13 rationalization for continuing gambling, seeing it as a primary outlet for supporting their  
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15 happiness. Finally, the GRCS includes an *Inability to Stop* scale, which assesses the strength  
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17 of one's confidence in stopping gambling, which is believed to be an important thought  
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19 distortion when predicting problem gambling severity and relapse (Raylu & Oei, 2002; Smith  
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21 et al., 2015). Although this particular belief may not correspond directly to cognitive errors  
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23 per se, it reflects the acknowledgement that colder cognitive influences (e.g., stepping away  
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25 from a gambling table when one is ahead, not gambling beyond one's means, etc.) may not  
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27 be in balance with more affective, experiential cues like chasing wins or chasing losses to  
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29 reduce one's sense of loss aversion.  
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35 Research suggests that these cognitions are associated with over-reliance on  
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37 automatic/experiential processing (Toplak et al., 2007). Emond and Marmurek (2010) found  
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39 that individuals who reported greater tendencies to engage in experiential (vs. rational)  
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41 thinking styles demonstrated greater maladaptive gambling-related cognitions. Similarly,  
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43 Fletcher et al. (2011) found that lower analytic thinking was related to gambling biases and  
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45 superstitious thinking (cf., Leonard & Williams, 2018). Conversely, Armstrong et al. (2020)  
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47 found that rational thinking styles predicted protective gambling cognitions, which  
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49 subsequently were associated with decreased problem gambling severity.  
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54 Yet, no research has examined whether dispositional greed is associated with biased  
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56 judgements and decisions. However, several lines of evidence suggest this may be the case. It  
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58 is reasonable to speculate that the pursuit of acquiring more is accompanied by an expectancy  
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## GREED AND GAMBLING

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3 of success. Greedy people may find greater positive expected benefits in activities which  
4 have high payouts whilst discounting the riskiness of a situation (Hoyer et al., 2023). Another  
5 possibility is that greedy people embark on accumulation behaviors because they are  
6 optimistic about their chances, manifesting either as a general tendency to feel optimistic  
7 about the future (Carver & Scheier, 2009), or as the presence of optimistically biased  
8 cognitions, namely interpretive biases and illusions of control.  
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17 Additionally, traits that comprise greed's nomological network have been associated  
18 with judgment and decision-making errors. Traits such as (low) honesty-humility and  
19 disinhibition, are associated with lower decision-making competence (Garofalo et al., 2021;  
20 Weller et al., 2021). Similarly, dispositional greed has been associated with traits such as  
21 egoism and self-interest, which would promote biased, egocentric thinking (Hoyer et al.,  
22 2024a; Krekels & Pandelaere, 2015; Seuntjens et al., 2015a&b). Direct associations have also  
23 been observed between impulsiveness and both gambling-related cognitions and gambling  
24 severity (McLaren et al., 2015; Navas et al., 2017), whilst low honesty/humility has been  
25 associated with greater coping motivations for gambling (McGrath et al., 2018). Using a  
26 measure adapted from the GRCS, Ching et al. (2016) found that materialism was related to  
27 maladaptive compulsive buying-related cognitions.  
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**Method**

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44 This study was approved by the host university's Ethical Review Board (#MASKED).  
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46 Study methodology was pre-registered and available through Open Science Framework  
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48 <http://tinyurl.com/58pzerpe>  
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**Participants**

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52 We recruited participants through a third-party crowdsourced research firm (Cint) as  
53 part of a larger project to examine nationwide gambling behavior in England. In addition to a  
54 general population sample, the survey firm identified potential participants with prior stated  
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3 interest in gambling, thus also obtaining an additional sub-sample. To be eligible for this  
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5 study, a participant had to be 18 years of age or older and a resident of England. Quotas  
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7 based on UK Census estimates for region, age and gender were established.  
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**Data Cleaning**

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12 We followed data cleaning procedures specified in the preregistration. We first  
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14 examined responses for evidence of careless responding (e.g., taking less than 5 minutes to  
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16 complete the survey, evidence of careless responses sets, self-reporting that they did not  
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18 carefully or honestly answer the questions). We further used the *r* package *careless* to  
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20 identify potential outliers, which calculates indices of careless responding (Yentes &  
21  
22 Wilhelm, 2018), such as *maximum longstring values* and *intra-individual response variability*  
23  
24 indices which are beyond a gap in a distribution, *mahalanobis distances* that are beyond a  
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26 “gap” in the distribution can be excluded. Additionally, univariate outliers, *z-scores* of  $>|3|$   
27  
28 and a disconnection from the rest of the distribution were similarly excluded at the variable  
29  
30 level. Cases that were missing more than 15% of responses were excluded listwise.  
31  
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34  
35 There were 9,003 survey clicks on the invitation which advertised a study about  
36  
37 personality and gambling, with 6,016 of these clicks agreeing to participate after reading the  
38  
39 participant information sheet. Decisions to handle outliers were made a priori, based on  
40  
41 considerations and remedies suggested by Pickering and Blaszczynski (2021), who  
42  
43 highlighted potential challenges for collecting problem gambling data in convenience  
44  
45 samples (see also Chandler & Paolacci, 2017; Lovett et al., 2018). We removed participants’  
46  
47 data who abandoned the survey ( $n=296$ ), those who showed clear evidence of straight-lined  
48  
49 responding throughout the survey ( $n=147$ ), and those who self-stated that they did not  
50  
51 respond honestly or carefully ( $n=87$ ). Continuing to follow our data retention criteria (e.g.,  
52  
53 completion duration  $< 5$  minutes, using the *r careless* package to further identify problematic  
54  
55 cases such as low variability/straight-lining), we removed 703 additional participants. We  
56  
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## GREED AND GAMBLING

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3 retained a final sample size of  $N = 4783$  ( $n_{general\ population} = 3869$  and  $n_{prior\ gambling\ interest} = 914$ ).  
4  
5 Median age was 48 years, 50.2% male, 49.2% female, 0.5% transgender/non-binary/preferred  
6  
7 to self-describe, 0.2% did not report. Participants were primarily of white-UK origin (87.7%);  
8  
9 3.1% reported Black/African/Caribbean ethnicity, 0.4% Asian, 2.5% mixed ethnicity, 0.5%  
10  
11 reported other ethnicity, and 0.7% did not respond. With respect to annual income, 23.7% of  
12  
13 participants reported earning £20000 or less per year, 37.3% between £20000 and £39,999,  
14  
15 22.4% between £40,000 and £59999, 16.6% over £60000, and 6.2% did not report.  
16  
17  
18

19 We examined the degree to which the two subsamples differed from each other. The  
20  
21 gambling interest subsample contained slightly more males,  $\chi^2(1,4750) = 3.71, p = .05$ , 53.3%  
22  
23 male vs. 46.6% female in the subsample, 50-50% in the general population sample). We also  
24  
25 observed a significant difference in the age between these two groups,  $t(4775) = 3.02, p <$   
26  
27  $.01$ ; however, the mean difference across the two groups was trivial, 48.15 vs 46.22, for the  
28  
29 general and gambling samples, respectively. There were no significant differences for  
30  
31 education level,  $\eta^2 = .02$ , household income ( $\eta^2 = 0.00$ ); region of residence (Cramer's  $V =$   
32  
33  $.05, p = .09$ ), or ethnicity,  $\chi^2(1,4753) = 0.98, p = .32$ , 11.5% and 12.8% non- white  
34  
35 participants, respectively).  
36  
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39

### 40 *Measures*

41 We included the following measures in this study<sup>2</sup>:  
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43  
44

45 **Dispositional Greed.** We used the shortened, 3-item version of the Dispositional  
46  
47 Greed scale (Seuntjens et al., 2016). "As soon as I have acquired something, I start to think  
48  
49 about the next thing I want", "I always want more", and "Actually, I am kind of greedy" (1 =  
50  
51 strongly disagree; 5 = strongly agree),  $M = 2.57, SD = 0.81, Cronbach's\ \alpha = .63$ .  
52  
53  
54

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55 <sup>2</sup> Participants completed the Life Orientation Test-Revised (Scheier et al., 1994) as a measure  
56  
57 of dispositional optimism,  $M = 3.04, SD = 0.51, Cronbach's\ \alpha = .78$ . However, our analyses  
58  
59 found that it was not associated with either greed, any gambling cognitions, nor did it show  
60  
any systematic associations with the gambling indicators. Thus, despite its inclusion in our  
preregistration, we did not include it here.



