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Moderate-Risk and Problem Slot Machine Gamblers: A Typology of Gambling-Related Cognitions

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Abstract

Cognitive distortions are said to play a key role in the development and maintenance of problem gambling, as well as in its treatment. Toneatto's (1999, 2002) typology of gambling distortions provides a useful conceptualization of gambling-related cognitions, although game-type specification is absent from his analysis. Toneatto's categorization was used in the present study to organize the beliefs of 43 slot machine gamblers experiencing either moderate-risk or problem gambling, recruited and interviewed in Toronto, Canada. The typology captured many of the gambling-related cognitions, although specific beliefs held by this sample of slot machine gamblers required revision of the original typology. This study provides unique insight into the cognitive structure of these beliefs, as described by gamblers, and their frequency count, suggesting that game type is an important factor when identifying and describing gambling-specific cognitive distortions.

Keywords: gambling subtypes, cognitive distortions, qualitative methods, irrational beliefs, slot machine gambling

Résumé

Les distorsions cognitives joueraient un rôle dans l'apparition et le maintien des problèmes de jeu, ainsi que dans leur traitement (Cunningham, Hodgins et Toneatto, 2014; Cunningham, Hodgins, Toneatto et Murphy, 2012; Fortune et Goodie, 2012). La typologie des distorsions cognitives liées au jeu de Toneatto (1999, 2002) est à ce titre un outil utile pour conceptualiser les processus cognitifs des joueurs, bien que l'analyse ne précise pas les types de jeux de hasard en cause (Milosevic et Ledgerwood, 2010). Le présent article cherche à organiser à l'aide des catégories de Toneatto (1999, 2002) les croyances de 43 utilisateurs d'appareils à sous présentant un risque moyen ou problématique, recrutés et interviewés à Toronto (Canada). En conclusion, cette typologie permet de rendre compte de nombreux processus cognitifs liés au jeu, bien que certaines des croyances propres à cet échantillon de joueurs utilisant

des appareils à sous aient nécessité une révision des catégories initiales. Fournissant un aperçu unique de la structure cognitive associée à ces croyances, telles qu'elles ont été décrites par les joueurs et selon leur nombre d'occurrences, cette étude donne à penser que le type de jeu de hasard en cause constitue un facteur important pour cerner et décrire les distorsions cognitives rattachées au jeu.

Introduction

It is well documented that gamblers' maintain erroneous beliefs[1] that assume causal explanations in games of chance (Fortune & Goodie, 2012; Goodie & Fortune, 2013). Such beliefs are also said to be more pronounced in problem versus social gamblers (Joukhador, Blaszczynski, &MacCallum, 2004). The importance of these beliefs in understanding gambling behaviour is well demonstrated by the wealth of research on them and by the published instruments used to measure distortions in gamblers (Goodie & Fortune, 2013). A growing area of interest in the gambling literature is specification by gambling subtype, including by game type (Raylu & Oei, 2002; Toneatto & Millar, 2004; Toneatto, Turner, Zack, Farvolden, & Bagby, 2007). Important game type differences in cognitive biases have been alluded to (Czerny, Koenig, & Turner, 2008), although little research has focused on this area. Myrseth, Brunborg, and Eidem's (2010) study is one exception, in which the authors found that the illusion of control was more pronounced for individuals favouring games of skill versus games of chance.

The most detailed account of gambling-related cognitions (Toneatto, 1999, 2002) lists and describes an array of cognitive distortions known to occur in heavy gamblers. This typology provides a necessary conceptualization of gambling cognitions, but its construction relies on data from a range of studies with heterogeneous samples, including studies without subtype specification and samples of recreational gamblers who are not experiencing gambling problems (Toneatto, 1999). A fuller understanding of these beliefs is particularly important in light of research that suggests cognitive distortions play a role in the conduct and development of pathological gambling (Cunningham, Hodgins, & Toneatto, 2014; Goodie & Fortune, 2013). Thus, researchers describe therapies that emphasize correction of disordered thinking as having good promise (Fortune & Goodie, 2012).

This study frames the analysis of 43 in-depth interviews in a sample of moderate-risk and problem slot machine gamblers by using Toneatto's (2002) conceptualization to assess belief types.

