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Unclaimed prize information increases the appeal of scratch card games

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ABSTRACT

Previous research suggests that intuitively appealing, yet uninformative unclaimed prize information is capable of biasing gambling-related judgments when people compare scratch cards that vary in the number of unclaimed prizes. However, it is unknown if the mere presence of unclaimed prize information alters a game's attractiveness. Using an online crowdsourcing platform, we recruited 402 U.S. residents to participate in an online study. In a within-subjects design, participants made four gambling-related judgments (likelihood of winning, excitement to play, urge to gamble, and hypothetical card purchasing) for scratch cards presented with and without unclaimed prize information. Compared to cards presented without unclaimed prize information, those with unclaimed prize information were judged as more likely to win, produced more excitement to play, a greater urge to gamble, and were chosen more often during a hypothetical purchasing task. Therefore, unclaimed prize information increases the appeal of scratch card games, and may be an important aspect of the scratch card gambling environment to consider from a harm reduction perspective.

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Scratch card; lotteries; cognition; decision making; harm-minimization

Gambling involves many choices. Not only do gamblers have to decide between different modes of gambling (e.g. slot machines, lottery, sports betting, card games, etc.), within each of these gambling forms, many options exist. For example, the single domain of lottery gambling encompasses various game types. Gamblers must decide which form of lottery they wish to play (e.g. traditional lottery draws or instant lottery games), and within that, which specific bet to undertake. These decisions are guided by information made available to gamblers. For example, information regarding the cost of play, prizes available to be won, and odds of winning may be used to inform gambling behavior. Although one may assume that having more information allows people to make better choices, this is not always the case (Czerlinski et al., 1999; Gigerenzer & Brighton, 2009; Gigerenzer & Goldstein, 1996; Tsai et al., 2008; Walker et al., 2019). For example, in a scratch card gambling scenario, providing useful information regarding a gamble was found not to improve individuals' gambling-related choices (Walker et al., 2019).

Within the domain of scratch card gambling, non-diagnostic (i.e. information that does not aid in assessing the true value of a card) unclaimed prize information has been shown to bias scratch card choices (Walker et al., 2019, 2018). Unclaimed prize information refers to the number of prizes still available to be won and is made widely available in many jurisdictions. Although unclaimed prize information may *appear* useful for gamblers choosing between scratch cards, it is not of any use when comparing the objective value of two or more scratch cards. For example, imagine choosing between two scratch card games, Scratch Card A and Scratch Card B. You learn that Scratch Card A features a single top prize remaining, whereas Scratch Card B features ten. Which card offers the better chance of monetary gain? Although unclaimed prize information makes Scratch Card B seem like the better option intuitively, it does not reveal which card offers the best chance at winning the top prize. That is, despite having a greater number of top prizes unclaimed, Scratch Card B may have far more cards remaining in circulation and may therefore offer a *lower* chance at winning a top prize compared to Scratch Card A.

Despite its non-diagnostic nature, previous research has demonstrated that gamblers are biased by unclaimed prize information such that they report a greater subjective likelihood of winning, perceived excitement to play, and card preference for scratch cards with high compared to low levels of unclaimed prizes (Walker et al., 2018). Furthermore, the bias to prefer cards with high levels of unclaimed prize information persists even when in direct competition with truly diagnostic information (e.g. payback percentage), leading many gamblers to report sub-optimal scratch card preferences (Walker et al., 2019, 2018).