**Impulsiveness.** We included five items from the Abbreviated Barratt Impulsiveness Scale (Coutlee et al., 2014): “I am self-controlled”, “I concentrate easily”, “I act on impulse”, “says things without thinking”, and “I plan trips well ahead of time” (1 = strongly disagree to 5 = strongly agree). Because there has been debate regarding whether scores on this scale should be combined as a sum score, or if subscale (i.e., Motor, Attention, and Non-Planning) scores should be used (see Coutlee et al., 2014), we conducted an exploratory factor analysis with oblimin rotation, on a random sample of 50% of the participants. The results suggested a 2-factor solution: a 2-item motor impulsiveness scale (Imp-Motor;  $M = 2.98$ ,  $SD = .97$ ;  $r = .57$ ) and a 3-item scale that included attention and non-planning items (Imp-A/NP;  $M = 2.30$ ,  $SD = .71$ ;  $\alpha = .63$ )<sup>3</sup>.

### **Gambling Cognitions and Behavior.**

**Gambling Participation.** Participants were asked: “In the past 12 months, have you participated in ANY form of gambling? This includes, but not limited to, lottery tickets, scratch cards, bingo, horse racing, sport betting, and casino gambling?” For those who responded “Yes” (67.1%), we asked several follow-up questions to better characterize their gambling behavior, namely:

**Amount Spent.** We asked participants to estimate approximately how much they have spent (in GBP) on gambling activities within the last 14 days. If they had not gambled within this time frame, they were instructed to answer 0. Reported amounts that exceeded 3 standard deviations above the mean ( $n=12$ ;  $M = 151.58$ ,  $SD = 4855.14$ ) were winsorised to £2000.

**Gambling Types and Frequency.** Participants were asked to report their gambling frequency (0 = never, 1 = less than 6 months, 2 = every other month, 3 = monthly, 4 =

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<sup>3</sup>See supplementary online information Table SI-1 for EFA results. Because we only included five items, we acknowledge that it is possible, that with the full scale, the three-factor correlated structure found by Coutlee et al. (2014) would emerge (though a 2-factor solution was not reported in that study).

## GREED AND GAMBLING

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3 weekly, 5 = daily) for nine common gambling activities (i.e., lottery draws, scratch cards,  
4  
5 bingo, slot machines in pubs/restaurants/casinos, online slots/instant wins, horse/dog race  
6  
7 betting, sports betting, in-person or virtual casino games, poker). A mean gambling frequency  
8  
9 was then computed. Additionally, we finally created a poly-gambling engagement variable  
10  
11 by first coding any frequency response greater than 0 as 1 (Yes), and then adding the number  
12  
13 of endorsed activities (range 0-9), as in Study 1 (range 0-9).  
14  
15

16  
17 ***Problem Gambling Severity Index.*** Negative consequences related to gambling were  
18  
19 measured by the 9-item Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001),  
20  
21 answered on a 4-point scale (never, sometimes, most of the time, almost always). Scores are  
22  
23 summed, ranging from a total score from 0 to 27. Scores > 8 represent problem gambling, 3-7  
24  
25 represent moderate level of gambling problems, and 1-2 represents gamblers with a low level  
26  
27 of problems.  
28  
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31 ***Gambling-Related Cognitions.*** We asked participants who reported gambling within  
32  
33 the last 12 months, to complete the Gambling Related Cognitions Scale (GRCS; Raylu &  
34  
35 Oei, 2004). The GRCS assesses five domains of gambling-related cognitions (1 = strongly  
36  
37 disagree to 4 = strongly agree): Gambling Expectancies (4-items,  $M = 2.01$ ,  $SD = 0.74$ ,  $\alpha =$   
38  
39  $.85$ ), Illusion of Control (4-items,  $M = 1.65$ ,  $SD = 0.76$ ,  $\alpha = .88$ ), Predictive Control (6-items,  
40  
41  $M = 1.89$ ,  $SD = 0.70$ ,  $\alpha = .86$ ), Inability to Stop Gambling (2 items<sup>4</sup>,  $M = 1.59$ ,  $SD = 0.82$ )  
42  
43 and Interpretive Bias (4-items,  $M = 1.91$ ,  $SD = 0.75$ ,  $\alpha = .84$ ).  
44  
45

***Additional Exploratory Measures***

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49 We also considered the following measures which were part of the larger project to  
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51 gain a broader characterization of the association between greed and gambling.  
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54  
55 ***Gambling-Related Variables.*** We asked participants the following (all on: 1 =  
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58  
59 <sup>4</sup> Because this study was conducted with the general population in mind, we chose not to ask  
60 items that we deemed were better suited for disordered gambling populations.

## GREED AND GAMBLING

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3 strongly disagree to 4 = strongly agree): (1) 3-item attitudes towards *winning* (“My past wins  
4 prove that I will be successful at gambling in the long-run”, “I expect to win more than lose  
5 when gambling over the long-run” and “I make sure to tell others when I’ve won gambling”);  
6  
7  
8 (2) 3-item *loss chasing* (“If I lose one gamble, it’s best to double the wager the next time,”  
9  
10  
11 “If I’ve already lost that day, making more risky bets sounds like the best way to break-even  
12  
13 or get ahead”, and “If I would lose a gamble, I would bet more next time to break even”); (3)  
14  
15  
16 a 6-item scale about *general attitudes towards losing* (“Losses are not very stressful or  
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18 upsetting to me”; see Supplementary Information for full items),  $M = 2.32$ ,  $SD = 0.63$ ,  $\alpha =$   
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strongly disagree to 4 = strongly agree): (1) 3-item attitudes towards *winning* (“My past wins prove that I will be successful at gambling in the long-run”, “I expect to win more than lose when gambling over the long-run” and “I make sure to tell others when I’ve won gambling”); (2) 3-item *loss chasing* (“If I lose one gamble, it’s best to double the wager the next time,” “If I’ve already lost that day, making more risky bets sounds like the best way to break-even or get ahead”, and “If I would lose a gamble, I would bet more next time to break even”); (3) a 6-item scale about *general attitudes towards losing* (“Losses are not very stressful or upsetting to me”; see Supplementary Information for full items),  $M = 2.32$ ,  $SD = 0.63$ ,  $\alpha = .76$ . Higher scores reflect a greater tendency to shrug off losses, and not experience distress because of them; and (4) two items from the Gambling Motives Questionnaire (Dechant, 2014) related to different *financial motivations*, “I gamble to win money” and “I gamble because worried about not winning if I don't play”. Participants completed these items on a 3-point scale (1 = not a reason, 2 = somewhat a reason, 3 = very much a reason).

**Individual Differences.** We asked the following (1 = strongly disagree to 4 = strongly agree): (1) *Regret*, measured by Schwartz et al.’s (2002) 5-item Regret scale (e.g., “When I think about how I’m doing in life, I often assess opportunities I have passed.”),  $M = 3.10$ ,  $SD = 0.74$ ,  $\alpha = .72$ ; (2) a one-item *risk-taking* measure, “I consider myself to be a risk-taker,”  $M = 2.05$ ,  $SD = 0.87$ .

