Do pokers players know how good they are? Accuracy of poker skill estimation in online and offline players

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ABSTRACT

This study was a collaborative investigation between the disciplines of computing and social sciences to determine whether poker players accurately assess their relative skill level. Of particular interest was whether online poker players exhibit higher degrees of distorted thinking about skill when compared to offline gamblers, in the absence of superior proficiency. Two hundred and seventy-eight gamblers played a simulated game of Texas Hold'em poker against a computer controlled opponent. The computer program has been used in artificial intelligence simulated games against actual poker players and can mathematically estimate skill. Information was collected about player demographics, poker experience, cognitive distortions, and subjective perception of poker skills. The results of study revealed that online gamblers had a greater perception of perceived skill when compared to offline gamblers, despite showing no superiority in poker ability. General gambling-related cognitions and subjective rating of poker skill contributed to categorization as an online gambler. Gambling more frequently in offline formats and playing for longer periods significantly influenced the perception of poker skill for online gamblers. From a treatment perspective, it is more difficult to address games like poker because the chance component is equivocal and interpretive biases may be especially difficult to combat.

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1. Introduction

In the 21st century the game of poker has experienced unprecedented growth and popularity, largely because of the advent of online poker and televised poker championships. In a large international study, the total number of regular poker players (at least once per month) in 2010 was estimated to be 44.5 million, a 13.5% increase from 2006 estimates (Poker Players Research Ltd., 2010). Research has shown that poker players have a higher gambling frequency and spend more time gambling when compared to non-poker players (Shead, Hodgins, & Scharf, 2008). In the most recent British prevalence study, problem gambling prevalence rates were highest among poker players. Respondents who had played poker were more likely to engage in a range of gambling opportunities, with 48% of past year poker players engaging in seven or more activities (Wardle, Moody, Griffiths, Orford, & Volberg, 2011). The advent of online poker in the late 1990s prompted a major increase

in player interest and has since grown exponentially in player participation levels, with online poker being the fastest growing form of Internet gambling (Griffiths, Parke, Wood, & Parke, 2006). Researchers collecting data from online poker players over a 6 month period found that 6 million gamblers spent $3.61 billion (US) playing online poker, with the United States accounting for the largest majority of revenue and players (1,429,943 players with $973.3 million in net revenues; Fiedler & Wilcke, 2012).

The major distinction between poker and most other forms of gambling is that poker involves a combination of skill and chance factors to determine outcome. In as such, the propensity for illusory control increases. Gamblers with a preference for skill games have a greater illusion of control over outcomes when compared to those that prefer games of chance (Myrseth, Brunborg, & Eidem, 2010). When skill is believed to be involved in a particular gambling activity, it is more likely that a player will develop an illusion of control over the outcome (Letarte, Ladouceur, & Mayrand, 1986; Toneatto, 1999). Wohl, Young, and Hart (2005) found that gamblers endorsing problematic behaviors (more than 1 DSM criteria) were more likely to view themselves as being inherently lucky when their game of choice contained a skill component. Regular gamblers have been shown to believe that they possess above

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average skills in slot machine play when compared to non-regular players (Griffiths, 1990a) and problem gamblers have an exaggerated perception of their own skill level (Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997).

The idea that many players perceive themselves to be skilled is evidenced by the fact that recreational poker players assert that they can consistently generate a profit. In a 2006 prevalence study, researchers found that one in 10 respondents agreed with the statement: "Playing poker is a good way to earn extra money" (Responsible Gambling Council, 2006). Poker players were more likely to agree with the statement when compared to non-poker players (20% vs. 5%) and 42% of online players endorsed poker play as a profitable enterprise. Online poker players tend to report more financial gains when compared to online casino players (e.g., online slots), with less than one-third of Internet poker players reporting a monthly loss (eCommerce and Online Gaming Regulation and Assurance [eCOGRA], 2007). In a sample of online poker players, Hopley and Nicki (2010) found that 19% reported supporting themselves solely via online poker and an additional 15% reported supplementing their income this way. Playing to win money was listed as the primary reason for online poker gambling (48%) and playing to enhance skills was the second most endorsed reason (12%). Similarly, Wood, Griffiths, and Parke (2007) found that 50% of online poker players said they always or frequently win money. When asked about the contribution of skill vs. chance in online poker, 38% regarded it as predominantly game of skill.