Although unclaimed prize information may help a gambler avoid cards lacking a particular prize, and allow lottery operators to avoid advertising prizes no longer attainable, the inclusion of this information within the gambling environment may have unintended consequences. To date, we have shown that although non-diagnostic, participants are biased to choose games with more unclaimed prizes over games with fewer unclaimed prizes. Given that people's scratch card preferences are unduly guided by unclaimed prize information, one may wonder if the mere presence of this information alters the appeal of scratch card games. That is, without unclaimed prize information, gamblers may assume that all prizes remain available to be won. Thus, including unclaimed prize information (even when a relatively high number of prizes remain), may lower the appeal of scratch card games due to unclaimed prize information highlighting that fewer prizes remain. Alternatively, as unclaimed prize information varies between cards, it may prompt comparisons between available games. As such, games with a high number of prizes remaining, despite being no more likely to feature a better payback percentage, may appear superior in the minds of gamblers. This discovered 'superiority' of a subset of scratch card games may not only lead to gamblers preferring these games, but result in the increased appeal of these games overall, compared to if no unclaimed prize information was presented. The consequences of this increased appeal would not be trivial: despite the widespread notion that scratch cards are not harmful, recent research suggests that the frequency with which individuals engage in scratch card gambling is related to problem gambling severity (Stange et al., 2018). Additionally, reports of problematic scratch card use have been cited among both adults and adolescents (Raposo-Lima et al., 2015; Wood & Griffiths, 1998). Further, in longitudinal samples, frequency of scratch card gambling has been shown to be predictive of problem gambling over time (Williams et al., 2015). Therefore, determining the influence of available gambling information, such as unclaimed prize information, should be a priority for continued harm reduction efforts in gambling.

Previous work examining unclaimed prize information bias exclusively compared scratch cards featuring different levels of unclaimed prizes (e.g. low vs. high). However, the consequences of including this information, versus not including this information are unknown. The current study sought to determine if the inclusion of unclaimed prize information alters the attractiveness of scratch card games by assessing participants' perceived likelihood of winning, excitement to play, urge to gamble, and hypothetical purchasing behavior for cards presented with and without unclaimed prize information. If the inclusion of unclaimed prize information simply highlights the fact that fewer prizes remain, one may predict that including this information will lower the appeal of these games. In contrast, if the inclusion of unclaimed prize information prompts comparisons between available games, making some games seem superior in the presence of others, then including this information may *increase* the appeal of these games. This pattern of results would suggest that an unintended consequence of providing this information is the increased attractiveness of scratch card games and possible encouragement of continued gambling behavior.

Method

Participants

A sample of 402 participants was recruited from Amazon Mechanical Turk (an online crowdsourcing platform) and received 1.25 USD upon completion of an 8-minute questionnaire. Participants were recruited under the condition that they be U.S. residents and possess a Mechanical Turk HIT approval rate greater than or equal to 95%. We collected our full sample prior to data analyses and report all data exclusions, all manipulations, and all measures used. This experiment was reviewed and received ethics clearance from a University of Waterloo Research Ethics Committee.

Materials

Scratch card games

An image of a currently available scratch card game (100X Multiplier) was chosen from the Ontario Lottery and Gaming Corporation's website (Ontario Lottery and Gaming Corporation, 2019). Using Adobe CS6, four versions of the same card were created (Red, Blue, Green, and Yellow) by changing the color of the card. Information originally featured on the card (e.g. the top prize amount) was digitally altered so as to not conflict with information presented within the experiment.

Measures

Throughout the study, participants were asked to make various gambling-related judgments regarding presented scratch card games. All measures used were adopted from Walker et al. (2018, 2019).

Likelihood of winning

Participants rated their likelihood of winning a prize while playing 100X Multiplier by responding to the item: 'How likely do you think you are to win a prize while playing

100X Multiplier (Red/Blue/Green/Yellow)? Participants responded to this item using a 7-point scale that ranged from 1 (*Extremely unlikely*) to 7 (*Extremely likely*).

Excitement

We assessed participants' excitement to play by having them respond to the item 'How excited would you be to play 100X Multiplier?' Responses to this item were provided using a scale that ranged from 1 (*Not at all excited*) to 7 (*Extremely excited*).

Urge to gamble

Participants reported their urge to gamble on the presented scratch card games using the item: 'Please indicate your urge to gamble on 100X Multiplier.' Responses to this item were provided using a scale that ranged from 1 (*No urge to gamble*) to 7 (*Strong urge to gamble*).

Card purchasing

Participants completed a hypothetical card purchasing task which allowed us to assess their preferences between scratch cards with and without unclaimed prize information. Participants were told: 'Say you had the opportunity to purchase 100X Multiplier (Red/Blue/Green/Yellow) scratch cards. Each card costs \$5. Hypothetically speaking, how many 100X Multiplier (Red/Blue/Green/Yellow) cards would you like to purchase?' Participants responded to this item by typing a number into a free-entry text-box.