**Data Analytic Plan**

Descriptive statistics and correlational analyses were first conducted for the variables of interest. We then adopted a structural equation modelling (SEM) approach to test the unique contributions of dispositional greed in explaining the variance in (a) PGSI scores, (b) behavioral indicators of gambling, and (c) gambling-related cognitions, holding

impulsiveness and sociodemographic covariates constant<sup>5</sup>. The main analyses were conducted with MPlus 8.6 (Muthen & Muthen, 2017). Parameters were estimated using a weighted least squares mean and variance adjusted (WLSMV) estimator, a type of diagonally weighted least squares (DWLS) estimator, for analyses involving the PGSI due to the non-normality associated with the scale. For the other analyses, we used a maximum likelihood with robust estimator (MLR) method. Model fit was evaluated using RMSEA, SRMR, TLI, and CFI. Variances for latent variables were fixed at 1. To reduce model complexity, direct paths that did not demonstrate a zero-order correlation  $> |.10|$  were not included in the tested model (Gignac & Szodorai, 2016).

**Sensitivity analysis.** Due to being part of a larger data collection, we performed a sensitivity power analysis in PowerSEM v0.1.2 (Wang et al., 2021) for the 3-item dispositional greed latent variable predicting a 9-item PGSI latent variable. Factor loadings were conservatively set at .6 for each latent variable. We assumed a two-tailed test ( $\alpha = .01$ ), with 1000 simulations. The current sample size would provide  $>99.0\%$  power to detect a direct effect of at least .10, with 95% of the parameter estimates falling between .06 and .14.

## Results & Discussion

### *Gambling Behavior*

We first examined the gambling tendencies of the current sample (Table 1). Over the past 12 months, 67.1% of participants reported gambling, in any form, at least once. Most participants gambled online vs. in person (61.5% mostly or always online vs 22.7% mostly/always in-person). Across the nine activities, 50.6% of gamblers reported

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<sup>5</sup> Our pre-registered hypotheses were focused on a path-modelling approach that tested the degree to which the relationship between dispositional greed and gambling outcomes were statistically mediated by gambling-related cognitions. However, upon suggestions during the review process highlighting potential concerns associated with mediation models in cross-sectional survey design, we have modified our approach. The path-model results can be found at <https://osf.io/y85jr/>.

## GREED AND GAMBLING

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3 participating in at least four activities ( $M=4.25$ ,  $SD=2.76$ ). The most common gambling  
4  
5 activities were purchasing a ticket for a national lottery draw and instant-win scratch cards.  
6  
7 Within the last 14 days, gamblers reported spending a median of £10, with 7.3% spending  
8  
9 over £100 during this period.  
10  
11

12 The mean PGSI score for those gambling within the last 12 months was 3.5  
13  
14 ( $SD=5.73$ ). According to suggested cut-scores for risk levels (Ferris & Wynne, 2001), 27.6%  
15  
16 scored 3 or higher, suggesting at least a moderate level of gambling-related problems leading  
17  
18 to some negative consequences, and 17.6% reported a score of 8 or higher.  
19  
20

**Correlation Analyses**

21  
22  
23 Table 2 shows the correlations for the variables of interest. Neither age, gender, nor  
24  
25 education level were associated with any gambling participation within the last 12 months.  
26  
27 However, for those who did gamble during this period, age was inversely associated with  
28  
29 poly-gambling activities, mean gambling frequency, amount spent over the past 14 days, and  
30  
31 PGSI scores. In contrast, reported household income level was positively associated with all  
32  
33 outcomes except PGSI scores. Education level was positively associated with poly-gambling  
34  
35 activities and mean gambling frequency. Gender did not correlate with the gambling  
36  
37 outcomes above  $r = .10$ , with the exception that men were more likely to spend more on  
38  
39 gambling within the past 14 days than women.  
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45 Consistent with the predictions, dispositional greed was positively associated with  
46  
47 gambling participation. Holding demographic variables constant, a one-unit increase in  
48  
49 dispositional greed was associated with a 31.6% increase in the odds for gambling within the  
50  
51 past 12 months ( $B = 0.28$ ,  $p < .001$ ; 95% CI for odds ratio 1.20-1.44). Dispositional greed  
52  
53 was also positively associated with poly-gambling, gambling frequency and PGSI scores.  
54  
55 Moreover, as in Study 1, gamblers who played other games than solely lottery draws reported  
56  
57 greater dispositional greed ( $M = 2.67$ ,  $SD = 0.80$ ) than lottery-only players ( $M = 2.36$ ,  $SD =$   
58  
59  
60

0.80),  $t(3205) = 7.47, p < .001, d = 0.40$ . Similarly, greater impulsiveness was positively associated with gambling indicators for those reporting recent gambling, but not for gambling participation. In contrast, optimism was only associated with lower PGSI scores.

Also supportive of the hypotheses, greed was positively associated with impulsivity. However, it was more strongly associated with the motor subscale than the attention/non-planning scale (which had a very small effect size). Greed, and motor impulsiveness, but not the Imp-A/NP scale, were both positively associated with all five gambling-related cognitions scales.

### *Associations between Gambling-Related Cognitions and Gambling Outcomes*

As expected, all five gambling-related cognitions scales were positively associated with the primary gambling outcomes. Greater endorsement of maladaptive cognitions related to higher PGSI scores, poly-gambling behavior, gambling frequency, and amount spent in the past 14 days. The correlations for all GCS subscales were relatively uniform across the assessed outcomes.

### *SEM Analyses*

We next tested the degree to which greed uniquely accounted for variance in the gambling outcomes, holding impulsiveness and covariates constant (see Supplemental Online information SI-2 for parameter estimates). Figure 1a shows the significant path coefficients for SEM model predicting PGSI scores. Model fit statistics showed a good absolute fit to the data CFI = .992, TLI = .991, RMSEA = .045, SRMR = .031. Consistent with our predictions, we found that dispositional greed significantly accounted for variance in PGSI scores, holding impulsiveness and sociodemographic variables constant. We found a similar pattern of results for the behavioral indicators of gambling (See Figure 1b), which also showed good absolute fit to the data CFI = .980, TLI = .952, RMSEA = .046, SRMR = .022. in which dispositional greed and motor impulsiveness were associated with mean gambling frequency

and poly-gambling activities, but neither trait significantly predicted the amount spend within the past 14 days.

Subsequently, we focused on the degree to which dispositional greed uniquely accounted for variance in gambling-related cognitions. Figure 2 shows the significant path coefficients for this model (see Supplemental Online information Table SI-3 for parameter estimates)<sup>6</sup>. Model fit statistics showed a good absolute fit to the data CFI = .958, TLI = .952, RMSEA = .041, SRMR = .030.

For all four GRC factors, greed showed stronger relationships between the GRCs than did motor impulsiveness. Individuals reported higher greed scores were more likely to report more maladaptive cognition distortions, attach more positive expectancies in gambling, and report a greater perceived inability to stop gambling. These effects were present beyond that explained by trait motor impulsiveness.

### *Exploratory Analyses*

We aimed to further characterize how greedy gamblers approach gambling (see Table 3). Greedy individuals were not only more confident that they will win more than others, but also were more likely to tell others about wins when they occur. Also, greedy gamblers were both more likely to chase losses and reported greater “resiliency” with losses (e.g., shrugging off losses, laughing about them, etc.). Consistent with past research, we found that greedy individuals were more likely to self-report that they were a risk-taker. When examining the associations between greed and financial motivation questions, we found that gambling because of a “fear of missing out” on a win was more strongly associated with greed than a motivation solely to earn money. Finally, dispositional greed was associated with greater

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<sup>6</sup> We first tested a model with all five GRCs as correlated latent variables. However, the Interpretive Bias latent variable had a linear dependency with the Predictive Control latent variable. We addressed this by creating a latent variable that included items from both scales, and thus, we proceeded with a correlated, four-factor model.