[1]Irrational/erroneous beliefs and cognitive distortions/biases are used interchangeably throughout.

Literature Review

Cognitive distortions, or beliefs and practices held and used by gamblers to help determine or procure a gambling outcome, are reported to play a fundamental role in the maintenance and development of gambling problems (Cunningham et al., 2014; Fortune & Goodie, 2012; Toneatto & Millar, 2004). Research on problem versus social gamblers demonstrates the greater likelihood of those experiencing problem gambling endorsing such beliefs (Joukhador et al., 2004; Myrseth et al., 2010). As the frequency of gambling progresses, biased and distorted cognitive schemas appear and shape beliefs about attribution, personal skill, control over outcome, biased evaluations, and erroneous perceptions, including superstitious thinking (Ladouceur & Walker, 1996; Toneatto, 1999, 2002). How these beliefs influence behaviour is not clear, the most conclusive finding being that cognitive schemas appear to be a precursor to problem gambling behaviour (Goodie & Fortune, 2013; Ledgerwood & Petry, 2010).

Gamblers' core cognitive distortion lies in the belief that they can predict or control gambling outcomes. Cognitive therapy (CT) is applied to help correct such beliefs (Toneatto, 2002). Smith, Battersby, Harvey, Pols, and Ladouceur (2015) conducted a randomized controlled trial comparing CT and exposure-based therapies in a sample of treatment-seeking electronic gaming machine (EGM) gamblers and found that CT is a viable and effective treatment for problem gambling. CT involves creating awareness of these distortions and attempts to modify them by helping problem gamblers understand that they possess false beliefs (Ladouceur, 2004; Ladouceur, Sylvain, Boutin, Lachance, Doucet, & Leblond, 2001; Ladouceur & Walker, 1998; Smith et al., 2015; Sylvain, Ladouceur, & Boisvert, 1997). As Toneatto (1999) explains, gamblers make "decisions that can be powerfully influenced by cognitive biases, distortions in reasoning and errors in judgement" (p. 1594), believing they can predict, manipulate, or somehow decipher an indiscernible and indeterminable outcome.

According to Toneatto (1999), a full understanding of these cognitions, including how they can be identified in treatment, requires an understanding of their phenomenology. Toneatto (1999) identified a vast array of distortion types that were derived from an extensive review of the literature on gambling-related cognitions that included a qualitative study of cognitive distortions (Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997). The samples used to derive this typology included non-problem gamblers and university students or adolescents, thus risking the application of widespread generalizations to heterogeneous samples. Gambling subtypes (Blaszczynski & Nower, 2002; Lobo et al., 2014; Milosevic & Ledgerwood, 2010), including game-type differentiation, has become an important consideration for problem gambling research and treatment (Ledgerwood & Petry, 2010; Raylu & Oei, 2002; Toneatto et al., 2007). Although earlier research focused on irrational beliefs without game type specification (Gaboury & Ladouceur, 1989; Toneatto, 1999 researchers now acknowledge important differences in cognitive schemas by game type (Czerny et al., 2008), with some evidence lending support to these observations (Myrseth et al., 2010). This raises the questions: What gambling-related

distortions emerge from a sample of problem and moderate-risk slot machine gamblers? How are these distortions described by gamblers? Which distortions occur most frequently?

Method

Sample

A total of 43 adults who were moderate-risk (35%) or problem (65%) slot machine gamblers were recruited from Toronto, Ontario, via online and paper-based classified advertisements. Participants were screened by the principal investigator using the Lie-Bet instrument, a brief screening tool. During the interview, participants were assessed with the Problem Gambling Severity Index. As women are thought to favour games of chance (Hing & Breen, 2001), in order to avoid oversampling them, efforts were made to recruit an equal proportion of men and women. All participants had to be of legal gambling age, that is, 18 years or over. The sample demographics are outlined in Table 1. A semi-structured interview guide was administered to individual participants by the principal investigator, who asked questions centred on gambling-related beliefs, ritual activity, and gambling-centred social processes, but participants were encouraged to expand on their beliefs, ideas, and experiences throughout the interview. Feminist epistemological insight (Devault, 1990) was used to empower participants through interviewing. The principal investigator elevated the participants' insights above her own, which is particularly important for a population who is aware of the perceived irrationality of their beliefs, including felt stigma (Baxter, Salmon, Dufresne, Carasco-Lee, & Matheson, 2015). Participants were situated in the role of the "expert" regarding their lives and were referred to this role by the principal investigator during the interview when necessary. A set of demographic questions was asked at the end of the interview. Interviews lasted between 60 and 120 min. All participants were provided with a $20.00 honorarium, with the monetary compensation being disclosed by the principal investigator only when asked by the participants in order to avoid its influence on their decision to participatein an attempt to avoid coercion.