Problem Gambling Severity Index (PGSI)

The PGSI (Ferris & Wynne, 2001) is a well-validated and reliable measure for problem gambling symptomatology in the general population. Participants were administered nine PGSI items, and responded on a scale from 0 (*Never*) to 3 (*Almost Always*) with regards to how often a particular behaviour had occurred in the last 12 months. Responses to all PGSI items were summed to create a PGSI score for each participant which ranged from 0 to 27. Scores of 0 on the PGSI indicate non-problem gambling, scores between 1 and 4 indicate low-risk gambling, scores between 5 and 7 indicate moderate-risk gambling, and scores of 8 or more are indicative of problem gambling (Currie et al., 2013).

Design and procedure

This experiment utilized a within-subjects design, in which participants provided gambling-related judgments for scratch card games with and without unclaimed prize information present (order counterbalanced). All scratch cards were presented with an information table that included the name of the card, the prize amounts available, and the total number of prizes at each prize level (Figure 1). On unclaimed prize information present trials, unclaimed prize information was added for each prize level (see Figure 1a, 1b). Prior to making any gambling-related judgments, participants were provided with a set of instructions that provided information common to all four versions of 100X Multiplier (i.e. the cost of play, total number of prizes, and top prize amount), while also being informed that each version could differ with regards to the number of cards remaining to be purchased, and the number of prizes remaining to be won. Next, participants were presented with an explanation of each piece of gambling-related information provided in the experiment (e.g.

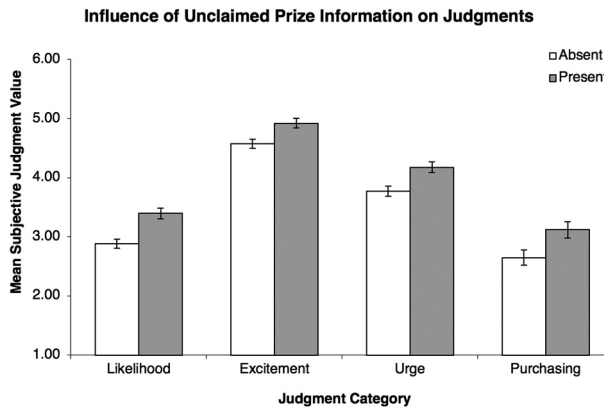


Figure 1. Scratch card information presented to participants in the unclaimed prize information present trials (panels a and b) and the unclaimed prize information absent trials (panels c and d). Participants provided judgments for one card of each type individually.

unclaimed prize information). Following these instructions, participants were presented with a pair of scratch cards and asked to choose which scratch card they would prefer to play. On unclaimed prize information present trials, unclaimed prize information was presented such that one scratch card featured a high number of unclaimed prizes (approximately 90% of each prize amount unclaimed) while the other featured a low number of unclaimed prizes (approximately 10% of each prize amount unclaimed).¹ After selecting the scratch card that they preferred to play, participants were presented with the card they had chosen, and judged this card on various gambling-related measures (i.e. likelihood of winning, excitement, urge to gamble, and card purchasing; see Figure 2); this choice followed by judgment sequence was then completed for the other information condition. Following the completion of both unclaimed prize information present and absent trials, participants responded to items assessing their age, gender, scratch card gambling frequency ('In the past 12 months, how many times have you played an instant scratch card game'), and problem gambling symptomatology (PGSI), in order to characterize the sample.

Results

Sample characteristics are outlined in Table 1. Our overall analytical strategy centered on comparing participants' judgments of scratch card games when unclaimed prize information was present versus absent. This allowed us to test whether the presence of unclaimed prize information altered participants' perceived likelihood of winning, excitement to play, urge to gamble, and hypothetical card purchasing behavior.