Based on these findings, it is evident that poker is an increasingly prevalent activity that lends itself to common distortions of illusory control. While it is accurate that some players generate a profit, the proportion of recreational players who claim to have a positive financial outcome seems improbable. It is inherently confounding that self-perceptions of skill are often directly derived from a player's (perhaps inaccurate) recall of monetary output or (perhaps inaccurate) belief in advanced ability. It would be difficult to ascertain from player self-report data whether they possess a legitimate degree of skill in poker play. The current study employed a collaborative investigation between researchers in the social sciences area with researchers from computing science department to determine whether poker players accurately assess their relative skill level. Poker skill was assessed via a simulated game of online poker developed by the Computer Poker Research Group (CPRG; http://poker.cs.ualberta.ca/). The CPRG has developed a computer "poker bot" that became the first computer poker program to win against human competitors and the program has the capacity to mathematically estimate the skill level of players.

Of particular interest was whether online poker players exhibit a higher degree of cognitive distortions around poker play when compared to offline gamblers. Models explaining problematic Internet use have suggested that maladaptive cognitions play a critical role in moderating use (Davis, 2001). There are a number of elements in the online gambling environment that could serve to exacerbate the perception of control including lack of personal feedback, lower salience of losses in a virtual environment, player belief in skill acquired through success in demonstration games with misleading payouts (Sévigny, Cloutier, Pelletier, & Ladouceur, 2005), media portrayal of monetary successes, familiarity with an online medium, player characteristics (e.g., being male and younger) and increased control over the pace and timing of play. Research has shown that irrational thinking is more pronounced for gamblers with a preference for online gambling (Lund, 2011) and it has been demonstrated that gamblers take more risks and place higher bets when gambling online vs. in a casino environment (Cole, Barrett, & Griffiths, 2011). Internet gamblers have been shown to have higher levels of cognitive distortions when compared to gamblers who had never placed a bet online, even after controlling for differences in gambling frequency, expenditure

and problem gambling severity (MacKay & Hodgins, 2012). Based on previous research, it was hypothesized that online gamblers would *not* possess superior skill in poker play when compared to offline gamblers but would deem themselves to be more skilled. It was also hypothesized that online gamblers would have more gambling-related cognitive distortions when compared to offline gamblers. It was expected that cognitions around perceptions of control (general and poker specific) would differentially predict whether a participant had gambled online.

2. Method

2.1. Participants and Procedure

Two hundred and seventy-eight participants (111 online gamblers[1], 140 males) were recruited from a large Canadian university. Post-secondary students were used as sample participants because of the higher rates of online gambling observed in this population (Griffiths & Barnes, 2008; Petry & Weinstock, 2007) compared to rates in the general population (Wood & Williams, 2009). The mean age of participants was 20 years (range = 18–52; SD = 3.1) with an average of 2.3 years of post-secondary education. Respondents had to speak English, be at least 18 years of age, have played poker in the past month and know how to play Texas Hold'em to be eligible to participate. Online poker players were over sampled to increase cell sample sizes for the logistic regression analysis. The sample size exceeded the recommended rule of thumb for logistic regression of at least 10 cases per independent variable (Harrell, Lee, Califf, Pryor, & Rosati, 1984) and the recommended sample size for multiple regression based on Halinski and Feldt (1970). The Conjoint Faculties Research Ethics Board granted approval for this project. The study consisted of three segments: a questionnaire, computer poker play and post-play questions. After participants signed up for the study they were directed to a page where they registered for a code. This code was entered prior to completing each section and the segments were linked by the individual code to ensure confidentiality in data collection.

Participants completed an online questionnaire to gather information about demographics, poker experience (type of play, frequency, duration), cognitive distortions (GBQ; GCI), and general self-perception of poker skill (i.e., rate your poker skill on a scale from Poor = 1 to Excellent = 7). Two simple poker questions were included as a screening measure (not included in the analysis) to ensure players had a fundamental, basic understanding of the game. When participants finished the questionnaire they were directed to the poker play segment where they played 75 hands of heads-up limit Texas Hold'em poker against a computer-controlled opponent through a web-based interface. Seventy-five hands were chosen because they provided a reasonable trade-off between the accuracy of the low-variance skill estimator and the time needed to complete the poker game. The computer opponent for this investigation was a relatively strong opponent so the overlap in variability would be lower and lead to a more accurate estimate of skill. The computer program implemented the rules of limit Texas hold'em, securely dealt cards, communicated the state of the game with players, and logged the players' actions and results of each hand. The web interface provided visual communication to the participant on the state of the hand and provided buttons for the player's options of "fold", "call", or "raise". The program was designed to present an interface similar to that used in online poker establishments and training software. When participants completed the poker segment, they were directed to the post-play

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[1] It should be noted that online and offline are not mutually exclusive categories because online players also engage in offline play.