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2  
3 dispositional regret with respect to the decisions that they have made.  
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### 5 6 **General Discussion**

7  
8 Gambling is popular worldwide and continues to grow. The current study provides  
9  
10 evidence that dispositional greed may be a contributing predictor of gambling participation,  
11  
12 frequency, and realizing negative consequences from gambling, which have the potential to  
13  
14 develop into a pathological disorder. We found that these associations could not be explained  
15  
16 by other dispositional factors within its nomological network, specifically materialism (in  
17  
18 Study 1) and impulsiveness (in Study 2). Additionally, our results provide unique insights  
19  
20 into the beliefs that these individuals may hold which may perpetuate, and perhaps  
21  
22 accelerate, gambling behavior. Our results revealed that dispositional greed was associated  
23  
24 with specific gambling-related cognitions, namely perceived inability to stop, gambling  
25  
26 expectancies, and biased thinking. Furthermore, those reporting higher greed, were more  
27  
28 likely to hold distorted thoughts about chasing losses, gamble as a means to make financial  
29  
30 gains (cf., Tabri et al., 2022), not miss out on potential wins and may use wins as a way to  
31  
32 bolster status. In contrast to prior studies that examined greed and risk-taking with controlled  
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34 laboratory tasks, this study demonstrates one way that greed and risk taking may manifest in  
35  
36 everyday life, along with the experiences of consequences associated with them.  
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42 The influential Gambling Pathways Model (Blaszczynski & Nower, 2002) suggests  
43  
44 that the development of problem gambling, in part, results from distorted gambling-related  
45  
46 schemas such as illusions of control and interpretive biases. Reinforcement of these schemas  
47  
48 lead to expectancies and continued gambling behavior, which in turn, results in a further  
49  
50 escalation of gambling. Subsequently, loss chasing and negative consequences then become  
51  
52 more likely to occur, giving rise to pathological gambling pathology. This model specifies  
53  
54 three sub-types, (1) gamblers absent of psychopathology, who gamble for recreational and  
55  
56 social purposes, but hold distorted cognitions about gambling, such as illusions of control,  
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## GREED AND GAMBLING

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3 superstitious beliefs, and interpretive biases; (2) an “anti-social impulsive” gambler subtype,  
4 who possess higher levels of disinhibition, dark triad traits, risk-taking, and comorbid  
5 substance use disorders, and uses gambling for meaning and purpose, as well as coping; and  
6  
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10 (3) an “emotionally vulnerable” group who gamble pathologically to avoid negative mood  
11 states, and who often have comorbid mood and anxiety disorders and gamble as a means for  
12 coping (Nower et al., 2021).  
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17 The distorted thought processes associated with illusions of control and interpretative  
18 biases provide the basis for a potential pathway for greedy individuals to engage in problem  
19 gambling behavior. Individuals reporting greater dispositional greed demonstrate a more  
20 egocentric point of view, and as a result, they may be more likely to interpret wins as  
21 internally-caused, reinforcing their own perceived abilities, whilst they discount negative  
22 outcomes as being the result of chance events. Supporting this assertion, greedy individuals  
23 were more likely to shrug off losses when they occurred, even being more likely to have a  
24 laugh about them as being a part of gambling, than exhibit concern.  
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35 Although this study did not include a clinical sample, as is the case with pathways  
36 model research, gamblers who reported higher levels of dispositional greed appear to share  
37 characteristics with the impulsive antisocial pathological gambling subtype. However, our  
38 findings suggest that greed represents a unique factor, separate from impulsiveness, that may  
39 perpetuate gambling behavior. These gamblers also reported more positive gambling  
40 expectancies that center around improving one’s current negative mood state, suggesting  
41 coping motivations for gambling which are part of the emotionally vulnerable subtype.  
42 People reporting greater dispositional greed have been shown to experience lower  
43 satisfaction with life (e.g., Hoyer et al., 2024a). Gambling may offer a potential way to  
44 quickly change this status, even if it may only temporarily alleviate dissatisfaction with life,  
45 and potentially may lead to subsequent compounding of difficulties. In this study, we found  
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## GREED AND GAMBLING

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3 that greed was positively associated with gambling cognitions associated with the expectation  
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5 of increasing happiness, and relieving stress.  
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8         As the behavior of gambling to cope with daily stresses becomes more frequent,  
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10 losses are bound to mount. Perpetuating this cycle, reinforced by biased thinking, may  
11  
12 eventually lead to feeling unable to stop once signs of problematic gambling have  
13  
14 manifested. Greedy people may be more likely to develop these cognitions over time,  
15  
16 perhaps after adopting other cognitions such as interpretive biases, illusions of control, and  
17  
18 general expectancies about gambling. We speculate that this pattern represents a potentially  
19  
20 harming feedback loop for greedy individuals. Whilst the temporal dynamics of gambling  
21  
22 pathology extends beyond our study, we feel that this is a fascinating avenue for future  
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24 research.  
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28         However, we hesitate to classify greed as a unique factor to any one pathway. Instead,  
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30 dispositional greed may be a common personality factor for the potential development of  
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32 gambling problems, beginning with an increased tendency to endorse maladaptive cognitions  
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34 and experiencing the excitement associated with gambling. Because greedy individuals are  
35  
36 prone to be dissatisfied with their current status quo, and always wanting more, we speculate  
37  
38 that the excitement of gambling may be particularly alluring. Notably, Li et al. (2019)  
39  
40 reported structural and functional differences in greedy individuals which may indicate  
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42 differences in the neural prefrontal reward and affect system associated with risk taking  
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44 (Damasio, 2006), which may contribute to their experience of unquenchable desire and  
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46 dissatisfaction.  
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### 50 51 **Limitations & Future Directions** 52

53         Although this study provides converging evidence across samples, measures, and  
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55 countries, that dispositional greed may be associated with gambling behavior, and subsequent  
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57 negative consequences, we do acknowledge some potential limitations and avenues for future  
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3 research. First, the absence of a clinical sample of pathological gamblers leaves questions  
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5 regarding the associations between greed and the experience of gambling-related harms in a  
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7 clinical population unanswered. That is, although our results align with clinical studies, they  
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9 are silent to clinical assessments of severity, not to mention other contributing background  
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11 factors such as prior childhood maltreatment and the presence of both internalizing and  
12  
13 externalizing psychopathologies (Nower et al., 2021).  
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17 Related, Study 2 involved convenience online sampling, which may yield over-  
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19 reporting of gambling problems in general populations (Pickering & Blaszczynski, 2021). To  
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21 address this concern, we followed practices such as maintaining age/gender/region quotas,  
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23 identifying psychometrically problematic responses, as well as pre-registered the study  
24  
25 design. Even if over-reporting still occurred, it could not readily explain the associations  
26  
27 between greed and gambling that we observed. In contrast, Study 1 used a more clinically-  
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29 oriented assessment of problem gambling (i.e., SOGS) in a non-clinical sample. In  
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31 combination with a much smaller engagement with gambling in Dutch culture (at the time of  
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33 study), the use of the SOGS may have resulted in even lower observed base-rates, not only  
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35 compared to Study 2, but also, but the vast majority of other studies. However, it is important  
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37 to note that our aim was not to provide prevalence estimates for a given population.  
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43 Second, although our results provide evidence that greed predicts gambling behavior  
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45 and related-cognition beyond that explained by trait impulsiveness, we acknowledge that our  
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47 study only considered certain aspects of impulsiveness. Whilst we found evidence for our  
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49 hypothesis and that prior research has suggested that motor impulsiveness is higher in GD  
50  
51 than in other externalizing disorders (Reid et al., 2014), this study was silent regarding other  
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53 processes that may yield impulsive behavior, and subsequently, problematic gambling. For  
54  
55 instance, impulsiveness-related traits related to rash, emotion-based decision-making (i.e.,  
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57 Positive and Negative Urgency, as measured by the UPPS-P scale, Lynam et al., 2006), have  
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3 been shown to be associated with gambling behavior, and more broadly, psychopathology  
4 (Berg et al., 2015; Cyders et al., 2007, 2014). Positive urgency has been associated with  
5 levels of gambling, and some gambling related cognitions (Cyders et al., 2007; Cyders &  
6 Smith, 2008), though it should also be noted that urgency dimensions show moderate  
7 correlations with BIS-motor impulsiveness (Sharma et al., 2013; Vergés et al., 2019).  
8 Although positive urgency may account for variance in gambling behavior beyond that  
9 explained by the impulsiveness measures used in this study, we would not expect that greed  
10 and positive, or negative urgency would share more overlapping variance than what was  
11 observed. Nonetheless, past investigations between greed and impulsiveness have not been  
12 comprehensive, and we encourage future research to examine further this open question.  
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26 These considerations aside, the current research has provided insight into how  
27 dispositional greed may be an important factor in predicting adverse consequences associated  
28 with gambling. In sum, our findings were robust across measures and cultures with varying  
29 degrees of gambling participation. We hope that future endeavors will help to further  
30 elucidate psychological mechanisms that greedy individuals may employ as they perpetuate  
31 their acquisition-dissatisfaction cycle. Such insights may lead to interventions for those who  
32 have experienced negative consequences from these tendencies, whether they arise from  
33 gambling, or spending time and effort to accumulate things that they no longer desire once  
34 they possessed.  
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**Table 1***Gambling Participation by Type and Frequency Within the Last 12 Months.*