The sample composition (Table 1) includes a high percentage of people aged 41 years or older (67%) who have engaged only in slot machine gambling (86%) and who have never been married (42%). Most had some post-secondary education (75%) and reported a gross annual income lower than $40,000 (56%). The majority of participants were ethnically tied to Europe, followed by the British Isles; various parts of Asia were well represented (25.6%) as was the Caribbean (14%). Over half the participants were Canadian born (56%).

Analysis

The study was approved by the Research Ethics Board of the University of Toronto and all participants gave informed consent. Interviews were audio-taped, transcribed verbatim, de-identified to ensure anonymity, and coded for emergent themes by the

Table 1
Sample Composition (N = 43)

Characteristic	Percentage
Female	46.5
Age, years	
21–30	14
31–40	18.6
41–50	34.9
51–60	20.9
⩾60	11.6
Marital status	
Never married	41.9
Married	18.6
Separated	4.7
Divorced	20.9
Widowed	2.3
Cohabitating	11.6
Education level	
Secondary	25.6
Trade school	9.3
Some college	4.7
College diploma	27.9
Some university	9.3
University degree	14
Masters/Professional degree	9.3
Income range	
Less than $20,000	23.3
$20,001–$40,000	32.6
$40,001–$60,000	32.6
$60,001–$100,000	11.6
Ethnic background	
Aboriginal	2.3
British Isles	18.6
Caribbean	14
Eastern/Other European	4.6
Southern European	25.6
Western European	7
Latin/Central/South American	2.3
West and East/South East Asian	14
South Asian	11.6
Canadian born	
Yes	55.8
No	44.2
Problem Gambling Severity Index Score	
Moderate-risk level	34.9
Problem level	65.1
Slots exclusively	
Yes	86
No	14

principal investigator with NVivo, qualitative analysis software. Axial coding was performed by using a "coding paradigm" informed by an existing and analytically selected framework (Strauss & Corbin, 1990, 1998). In this case, the pre-set categories were determined by Toneatto's (2002) typology. Negative cases, that is, data running counter to the typology, were coded separately to account for cognitive distortions not represented by Toneatto's (2002) classification.

Results

Using the Toneatto (2002) conceptualization, the principal investigator organized the beliefs of this sample into categories, as shown in Table 2; modifications are presented as italicized text.[2] All participants held at least one gambling-related cognition; their frequency distribution is presented in Table 3.

The typology accounted for most beliefs reported by participants; however, some categories were not relevant to these data, and emergent belief types required the addition of several categories and descriptors. One category and four subcategories were created to account for the findings, and four descriptors were added to existing categories. Additionally, two categories and two subcategories were omitted from the typology. These additions and omissions are shown in Table 2, and a further edited version of the original typology, including verbatim quotations, can be seen in Table 4.

Karma was added as a category to capture beliefs referencing moral cause and effect. Tempered avidity or moral worth demonstrated by thoughts, actions, and overall mind states (e.g., relaxed/not eager) were perceived by the study's participants to have an impact on gambling outcomes.

Magnified Gambling Skill was revised to include three subcategories to account for emergent strategy types. That is, Magnified Gambling Skill remained a catchment category for any gambling-related system specified by the sample, with subcategories to account for frequently specified types. The subcategories added include the following: (a) Hot Machine to account for the belief that machines in constant play will pay out, (b) Bet Max to account for the belief that placing a maximum bet on the machines will increase the chances of a win and the total winnings,[3] and (c) Higher Denomination Machines to account for the belief that higher denomination machines will pay out more often and in greater amounts. Lastly, Representative Bias was added as a subcategory in Attribution Biases to house the belief that a machine that has just won will not immediately pay out again.