Initial scratch card choices

Consistent with past findings (Walker et al., 2019, 2018), when asked to make a selection between a scratch card with a high versus low number of unclaimed prizes, the majority of participants stated a preference for the scratch card with a high number of unclaimed

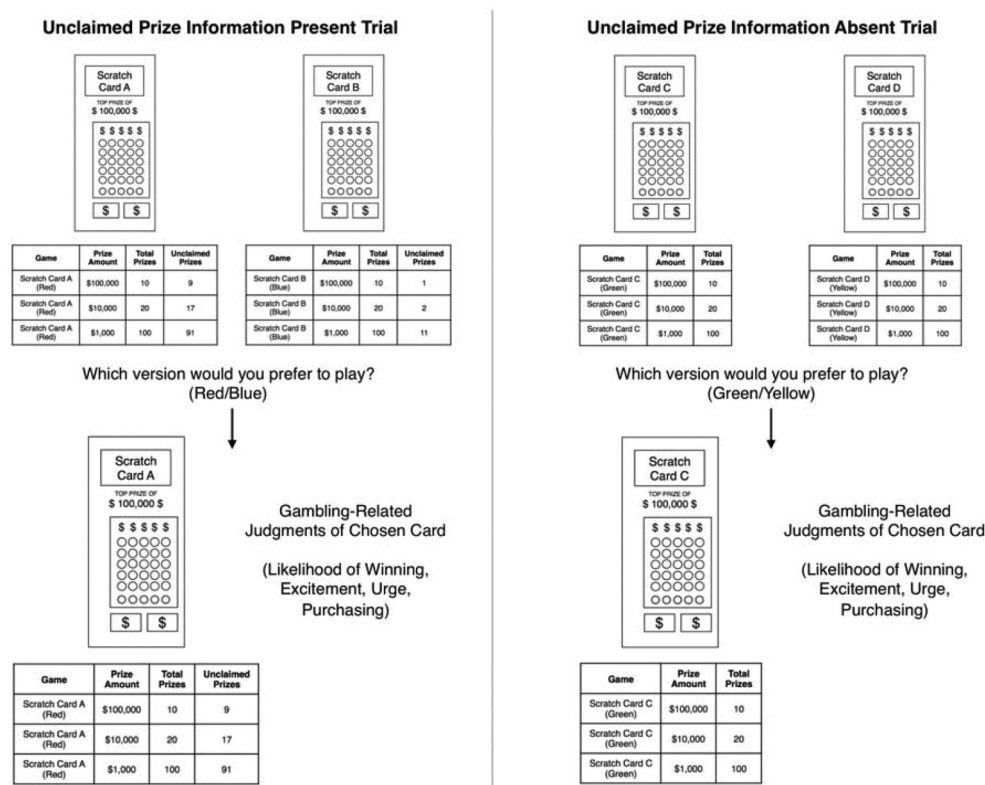


Figure 2. Overview of unclaimed prize information present (left) and unclaimed prize information absent (right) experimental trial types presented to participants.

Table 1. Sample characteristics.

Measure	Value
Age, mean (SD)	37.08 (11.31)
Gender, % females	47.3%
Frequency of Scratch Card Gambling, <i>n</i> (%)	
Had not played	117 (29.1%)
1–5 times	166 (41.3%)
6–10 times	58 (14.4%)
11–15 times	30 (7.5%)
16–23 times	10 (2.5%)
24 or more times	18 (4.5%)
Prefer not to say	3 (0.7%)
Problem Gambling Severity Index, <i>n</i> (%)	
Non-problem gambling	241 (60.0%)
Low-risk gambling	110 (27.4%)
Moderate-risk gambling	23 (5.7%)
Problem gambling	28 (7.0%)

Descriptive statistics for all measures presented in the Experiment. Frequency of Scratch Card Gambling categories represent self-reported scratch card gambling frequency in the last 12 months; ‘Had not played’ represents participants who said that they had never played this type of game or had played 0 times in the past 12 months. Problem Gambling Severity Index categories are based on those provided by Currie et al. (2013).

prizes (92.3%). This preference emerged despite the fact that unclaimed prize information was non-diagnostic of each scratch card's true expected value. Furthermore, on unclaimed prize information absent trials, the majority of participants showed a preference for the Green scratch card (70.1%) as opposed to Yellow (29.9%), despite the fact that both scratch cards featured identical gambling-related information.