	Study 1	Study 2	
	( <i>N</i> = 1118 Dutch citizens)	( <i>N</i> = 3297 UK citizens)	
	% participated	% participated	% participated monthly or more
<b>Gambling Type</b>			
National Lottery draws	57.7	86.7	58.3
Scratch Cards	14.5	68.4	34.5
Fruit/Slot machines (in pubs/restaurants/casinos)	4.8	38.8	14.1
Online slot machine games	--	40.2	23.1
Bingo	5.7	44.0	18.5
Horse/Dog races	0.0	43.3	17.5
Sports betting	2.0	51.8	31.3
Casino games (virtual or in person)	4.3	31.1	14.8
Poker at a pub/club	2.1	20.9	9.6

## GREED AND GAMBLING

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**Table 2.** Correlations Between Study Variables in Study 2.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Age	--														
2. Gender <sup>a</sup> (Male=0)	-.22**	--													
3. Education Level	-.16**	-.04	--												
4. HH Income Level	-.16**	-.04	.32**	--											
5. Greed	-.39**	-.01	.12**	.15**	--										
6. Impulsiveness-Motor	-.21**	-.01	-.06*	-.01	.36**	--									
7. Impulsiveness-A/NP	-.18**	.03	-.10**	-.09**	.07**	.24**	--								
8. GRC- InStop	-.32**	.07**	.07**	.03	.37**	.27**	.04	--							
9. GRC Expectancies	-.25**	-.10**	.06**	.04	.33**	.23**	-.03	.62**	--						
10. GRC Ill,Control	-.38**	.00	.11**	.07	.38**	.27**	.00	.76**	.71**	--					
11. GRC PreCont	-.35**	-.02	.08**	.06	.38**	.26**	.01	.68**	.76**	.82**	--				
12. GRC Int.Bias	-.35**	-.07**	.11**	.08	.40**	.26**	.02	.68**	.78**	.76**	.83**	--			
13. Polygambling (sum)	-.39**	-.01	.13**	.14**	.30**	.24**	.04	.53**	.53**	.56**	.54**	.55**	--		
14. Mean gambling frequency	-.29**	-.10**	.11**	.14**	.31**	.24**	-.04	.58**	.58**	.59**	.57**	.58**	.87**	--	
15. £ spent gambling last 14 days (winsorised) <sup>a</sup>	-.11**	-.18**	.02**	.11**	.18**	.15**	-.01	.40**	.43**	.34**	.36**	.40**	.49**	.64**	--
16. PGSI Score <sup>a</sup>	-.41**	-.03	.09**	.05	.35**	.32**	-.16**	.66**	.48**	.56**	.54**	.59**	.55**	.54**	.42**
17. Any gambling last 12 months? (1= yes)	-.05	-.03	.02	.12**	.12**	.05**	.00	--	--	--	--	--	--	--	--

*Note.* <sup>a</sup> Spearman rank-order correlation. InStop=GRCS Inability to Stop; Expectancies= GRCS Gambling Expectancies; Ill.Cont =GRCS Illusion of Control; PreCont =GRCS Predictive Control; IntBias= GRCS Interpretive Bias. With the exception of the binary gambling participation variable,  $N = 3029-3207$  for gambling-related correlations; otherwise  $N=4480-4776$ . Spearman's rho correlations reported for Amount spent and PGSI scores \*\* $p < .01$ .

## GREED AND GAMBLING

**Table 3.** *Exploratory Analyses for Study 2.*

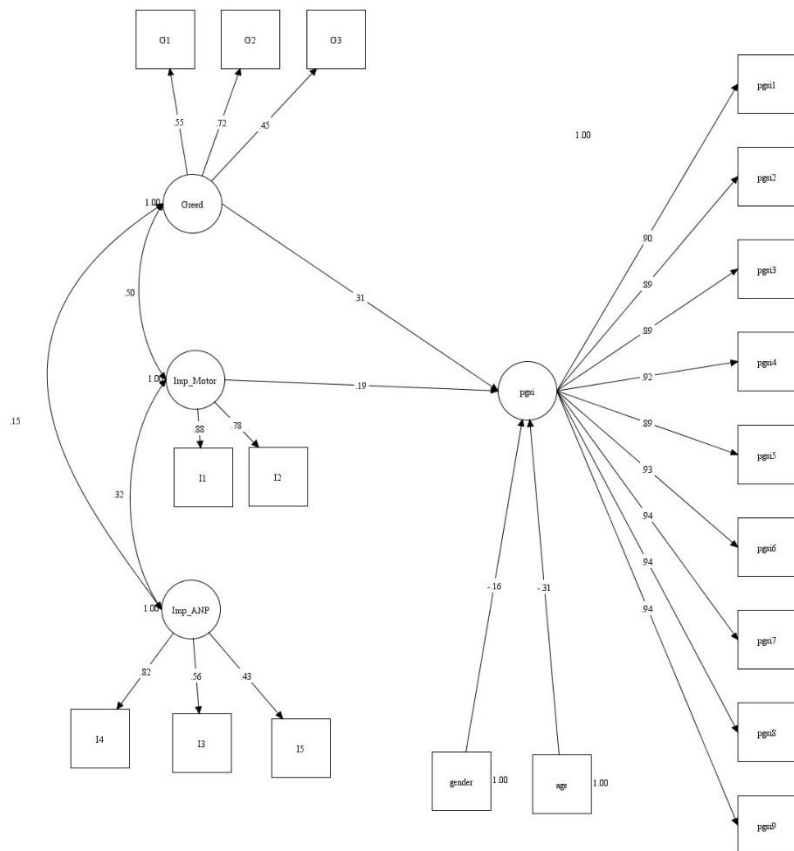
Item	Greed <i>r</i>	Partial <i>r</i> (Impulsiveness)
<b><i>Winning Attitudes</i></b>		
I expect to win more than lose when gambling over the long-run.	.29**	.26**
I make sure to tell others when I've won gambling.	.27**	.22**
My past wins prove that I will be successful at gambling in the long-run.	.31**	.27**
<b><i>Chasing Losses and Loss Attitudes</i></b>		
If I've already lost that day, making more risky bets sounds like the best way to break-even or get ahead.	.36**	.29**
If I lose one gamble, it's best to double the wager the next time.	.37**	.31**
If I would lose a gamble, I would bet more next time to break even.	.34**	.28**
(positive) Overall attitudes towards losses	.25**	.21**
<b><i>Financial Motivations</i></b>		
I gamble to win money	.06**	.05**
I gamble because worried about not winning if I don't play	.27**	.23**
<b><i>Dispositional Factors</i></b>		
Risk Taking ("In general, I would consider myself a risk-taker.")	.36**	.27**
Regret	.31**	.25**

Note. \*\* $p < .01$ .  $N = 3193-3195$ . Partial correlation value represents the correlation between greed and exploratory variables, controlling for both motor and attention/non-planning.