[2]The typology presented here was modified from the original source: Toneatto (2002).

[3]To win a jackpot on some machines, a player needs to bet the maximum to collect the win. However, the average return to the player is still set at a specific range, and random number generators do not assess whether a player has bet all possible lines. Gamblers notice a difference only if they experience the infrequent big win. In the end, gamblers pay more to play, which increases the speed at which their money is lost, likely leading to larger overall losses (British Columbia Responsible Gambling, 2015).

Table 2
Gambling-Related Cognitive Distortions: A Modified Typology

Cognitive distortion	Description
Magnified Gambling Skill	Overrated ability to win, exaggerated self-confidence despite persistent losing; efforts to acquire special knowledge and develop gambling systems.
Hot Machines	*A machine being continuously played will eventually win.*
Bet Max	*Always bet max to increase the chances of a win and the amount won.*
Higher Denomination Machines	*Target the higher denomination machines; the more you put in, the more you will be repaid.*
Superstitious Beliefs	
Talismanic Superstitions	Possession of certain objects increases the probability of winning (e.g., ring, hat) by conferring good luck; objects arrayed in ways believed to potentiate winning outcomes; lucky or preferred numbers.
Behavioural Superstitions	Certain actions or rituals can increase the probability of winning (e.g., seating preferences at bingo); verbal (e.g., verbal encouragement) and nonverbal (e.g., rubbing hands) behavior during play of a game (e.g., horse race) believed to modify the outcome.
Cognitive Superstitions	Mental states can influence probability of winning (e.g., prayer, hope); includes entrapment, the belief that one must continue to gamble or wager in the event that the winning outcome takes place. *Focus and positive mind states can help secure a win.*
Attribution Biases	
Attribution Errors	Dispositional factors (e.g., skills, abilities) overestimated to explain wins and situational factors (e.g., luck, probability) underestimated. *N/A*
Gambler's Fallacy	Losses interpreted as an indication that a win is imminent, often resulting in chasing.
Representative Bias	*Chance is perceived as a self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore the equilibrium. A machine that just won will not pay out again immediately.*
Anthropomorphism	Human characteristics attributed to gambling objects (e.g., slot machines), which may be credited with wins/blamed for losses.
Temporal Telescoping	Wins will occur in the short-term rather than the long-term despite the very low odds of winning at all; near wins taken as evidence that a win is temporally near. *N/A*
Selective Memory	Wins, but not losses, selectively recalled, especially large wins, partly due to the availability of wins, which tend to be rare and salient, and the motivation to sustain the hope of winning. *N/A*
Over-Interpretation of Cues	Overinterpreted ambiguous stimuli to guide decisions to gamble or to persist (e.g., bodily sensations, intuitions, omens, unusual events).
Control Over Luck	
Aligning with Luck	Luck cannot be manipulated directly; strategy is to wait for periods (streaks) of good luck to wager and to avoid betting during periods of bad luck.
Luck as a Variable	Actively try to manipulate luck through superstitious behaviors. *Actively try to manipulate luck through cognitions.*

Table 2 Continued.

Cognitive distortion	Description
Luck as a Trait	Lucky by nature with certain games and unlucky with others. *Luck as it relates to specific machine types.*
Luck as Contagion	Success in other areas of life generalizes to success at gambling; consequently, frequency of gambling or size of wagers may increase; may also believe other gamblers bring either good or bad luck.
Probability Biases	Incorrect beliefs about randomness may lead to incorrect inferences about the likelihood of winning. *N/A*
Illusory Correlation	Assign causality to salient features of the environment correlated with gambling outcomes contiguous with such wins even if such associations are noncontingent. *Certain areas of the casino should be focused on to maximize winning potential, while others should be avoided.*
Karma	*The natural law of moral cause and effect. This relates to action, thought, and overall state of mind.*

Note. N/A = not applicable.