Gambling-related judgments

We conducted paired-samples *t*-tests to compare participants' gambling-related judgments during unclaimed prize information present and absent trials (see Figure 2). Our results demonstrate that participants felt more likely to win a prize while playing a scratch card that featured unclaimed prize information ($M = 3.39$, $SD = 1.76$) compared to when this information was absent ($M = 2.88$, $SD = 1.60$), $t(401) = 9.57$, $p < .001$, $d = 0.30^2$ (Figure 3). Similarly, participants reported more excitement to play scratch cards when unclaimed prize information was present ($M = 4.92$, $SD = 1.62$) as opposed to absent ($M = 4.57$, $SD = 1.57$), $t(401) = 7.12$, $p < .001$, $d = 0.22$. Participants also reported a greater urge to gamble when unclaimed prize information was present ($M = 4.18$, $SD = 1.83$) compared to absent ($M = 3.77$, $SD = 1.77$), $t(401) = 8.11$, $p < .001$, $d = 0.23$. Lastly, participants indicated wanting to hypothetically purchase more scratch cards when unclaimed prize information was present ($M = 3.12$, $SD = 2.82$), compared to when it was absent ($M = 2.65$, $SD = 2.60$), $t(401) = 5.84$, $p < .001$, $d = 0.17$.³ Furthermore, the effect of unclaimed prize information was observed independently within each order condition (e.g. unclaimed prize information present trial followed by unclaimed prize information absent, and vice versa) for each dependent variable (all p 's $< .05$).

Additionally, we explored the possibility that the increased appeal of scratch card games featuring unclaimed prize information was an artifact of our within-subjects design, such that the presence of unclaimed prize information increases the appeal of scratch card games only

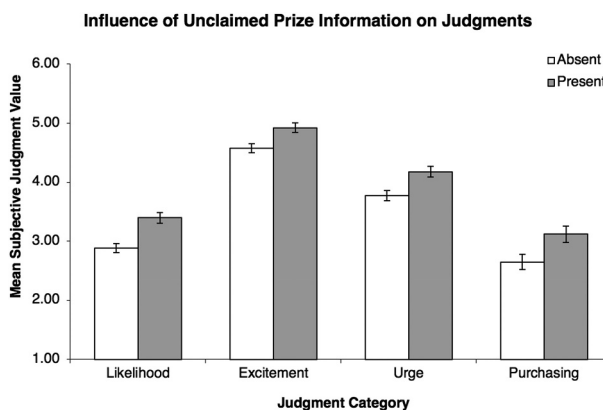


Figure 3. The influence of unclaimed prize information on participants' subjective judgments during the scratch card gambling task. Overall, the presence of unclaimed prize information led to significant increases in each of the judgment categories, relative to when unclaimed prize information was absent. Purchasing data is presented with a 90% Winsorization procedure applied (see Results). Error bars ± 1 SEM.

when explicitly contrasted with the absence of this information. We conducted independent samples *t*-tests analyzing participants' first trial, as responses to these trials would be free of such contrast effects (e.g. participants' responses to scratch cards with unclaimed prize information were made without knowledge of scratch cards without this information, and vice versa). Participants' likelihood of winning ratings were greater when unclaimed prize information was present ($M = 3.46$, $SD = 1.72$), compared to when absent ($M = 2.61$, $SD = 1.55$), $t(400) = 5.24$, $p < .001$, $d = 0.52$. Participants' excitement to play was marginally greater when unclaimed prize information was present ($M = 4.95$, $SD = 1.58$), compared to when it was absent ($M = 4.68$, $SD = 1.57$), $t(400) = 1.75$, $p = .082$, $d = 0.17$. Further, participants reported a greater urge to gamble when unclaimed prize information was present ($M = 4.23$, $SD = 1.81$), compared to when it was absent ($M = 3.76$, $SD = 1.78$), $t(400) = 2.64$, $p = .009$, $d = 0.26$. Finally, participants elected to hypothetically purchase nominally more scratch cards when unclaimed prize information was present ($M = 2.88$, $SD = 2.68$), compared to when it was absent ($M = 2.73$, $SD = 2.50$), however this difference did not reach statistical significance, $t(400) = .558$, $p = .577$, $d = 0.06$. Overall, unclaimed prize information increased the appeal of scratch card games on most measures, even in the more ecologically valid scenario where such information was not explicitly contrasted with the absence of this information. Although some of these effects failed to reach statistical significance (i.e. excitement marginally, and purchasing), this may have been due to a reduction in statistical power, and not to a substantial reduction in the effects themselves.