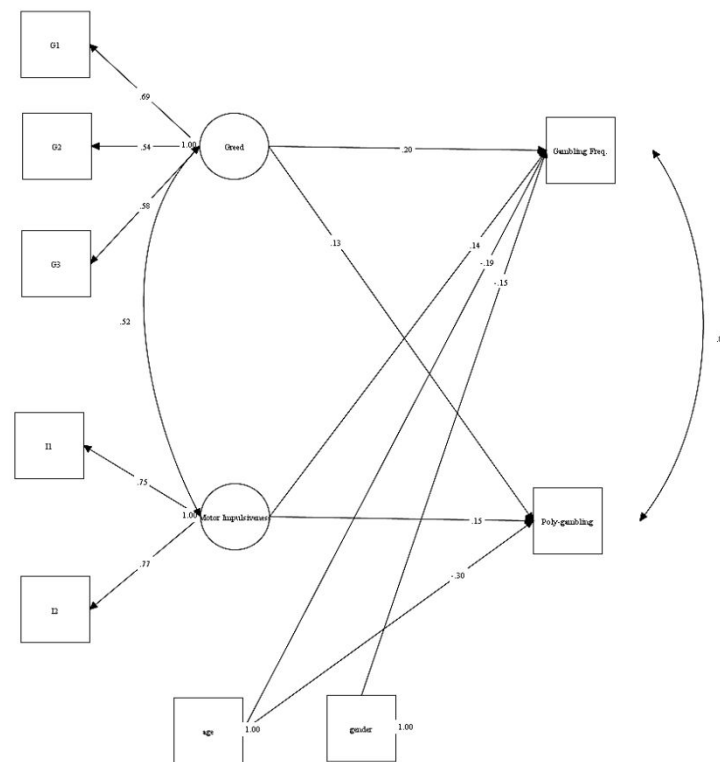
GREED AND GAMBLING

Figure 1. SEM Results by Outcome in Study 2

(a) PGSI



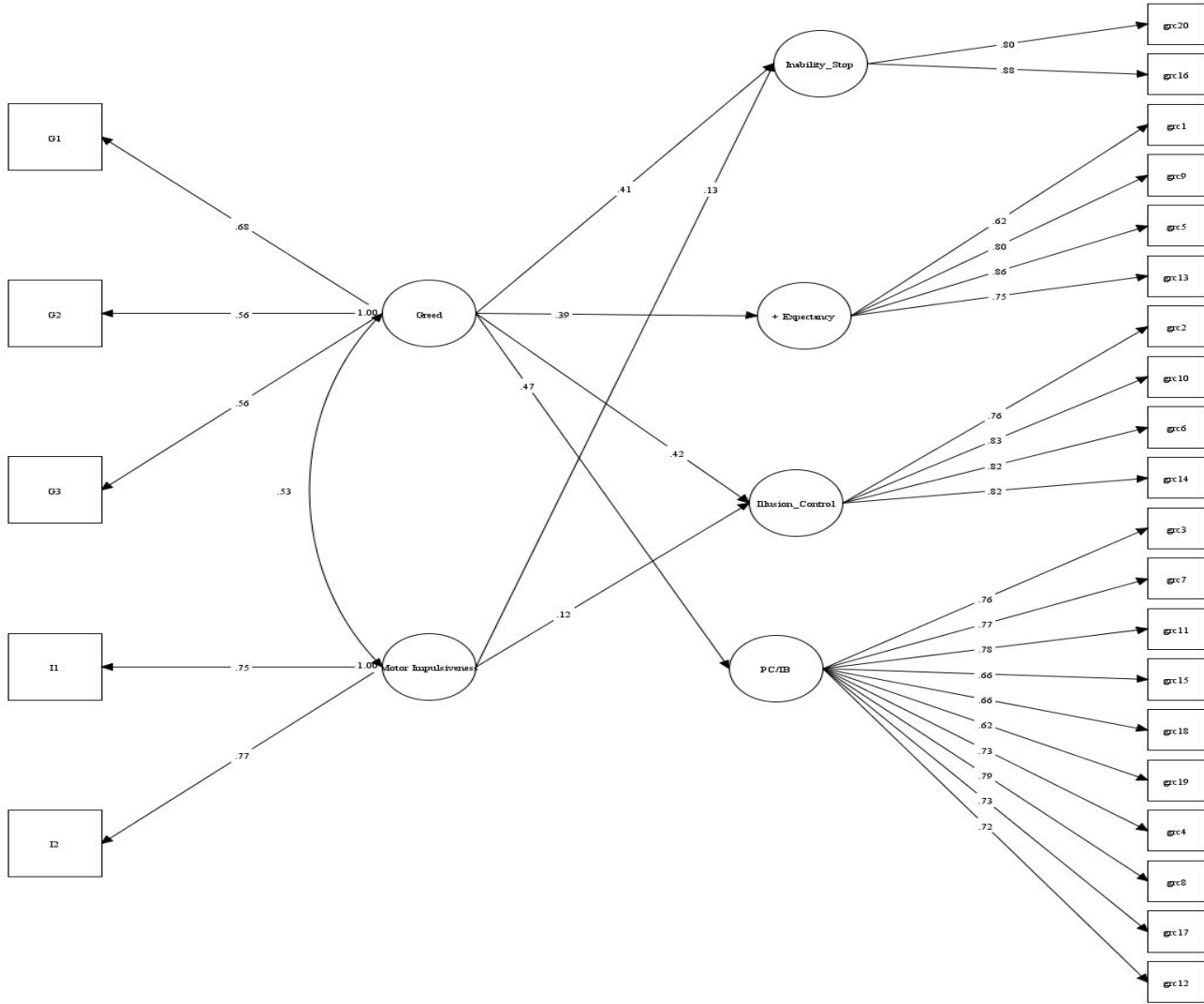
(b) Behavioral indicators



Note. Only significant direct paths  $\geq |.10|$  shown in figures.

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Figure 2. SEM Analyses for Gambling-Related Cognitions in Study 2



Note. PC/IB =Predictive Control/Interpretive Bias. Only significant direct paths  $\geq |.10|$  shown in figures.