Findings demanded the modification of existing descriptors as well. Under the existing subcategory Luck as a Trait, a descriptor was added to represent the emergent belief that luck is related not only to game types, but also to machine types for this sample of slot machine gamblers. Similarly, for the subcategory Cognitive Superstition, focus or positive mind state was added to the original description. For Luck as a Variable, manipulation of luck occurred not only through superstitious behaviours but also through cognitions, which were specified in the modified description. The existing category Illusory Correlation required a focused specification, with all participants who endorsed this belief referencing spatial-oriented cognitions. In particular, participants referenced areas of the casino where machines were prone to win and/or produce significant payouts.

Two subcategories and two categories were not applicable and were later omitted from the modified typology. The subcategories Attribution Errors and Temporal Telescoping under the category Attribution Biases did not emerge from the data. Specifically, participants did not amplify their skill and nullify thoughts on probability and luck in the same sentence or idea, leading to the removal of this subcategory. Concerning the latter subcategory, Temporal Telescoping, although near wins were frustrating, participants failed to convey that this meant a win was near. Selective Memory and Probability Biases did not warrant specific categorization. In the end, most of the beliefs in the typology, in one way or another, disregarded probability theory or involved the memory of select events, especially those with a favourable outcome.

The most frequently occurring distortion types (Table 3) were Cognitive Superstitions, Gambler's Fallacy, and Over-Interpretation of Cues, whereas Anthropomorphism, Aligning with Luck, and Luck as a Variable occurred far less frequently.

Table 3
Gambling-Related Cognitive Distortions: Frequencies

Cognitive distortion	Frequency
Magnified Gambling Skill	12
Hot Machines	17
Bet Max	14
Higher Denomination Machines	10
Superstitious Beliefs	
Talismanic Superstitions	19
Behavioural Superstitions	20
Cognitive Superstitions	28
Attribution Biases	
Gambler's Fallacy	29
Representative Bias	11
Anthropomorphism	9
Over-Interpretation of Cues	30
Control Over Luck	
Aligning with Luck	6
Luck as a Variable	2
Luck as a Trait	20
Luck as Contagion	18
Illusory Correlation	10
Karma	11

Although the typology outlined by Toneatto (2002) offers a number of categories and descriptions, it lacks illustrative examples to give voice to categorization. Illustrative examples are provided in Table 4 to convey the tone and structure of gambling-related cognitions, each quotation representing a unique voice from the sample of 43 gamblers.

Discussion

The cognitive distortions found here align with the distortion types outlined by Toneatto (2002). However, in the present study, Toneatto's (2002) typology required the addition of one category, four subcategories, and four descriptors, along with the omission of two categories and two subcategories. These findings lend some support to Czerny and colleagues' (2008) suggestion that important differences in cognitive biases may vary by game type.

Indeed, many of the distortions explored here are specific to slot machine gambling. That is, several new belief types added to the category Magnified Gambling Skill account for machine-specific beliefs. Additional modification of the existing typology is equally reflective of the focus on slot machine gambling. For instance, the new description for Luck as a Trait references a game-type-specific belief that certain machines are luckier than others. Of relevance to bricks and mortar casino gambling,

Table 4
Gambling-Related Cognitive Distortions: A Modified Typology, Illustrative Examples