Exploratory analyses

It is possible that the biasing effects of unclaimed prize information are especially pronounced for individuals experiencing gambling-related harm or those who engage in scratch card gambling more frequently. To assess this possibility, we categorized our sample on the basis of their PGSI scores (No Gambling Harm [PGSI score = 0, $n = 241$], Some Gambling Harm [PGSI score > 0, $n = 161$]) and scratch card gambling frequency (Have Not Played [$n = 117$], Low Frequency [1–5 times in the past 12 months, $n = 166$], High Frequency [6 or more times in the past 12 months, $n = 116$]). In categorizing participants into these groups, we sought to balance meaningful groupings with attempting to equate group sample sizes as closely as possible. For each dependent variable, we conducted a mixed factorial ANOVA with unclaimed prize information condition (Present, Absent) as the repeated measures factor and PGSI group (No Gambling Harm, Some Gambling Harm) or scratch card gambling frequency (Have Not Played, Low Frequency, High Frequency) as the between-subjects factor.

For PGSI scores, this analysis revealed a main effect of PGSI group on likelihood of winning judgments, $F(1, 400) = 16.26$, $p < .001$, $\eta_p^2 = .039$, and a significant unclaimed prize information condition by PGSI group interaction, $F(1, 400) = 10.32$, $p = .001$, $\eta_p^2 = .025$. To further understand the source of this interaction, difference scores for the effect of unclaimed prize information (Present – Absent) were calculated for each PGSI group, and compared with an independent samples *t*-test. This test revealed a significant difference between individuals experiencing No Gambling Harm ($M = 0.37$, $SD = 0.88$), and those experiencing Some Gambling Harm ($M = 0.72$, $SD = 1.29$), $t(400) = 3.21$, $p = .001$, $d = 0.32$, suggesting that unclaimed prize information had a greater impact

on likelihood of winning judgments for individuals experiencing some degree of gambling-related harm. For all other dependent variables (excitement to play, urge to gamble, and hypothetical purchasing), the main effect of PGSI group was significant (all p 's < .001), demonstrating that individuals experiencing gambling-related harm judged scratch cards (regardless of unclaimed prize information condition) more favorably. We observed no significant unclaimed prize information condition by PGSI group interactions for these variables (all p 's > .164).

Next, we conducted a mixed factorial ANOVA with unclaimed prize information condition (Present, Absent) as the repeated measures factor and scratch card frequency (Have Not Played, Low Frequency, High Frequency) as the between-subjects factor. For all dependent variables we observed a main effect of scratch card gambling frequency (all p 's < .001), but no unclaimed prize information condition by scratch card frequency interactions (all p 's > .177). Therefore, more frequent scratch card gamblers judged scratch cards across unclaimed prize information conditions more favorably than those playing scratch cards less frequently.

Discussion

Overall, the results of the present experiment suggest that the presence of unclaimed prize information influences participants' gambling-related judgments and preferences. That is, participants felt more likely to win, more excited to play, and reported a greater urge to gamble on scratch cards that were presented with unclaimed prize information, relative to cards presented without this information. Similarly, participants purchased a greater number of scratch cards in a hypothetical purchasing task when unclaimed prize information was present, as opposed to absent. Overall, the inclusion of unclaimed prize information appears to have the unintended consequence of enhancing the attractiveness of scratch card games.

The current study has practical implications and relevance to the operation and regulation of gambling games, specifically scratch cards. Unclaimed prize information is made easily accessible by lottery operators worldwide and is commonly utilized by scratch card gamblers in the real world – despite its non-diagnostic nature (Opid Technologies, 2020; Usockem, 2019). The results of the present study suggest a cause for concern with how unclaimed prize information is interpreted and utilized by gamblers, such that it may bias peoples' perceptions of scratch cards in a way that increases gambling engagement (e.g. by increasing the perceived likelihood of winning a prize). Further, the increased attractiveness of scratch cards presented with unclaimed prize information may be of greatest concern when considering its use among individuals experiencing more gambling-related harm. Participants who reported some level of gambling-related harm were more impacted by the presence of this information compared to those who reported no gambling harm for likelihood of winning judgments. This suggests that unclaimed prize information may distort perceptions of these games to a greater extent among those already experiencing gambling harm.