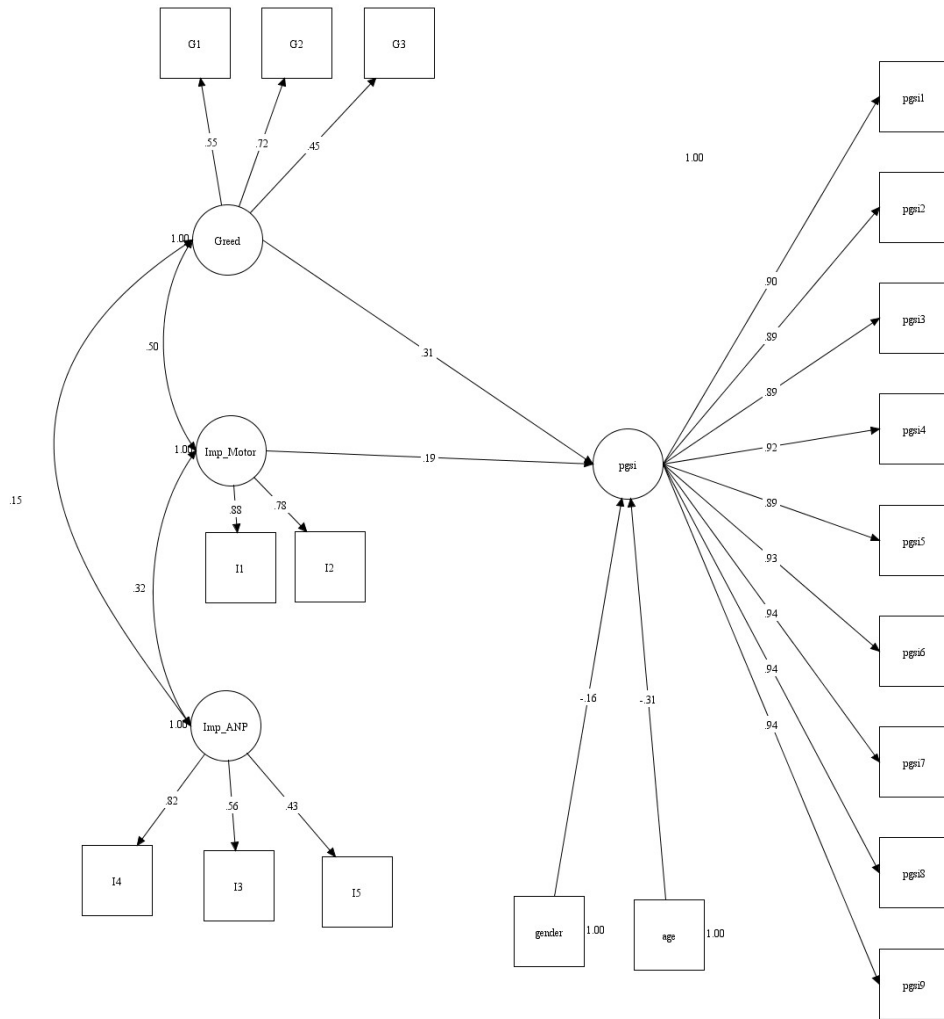


Figure 1a. SEM Results-PGSI. Only significant direct paths  $\geq |.10|$  shown.

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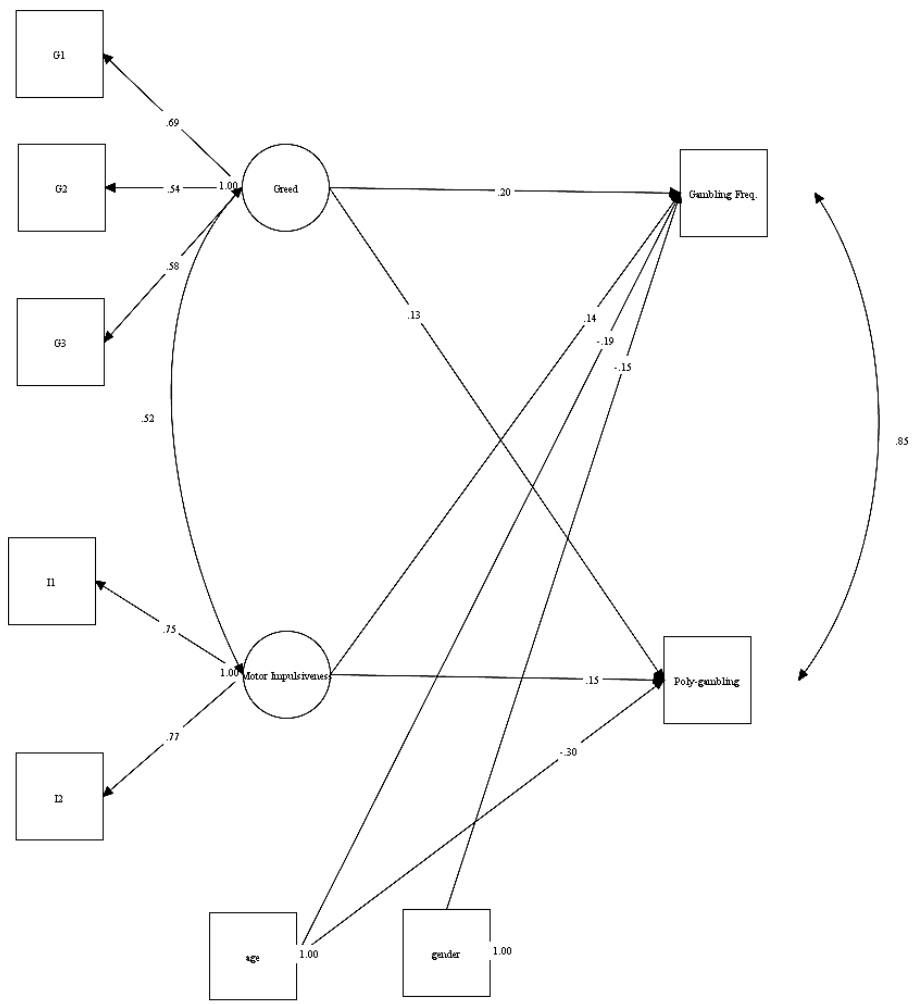


Figure 1b. SEM Results-Behavioral Gambling Indicators. Only significant direct paths  $\geq |.10|$  shown.

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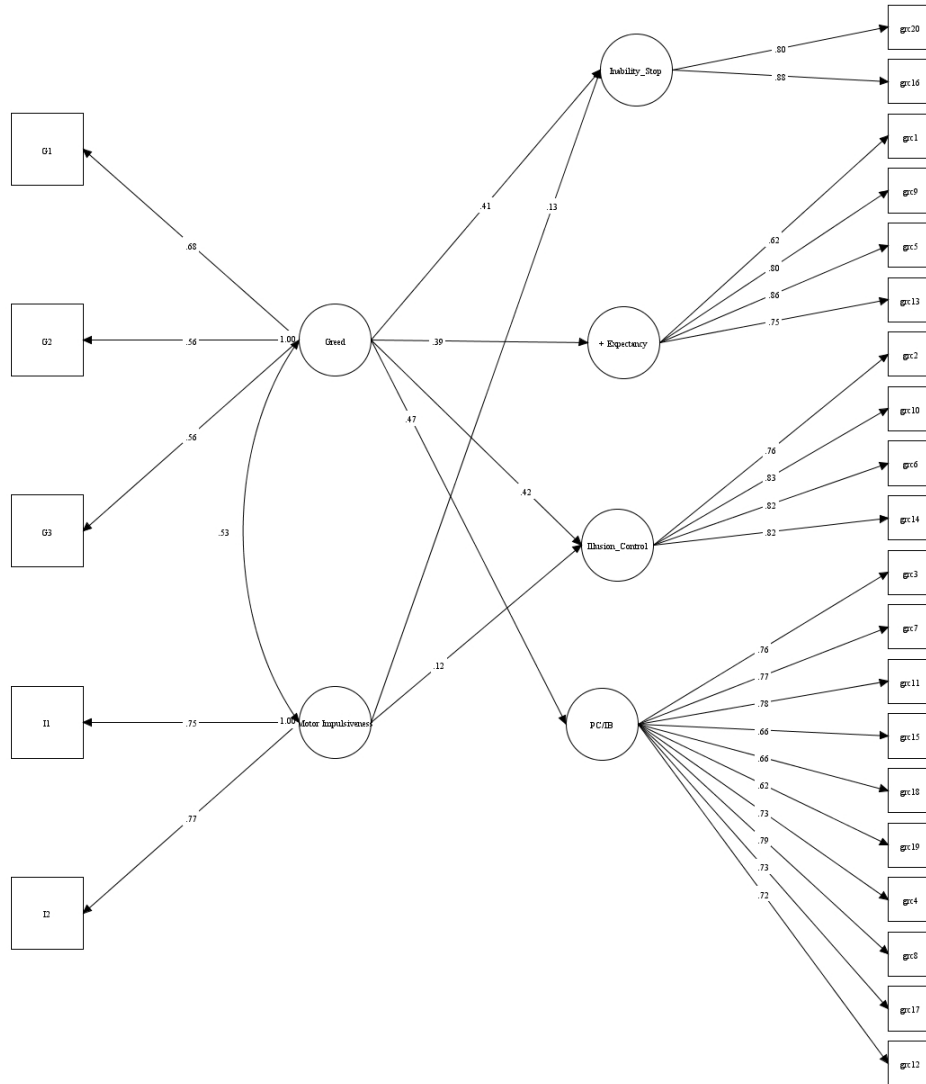


Figure 2. SEM Analyses for Gambling-Related Cognitions in Study 2. Note. PC/IB =Predictive Control/Interpretive Bias. Only significant direct paths >= |.10| shown.