Cognitive distortion	Illustrative quotations
Magnified Gambling Skill	Because those machines, I know they're geared to go off at a certain time.… because that's the system. Honestly, I know they, they got a timer on those machines… But I honestly think that's the way it is, and you [have to] know what it is geared to; don't put in five dollars, sometimes it's geared for only a dollar-fifty or two [dollars].
Hot Machines	Each machine is computerized and they have, it's some kind of binary numerical systematic code and…it turns over when it's being used a lot. It's not warmed up, it's like when it's not warmed up, it won't turn over a win.
Bet Max	You won't get a winning if you don't play the maximum.
Higher Denomination Machines	I would say play the higher denomination machines. So don't play the penny or nickel slots and play minimum a quarter. The higher the denomination the more the machine returns in the long run. So the dollar ones return higher than the twenty five cent ones.
Superstitious Beliefs	
Talismanic Superstitions	I actually look at the numbers on the machines themselves. Yeah, the machines are numbered, so if I like the number then I'll proceed. [I pick] numbers that I feel are lucky, numbers that I like, that I prefer, birthdates, etcetera. Family members, my birthday, people that I like birthdays, and certain numbers that I just like. It's weird, I just like certain numbers. And there's no logic or reason to some of the numbers I like.
Behavioural Superstitions	When I walk in there [the casino] sometimes, say I've won for the night, right, so when I come in, like, you can either walk in left, you can then walk right, or you can go centre. So, if I won, I'm thinking, which way did I walk in? That way, next time, I'll try to follow my same footsteps. If I went to the right…[and I had] a winning night, I think the next time I come maybe I should do the same route. Because when you get in there [the casino], it's bringing back memories, ideas. I won $250 here and I only bought $50. How did I do that? Well, I went this way so let's try that again.
Cognitive Superstitions	I probably can say the times I've gone in there [the casino] with my head held high, feeling really, really good about everything, those are the days I won.
Attribution Biases	
Gambler's Fallacy	I think it's the psyche because you want to try—because you want that feeling. Obviously because you want to come back to try and make that loss back up. It's like you feel angry because the person died [your money] and you want them to come back to life [your money]. [I'm due for a win] because you know you get a series of losses. Like you go like every month or every week and it's like ten in a row. It's got to be due.
Representative Bias	It [the machine] tells you how much the last person won. So, if let's say if it's more than thirty dollars, for example, I would stay away from those machines. Since it's already won, it has a greater chance of not winning again for a while.
Anthropomorphism	You feel in control because you are—it's hard to explain, because sometimes you think that you can—you could fool the machine. Like if you just sit there and you try to mess the machine up. You try it, okay.

Table 4 Continued.

Cognitive distortion	Illustrative quotations
	Instead of pressing one [button], you will press this [another button], dab, dab, dab. You will figure that if you—you will try to mess up its mind.
Over-Interpretation of Cues	I often avoid the slot machines where I noticed someone is very upset and frustrated with it. I leave that one [machine] alone. I feel like it's one of those bad omens like in the sense like his frustration and just his [fellow gambler] negative energy from that is just lingering over it now.
Control Over Luck	
Aligning with Luck	Usually when I know it's going to be my day, it's when I start winning the first or second time. If I don't win the first time, the second time I start winning, then I stay longer then I have a feeling it's going to be my lucky day, and I'm going to win some money today… But usually, [if] it's three times that I lost, then I leave.
Luck as a Variable	You see the first bonus coming up [on the machine] and then what I do, because I don't want everyone to look, is when it starts to go before it stops, I always hide it [with my hand]. I don't want people to see. It's just they're going to give you…bad luck.
Luck as a Trait	Something will come to me and say "okay I think you should go there." It's like a magnet trying to get you there or I've had friends tell me that they've had good luck on certain machines like the prince [machine]. My sister has had good luck with the mermaids. So, she tends to like that…. And I have a favorite now, the Grizzly Bear [machine]. The Grizzly Bear machine has been lucky. And one of my sister's girlfriends she got onto it and she won a hundred twenty dollars.
Luck as Contagion	Yes. Like—there was something that happened the other day and I was like, man, I should have gone to the casino, but I think my name came up for something at work. Some like random draw. I didn't win much. All I won was like a coffee mug, but still. I was like, I should go to the casino…I feel like it will be kind of like a lucky streak kind of thing.
Spatial Correlations	Okay so what I've learned over the years and years of research is the highest paying machines, or the machines that pay a lot, are the ones by the doors and the ones that are away from the tables. I guess they gear the higher paying machines or the machines that payout a lot, to places where it's visible, more visible. So you try and go to places like near the bathroom [where there is the] highest visibility [or like] areas where you first enter into the casino. [That's where] the better machines are [where there is] high visibility. Yeah the ones that are more visible, so if you're coming out of the bathroom there's more people congregated around the bathroom. You have a higher visibility, [so] that they're going to see it. And then they're going to want to go back and be like, "That guy just won ten thousand, I'm going to go back and play it" type of thing.
Karma	It's a day when I'm not thinking about anything except just enjoying myself. I don't think about winning, I think about just enjoying myself so when I start thinking about winning some money that's when I never win. It's karma…saying, "You're thinking you're going to win, you're not going to win."