Although the present results strongly suggest that unclaimed prize information increases the attractiveness of scratch card games, it could be the case that presenting *any* additional piece of gambling-related information exerts a similar effect. That is, it may be that presenting additional gambling-related information, especially information that appears to informatively distinguish between scratch card games, increases gambling

engagement due to making gamblers feel like they can increase their odds of winning by utilizing such information. In fact, if the information that is being used to select scratch card games *is* informative, unlike unclaimed prize information, this shift in perception could theoretically allow gamblers to make more optimal decisions concerning game choice. Nevertheless, past research suggests that the addition of various diagnostic pieces of information (e.g. payback percentage) fail to influence gambling-related choices when presented alongside unclaimed prize information (Walker et al., 2019). Thus, it would appear that not all gambling-related information is persuasive, even when such information could help gamblers make better choices.

Why might unclaimed prize information be especially influential for gamblers' scratch card perceptions and preferences? First, unlike other pieces of gambling-related information, unclaimed prize information is regularly updated and goes through a cycle, such that upon its release, a scratch card features the maximum number of unclaimed prizes which is reduced as tickets are purchased and prizes are won. One consequence of such a cycle is that, at any given time, there is likely to be scratch cards available both with a high and low number of unclaimed prizes. Compare this to other diagnostic pieces of gambling-related information (e.g. payback percentage) which are not publicly updated throughout a scratch card's lifespan and do not vary significantly from game to game. Thus, the continuously changing nature of unclaimed prize information may lead gamblers to falsely conclude that they have access to information that can only be utilized within a limited time frame. This property of unclaimed prize information may create a sense of urgency, capitalizing on the link between impulsivity and disordered gambling (Chowdhury et al., 2017; Ioannidis et al., 2019). Furthermore, the drastic differences between scratch cards with regards to unclaimed prize information may make certain cards appear more attractive when viewed alongside scratch cards with far fewer unclaimed prizes. Past research suggests that people are more likely to use irrelevant information when it is salient or intuitively appealing (Denes-Raj & Epstein, 1994; Denes-Raj et al., 1995). Research on unclaimed prize information suggests that it may be of high intuitive appeal (Walker et al., 2019), which may be one mechanism explaining its persuasiveness and resulting influence on gamblers' perceptions of scratch card games. Of course, another aspect of unclaimed prize information is that it is commonly judged as diagnostic when it is in fact not (Stange et al., 2018; Walker et al., 2019, 2018). This may make the influence of unclaimed prize information especially problematic from a harm reduction stand-point as utilizing this information does not improve gamblers' scratch card preferences.

Finally, the influence of non-diagnostic information on gambling behavior has been demonstrated in other domains. For example, lottery gamblers tend to avoid numbers that have recently won (Ho et al., 2019; Wang et al., 2016), and streaks of outcomes in roulette tasks have been shown to result in choices that conform to the gambler's fallacy (Studer et al., 2015). Additionally, although not an exclusively chance-based form of gambling, gamblers engaging in sports betting often make use of statistics (of varying diagnosticity) related to team and player performance to inform their decisions (Cantinotti et al., 2004). The current study adds to this broader literature by examining non-diagnostic information in the scratch card gambling domain, and further suggests that presenting such information may have the unintended consequence of biasing various gambling-related judgments (e.g. likelihood of winning).

Limitations and future directions

Limitations of the current study include the fact that participants made judgments about hypothetical scratch card games, and further, that actual gambling behavior was not measured. It remains unknown how unclaimed prize information influences behavior during gambling scenarios involving real risk and reward. Therefore, future studies that involve realistic purchasing scenarios represent an important next step in assessing how unclaimed prize information influences gambling behavior. Furthermore, although the effects we observed were consistent across multiple dependent variables, they were nevertheless small (Cohen's d ranging from .09 to .30).⁴ However, as is typically the case of experimental investigations of gambling behavior, it's possible that the observed effects are an underrepresentation of the magnitude of effects in real gambling environments due to their simulated nature; future research could attempt to further discern the influence of unclaimed prize information within real-world gambling scenarios.