743x814mm (38 x 38 DPI)



## SUPPLEMENTARY INFORMATION

**Loss Attitude Scale: 4-point scale (1= strongly disagree; 4 strongly agree)**

Gambling losses are only minor setbacks.

Regardless of my losses, I will eventually come out ahead.

I tend to forget about my previous losses quickly.

I joke with others about times when I've lost gambling.

Losses are not very stressful or upsetting to me.

In the end, losses make you a better gambler.

For Peer Review

Table SI-1. EFA results for Impulsiveness

	Factor	
	1	2
.is self-controlled	.758	
...concentrates easily.	.646	
...plans trip well ahead of time	.419	
...acts on impulse		-.768
...says things without thinking		-.739

Extraction Method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.

**Table SI-2. Parameter Estimates for SEM Models Predicting Gambling Outcomes - Study 2.**

Model	Ustd. Estimate (S.E.)	Std. Estimate (S.E.)	95% CI for std. effect (low, high)
<b>PGSI Total Score</b>			
<b>PGSI</b>			
PGSI 1	.70** (.01)	.90** (.01)	.88, .91
PGSI 2	.69** (.01)	.89** (.01)	.88, .91
PGSI 3	.69** (.01)	.89** (.01)	.88, .90
PGSI 4	.72** (.01)	.92** (.01)	.91, .93
PGSI 5	.69** (.01)	.89** (.01)	.88, .90
PGSI 6	.72** (.01)	.93** (.01)	.92, .94
PGSI 7	.73** (.01)	.94** (.01)	.93, .95
PGSI 8	.73** (.01)	.94** (.01)	.93, .94
PGSI 9	.73** (.01)	.94** (.01)	.93, .95
<b>Greed</b>			
Item 1	.53** (.03)	.55** (.02)	.51, .59
Item 2	.81** (.03)	.72** (.02)	.67, .76
Item 3	.51** (.03)	.45** (.02)	.41, .49
<b>Impulsiveness-Motor</b>			
Item 1	.87** (.03)	.77** (.02)	.74, .81
Item 2	.80** (.03)	.75** (.02)	.71, .78
<b>Impulsiveness- A/NP</b>			
Item 1	.55** (.03)	.56** (.02)	.52, .61
Item 2	.74** (.03)	.82** (.03)	.77, .88
Item 3	.41** (.02)	.43** (.02)	.39, .47
<b>... → PGSI:</b>			
Greed	.36** (.05)	.28** (.04)	.20, .35
Imp-Motor	.30** (.04)	.23** (.03)	.17, .29
Imp- A/NP	-.03 (.03)	-.03 (.03)	-.08, .03
Age	-.03** (.00)	-.32** (.03)	-.37, -.26
Gender	-.43** (.06)	-.17** (.02)	-.21, -.12
HH Income level	-.07** (.03)	-.06** (.02)	-.10, -.02
<b>Gambling Indicators (F(q)/Poly-gambling/ £spent):</b>			
<b>Greed</b>			
Item 1	.66** (.02)	.69** (.02)	.66, .73
Item 2	.61** (.02)	.54** (.02)	.50, .58
Item 3	.65** (.02)	.58** (.02)	.54, .61
<b>Impulsiveness-Motor</b>			
Item 1	.85** (.02)	.75** (.02)	.71, .79
Item 2	.82** (.02)	.77** (.02)	.73, .81
<b>... → Mean Gambling Frequency:</b>			
Greed	.19** (.03)	.20** (.03)	.14, .26
Imp.-Motor	.14** (.03)	.14** (.03)	.09, .19
Age	-.01** (.03)	-.19** (.02)	-.23, -.15
Gender	-.30** (.03)	-.15** (.02)	-.18, -.12

3	HH Income Level	.05** (.02)	.06 (.02)	.02, .09
4	<b>... → Polygambling:</b>			
5	Greed	.36** (.08)	.13** (.03)	.07, .19
6	Imp.-Motor	.40** (.08)	.15** (.03)	.10, .20
7	Age	-.05** (.00)	-.30** (.02)	-.34, -.26
8	Gender	-.49** (.09)	-.09** (.02)	-.12, -.06
9	HH Income Level	.16** (.05)	.04** (.02)	.03, .10
10	<b>... → £ spent/ 14 days:</b>			
11	Greed	7.12 (6.98)	.05 (.05)	-.04, .13
12	Imp.-Motor	3.75 (5.73)	.02 (.04)	-.05, .10
13	Age	-1.23** (.30)	-.13** (.03)	-.18, -.08
14	Gender	-33.08** (3.32)	-.11** (.02)	-.15, -.06
15	HH Income Level	5.78 (3.32)	.04 (.02)	-.01, .09

Note. \*\* $p < .01$ .  $N = 3207$ .

For Peer Review

**Table SI-3.** *Parameter Estimates for SEM Models Predicting Gambling Related Cognitions*

Model	Ustd. Estimate (S.E.)	Std. Estimate (S.E.)	95% CI for std. effect (low, high)
<b>GRCs</b>			
<b>Inability to Stop</b>			
Item 20	.61** (.01)	.80** (.01)	.78, .83
Item 16	.70** (.01)	.88** (.01)	.87, .90
<b>Expectancies</b>			
Item 1	.47** (.01)	.62** (.01)	.60, .65
Item 9	.65** (.01)	.80** (.01)	.78, .82
Item 5	.70** (.01)	.86** (.01)	.84, .87
Item 13	.63** (.01)	.75** (.01)	.73, .77
<b>Illusion of Control</b>			
Item 2	.59** (.01)	.76** (.01)	.74, .78
Item 10	.62** (.01)	.83** (.01)	.82, .85
Item 6	.63** (.01)	.82** (.01)	.80, .83
Item 14	.64** (.01)	.82** (.01)	.80, .84
<b>Predictive Control/Int. Bias</b>			
Item 3	.55** (.01)	.76** (.01)	.74, .78
Item 7	.60** (.01)	.77** (.01)	.75, .79
Item 11	.59** (.01)	.78** (.01)	.76, .79
Item 15	.54** (.01)	.66** (.01)	.63, .68
Item 18	.55** (.01)	.66** (.01)	.63, .68
Item 19	.48** (.01)	.62** (.01)	.59, .64
Item 4	.57** (.01)	.73** (.01)	.71, .75
Item 8	.59** (.01)	.79** (.01)	.77, .80
Item 17	.60** (.01)	.73** (.01)	.71, .75
Item 12	.57** (.01)	.72** (.01)	.70, .74
<b>Greed</b>			
Item 1	.65** (.02)	.68** (.02)	.64, .72
Item 2	.64** (.03)	.56** (.02)	.52, .61
Item 3	.63** (.03)	.56** (.02)	.52, .60
<b>Impulsiveness-Motor</b>			
Item 1	.84** (.02)	.75** (.02)	.71, .83
Item 2	.83** (.02)	.77** (.02)	.87, .90
<b>...→Inability to Stop:</b>			
Greed	.48** (.05)	.41** (.04)	.35, .48
Imp-Motor	.15** (.04)	.13** (.03)	.07, .19
<b>...→Expectancies</b>			
Greed	.43** (.05)	.39** (.03)	.32, .46
Imp-Motor	.08 (.04)	.08 (.03)	.01, .14
<b>...→Illusion of Control:</b>			
Greed	.49** (.04)	.42** (.03)	.36, .49
Imp-Motor	.14** (.04)	.12** (.03)	.06, .18
<b>...→Pred.Cont/Int.Bias</b>			
Greed	.55** (.04)	.47** (.03)	.41, .53
Imp-Motor	.10** (.04)	.08** (.03)	.02, .14