Illusory Correlation accounts for beliefs centred on the physical or spatial location of slot machines within a casino. Because slot machine gambling is exclusively chance based, the addition of the descriptor "focus" to cognitive superstition is noteworthy, although the idea of "positive mind states" lends itself to a game type devoid of control. Karma, another category with a cognition focus, emerged from the data, this time making reference to moral cause and effect. Analogous to King's (1990) bingo players who believed wins would be awarded to those not expecting it, gamblers from this study indicated that tempered avidity increased the chances of a win. By the same token, the descriptor "cognition" was added to the subcategory Luck as a Variable to capture thought-oriented beliefs.

Representative Bias emerged from the data, although it was absent from Toneatto's (2002) typology. The gambler's fallacy is caused by the representativeness heuristic according to Tversky and Kahneman (1971) and Kahneman and Tversky (1972), which may underlie the absence of the category Representative Bias, with the category Gambler's Fallacy perhaps accounting for both. In the present study, they were treated as two categories. Although both categorizations reference the "self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore the equilibrium" (Tversky & Kahneman, 1974, p. 1125), Gambler's Fallacy had undertones of fairness (i.e., I am due for a win after repeated loss), whereas Representative Bias was focused on equilibrium restoration (i.e., a machine producing a jackpot requires time before it does so again).

The categories Selective Memory and Probability Biases as these categorizations were nested in many of the other belief types. Temporal telescoping, a subcategory specified in the Toneatto (2002) categorization, failed to emerge from the data. It is conceivable, however, that the problem gamblers in the present study merely failed to convey verbally what was implied through action because near misses are described as powerful motivators for gambling behaviour (Dixon et al., 2011; Dixon, MacLaren, Jarick, Fugelsang, & Harrigan, 2013). Indeed, participants from this study articulated various cognitive distortion types, adding to existingresearch that highlights their presence in samples of problem and/or heavy gamblers. This study lends support to game-type specification. Additionally, the articulation of such beliefs may help researchers and clinicians gain a better sense of them, including their cognitive structure. Clinicians applying problem gambling-specific CT, which seeks to clarify the concept of randomness and increase awareness about erroneous beliefs and restructure them, would benefit from a list of distortion types and descriptive examples. Smith and colleagues (2015) administered CT over the course of 12 weekly sessions to a sample of treatment-seeking electronic gaming machine gamblers, where cognition was a therapeutic focus. Sessions involved patients monitoring their thoughts through diary entries while a therapist also worked with them to develop skills to challenge and cast doubt on erroneous cognitions that led to excessive gambling (Smith et al., 2015). A list of game-type-specific cognitions could aid in belief identification and awareness creation as treatment-seeking patients, with a particular game-type preference, move through the course of CT treatment.

The greater prevalence of certain cognitions, especially those linked to what Ejova, Delfabbro, and Navarro (2015) call "secondary" illusion of control, or a complex set of beliefs about supernatural forces such as God and luck, is a finding warranting further exploration. Cognitive distortions are connected to notions of individual control; however, many of the identified beliefs referenced secondary illusion. The notion of agency is an important factor worthy of enhanced focus in future studies on cognitive distortions. The findings here suggest the need for insight into whether specific distortion types have a greater impact on problem gambling severity.

This study is not impervious to limitations. The research draws on a small convenience sample from a specific geographic area, with findings not generalizable to the larger population. The sample is a mix of both moderate-risk and problem gamblers, and despite the larger sample of the latter, certain gambling cognitions might be correlated with gambling severity. Other subtypes, beyond game type, might be important considerations, although they are not reflected on here. Finally, verbatim quotations only represent one unique voice from the study, which limits the reporting of variations in the structure and tone of belief types within specific categories highlighted in Table 2.

Conclusion

This is the first study of its kind to use qualitative data to assess the applicability of a comprehensive list of distortion types found in other studies of gamblers. This research adds to the growing body of literature that concerns subtype specification. Additionally, it suggests the need for game-type specification when considering gambling-related cognitions. Certain belief types are most likely a reflection of game types and their associated environment. Although much has been written about the importance of subtype considerations for understanding problem gambling, more research is needed on cognitive variations among game types and the impact of particular distortions on problem gambling severity.

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