The present study also utilized single-items to measure our dependent variables, which may be less accurate in estimating an underlying construct compared to multi-item measures. Future research could attempt to validate these single-item measures or use multi-item measures for more accurate assessment. However, we believe that the consistent main effects of PGSI status and scratch card gambling frequency in each of the exploratory analyses serve to reinforce the convergent validity of these measures. Additionally, a potential limitation of the current study was the exclusive use of an online crowdsourcing platform (i.e. Mechanical Turk) for data collection. However, several investigations have served to reduce concerns regarding Mechanical Turk samples, as they have been shown to be more representative (Berinsky et al., 2012; Buhrmester et al., 2016; Paolacci et al., 2010) and produce data of a similar, if not higher, quality (Buhrmester et al., 2016; Hauser & Schwarz, 2016; Paolacci et al., 2010) compared to undergraduate samples commonly used in psychological research.

Conclusion

Overall, the results of the present study suggest that the inclusion of unclaimed prize information alters perceptions of scratch card games, increasing gamblers' perceived likelihood of winning, excitement to play, urge to gamble, and scratch card purchases in a hypothetical card purchasing task. These findings suggest that the presence of this information in real-world gambling environments may not only bias individuals toward certain scratch cards (i.e. those with many unclaimed prizes), but may also increase gambling engagement by making certain cards appear more attractive. Given the demonstrated unintended consequences of its inclusion, unclaimed prize information is an important aspect of the gambling environment to consider when examining lottery games from a harm reduction perspective.

Notes

1. These levels of unclaimed prize information (i.e. 90% and 10%) were chosen to represent a realistic level of variation in unclaimed prize information across scratch cards. Very often lottery operators offer multiple versions of a scratch card game such that the more recently

released version features a considerably higher level of unclaimed prizes compared to the previous version. Nevertheless, as unclaimed prize information is a non-diagnostic piece of gambling-related information, this discrepancy is not consequential with regards to each card's true value.

2. All reported effect sizes were calculated with the pooled standard deviation estimate.
3. We conducted a 90% Winsorization procedure to correct for non-normality of the hypothetical purchasing data. As scores below the 5th percentile were already equal to the 5th percentile value, only scores above the 95th percentile were replaced with the 95th percentile value (10). The Winsorized purchasing data is used for all analyses reported in the manuscript.
4. Relatedly, we assessed the proportion of participants who showed a preference for scratch cards featuring unclaimed prize information for each gambling-related judgment. We find that across gambling-related judgments, the proportion of participants who demonstrated a bias toward cards with unclaimed prize information ranged from 31.3% to 37.1%. Of the remaining participants, a majority reported identical judgments across both scratch cards (55.5% to 60.9%).

Disclosure statements

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Constraints on publishing

The authors declare that there are no constraints on publishing.

Competing interests

MS has accepted travel and accommodation for conference speaking engagements from the British Columbia Lottery Corporation (Canada), the Responsible Gambling Council (Canada), and has received consulting fees from Gambling Research Exchange Ontario (Canada). These declarations are unrelated to the present manuscript. The authors declare no additional competing interests.

Notes on contributors

Madison Stange is a PhD candidate in the Department of Psychology at the University of Waterloo, studying under the supervision of Dr. Mike Dixon. Her research focuses on the structural characteristics of scratch card games and how various game features (such as near-misses) influence gambling behavior and decision making.

Alexander C. Walker investigates cognitive biases as they relate to scratch card gambling. Specifically, he is interested in how pieces of information (e.g. unclaimed prize information), presented to scratch card players, may bias their gambling related decisions, thus leading them to engage in irrational and potentially harmful gambling behaviors.

Jonathan A. Fugelsang, My research spans several topics in higher level cognition. Recently, my lab has primarily focused on the interplay between intuitive and analytic processes supporting complex reasoning and decision-making. We have examined this intuitive/analytic interplay in several real-world domains, such as creativity, moral judgments and values, religious beliefs, and technology use.

Derek J. Koehler is Professor of Psychology at the University of Waterloo, Ontario, Canada. His research investigates how people draw inferences, make plans, generate predictions, and pursue goals under conditions of uncertainty.

Mike J. Dixon is a full professor of psychology at the University of Waterloo who conducts research on gambling and gaming. He has garnered over 3.5M in funding and published over 90 articles in journals such as *Nature*, *Addiction*, *Journal of Cognitive Neuroscience*, *Cognitive Neuropsychology* and *Cortex*.

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Data availability statement

The data that support the findings of this study are openly available on the Open Science Framework at osf.io/w59zs.

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