

IDEAS IN BEHAVIORAL ECONOMICS RELATED TO GAMBLING RESEARCH

Douglas M. Walker and Elizabeth Mandell*

Paper presented at the 12th European Conference on Gambling Studies and Policy Issues
Valletta, Malta
11-14 September 2018

DRAFT – 3 September 2018

Abstract: Behavioral economics has received increased attention and credibility within the economics profession with Richard Thaler’s winning of the 2017 Nobel Prize. Although researchers’ understanding of disordered gambling and responsible gambling have thus far been based mostly on a psychological perspective, behavioral economics offers a variety of concepts that may help to better understand gambling behaviors and responsible gambling tools. This paper examines how key concepts, such as mental accounting, the house money effect, nudges, the endowment effect, and prospect theory, can be applied to the study of gambling behavior. With an explicit discussion of similar concepts in behavioral economics and gambling research, perhaps the overlap between the two approaches can be the catalyst for new and useful strategies for better understanding gambling behavior. *(123 words)*

JEL Category: D91 – Role and effects of psychological, emotional, social, and cognitive factors on decision making

Keywords: Behavioral economics, Mental accounting, Nudges, Prospect Theory, Endowment effect, Gambling research

* Walker is a professor of economics, and Mandell is a 2017 economics graduate, at the College of Charleston, in South Carolina. This project is an extension of Mandell’s senior thesis project. Walker is the contact author: WalkerD@cofc.edu; +1 (843) 953-8192.

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1 Introduction

Gambling research has been evolving from identifying and understanding gambling problems and prevalence toward treatment and prevention strategies, and understanding the psychology of different games of chance. In the past few years, responsible gambling has become a key focus at many academic conferences on gambling.¹ Separately, the field of behavioral economics has become more influential within the economics profession, culminating with Richard Thaler's winning the Nobel Prize in 2017. Since most of the developing field of behavioral economics traces its roots to the work of psychologists Kahneman and Tversky², we might expect that behavioral economics would have contributed to our understanding of gambling, problematic gambling behaviors, responsible gambling, and perhaps even treatment. Yet, this is not the case. To the extent that economists have contributed to the gambling literature, the focus has been on economic impacts, such as economic growth, tax revenues, and regulation, as well as crime and other "social costs of gambling" (Walker, 2013).

¹ For example, the British Columbia Lottery Corporation (BCLC) sponsors an annual conference, "New Horizons in Responsible Gambling," each February.

² The earliest of their contributions is considered to have launched the field of behavioral economics is Tversky and Kahneman (1974).

In this paper we explain how some of the key concepts of behavioral economics (BE) could contribute to a better understanding of gambling disorder (GD) and responsible gambling (RG). In order to illustrate, we discuss several recent contributions to the gambling literature. The goal is to illustrate some ways BE and gambling research overlap, and how crossing disciplinary lines might help advance the understanding of gambling behaviors.

2 Background

In order to explain how gambling research might benefit from using concepts and methods from BE, it is useful to first provide some basic details about the mainstream economics treatment of addiction, and how gambling researchers view problem gambling and responsible gambling. This background will be useful in understanding how BE improves upon the standard economics treatment of addiction in the application of gambling.

A. Consumer theory and the economic theory of addiction

Mainstream economics expands far beyond the study of “the economy.” Indeed, modern economics can be used to study a variety of topics usually thought to fall under different fields, such as sociology, political science, and psychology. A wide variety of individual behavior can be studied using an economics lens, including gambling.

One of the key assumptions of economic analysis is that individuals are “rational.” This assumption is not as unrealistic as it might first seem. It simply means that individuals’ behavior is goal-oriented, specifically aimed at making themselves better off, however they might define it. Some individuals may seek higher incomes, while others focus on a healthy lifestyle or maximizing their leisure time, or some combination of outcomes. In any case, economists assume that people compare expected costs and benefits, and act in a particular way only if they expect that the benefits will outweigh the costs.

The economic perspective on gambling has been explained in a variety of works, including Australian Productivity Commission (1999), Crane (2006), Eadington (1999), and Walker (2013), among many others. Economic analyses of gambling tend to focus on variables such as economic growth, crime statistics, tax revenues and regressivity, the social costs of gambling, and the consumer benefits of gambling. Long before the recent research on “positive play,” economists acknowledged the utility value (or consumer benefit) from gambling must offset the negative expected value of casino games (Ignatin & Smith, 1976, p. 75). That is, people gamble simply because they enjoy it as entertaining, and are willing to spend some money doing it.

Another intriguing concept from mainstream economics may seem to be in direct contrast to one of the diagnostic criteria for GD. In their understanding of consumers’ behavior being rational, economists believe that consumers are subject to the “law of decreasing marginal utility.” As an example, this means that each additional slice of pizza

eaten at a lunch buffet will provide the consumer less and less additional benefit (or satisfaction, or utility). The same would be true of gambling, which imply that repeated \$5 bets at a blackjack table, for example, would provide diminishing enjoyment with each subsequent bet. This fundamental idea in how economists understand consumers is conceptually identical to the first diagnostic criterion for GD: “Need to gamble with increasing amount of money to achieve the desired excitement” (American Psychiatric Association, 2013).

In the 1980s, Nobel Prize-winning economist Gary Becker developed the “theory of rational addiction” (Becker & Murphy, 1988). This work has been applied to gambling (Mobilia, 1993). A detailed exposition of the theory is beyond the scope of this paper, but it basically suggests that consumers are behaving rationally, even in the consumption of addictive goods, if the consumers respond to price changes. For example, empirical evidence shows that smokers consume fewer cigarettes when cigarette taxes are increased (Becker, Grossman, & Murphy, 1991). If smokers respond to price changes, then it raises doubt that they are helpless to control or reduce their smoking. More generally, the theory of rational addiction suggests that a person may be rational in deciding to consume an addictive good, even if the consumption eventually results in great harm. This is because the consumer enjoys the immediate consumption of the good, and the probability of becoming addicted is

uncertain and occurs in the longer-term (Orphanides & Zervos, 1995, p. 741). Alternatively, economists might explain addictions as very strong preferences.³

Most economists would likely be sympathetic to the theory of rational addiction because most subscribe to the assumption that consumers are rational. Some psychologists have expounded a similar view, e.g., Schaler (2000), a disciple of Thomas Szasz.

Yet, while the idea that rational behavior includes risky decisions is undoubtedly true, given that one study found milk to be rationally addictive (Auld & Grootendorst, 2004), some skepticism over the practical validity of the theory – and its application to gambling – may be warranted.⁴

The field of behavioral economics has raised a variety of objections to mainstream economics, and seems to offer a more reasonable and realistic framework for understanding and studying gambling and gambling problems. BE, as expounded by Thaler (2015), calls the purely rational beings “econs,” in contrast to “humans,” who sometimes make mistakes and systematic errors in decision making. This view of behavior is much more consistent with a psychological perspective, in which people commonly have cognitive distortions and other

³ For an entertaining dialog that explains Becker’s theory of rational addiction, see the video skit of “the rational addict,” at <https://www.youtube.com/watch?v=wC1O50az108>.

⁴ Among the few economists who study the economics of gambling, Walker has been a proponent of Becker’s theory of rational addiction; see Walker (2013, pp. 187-188). Yet, the theory does little to address the negative social impacts attributable to problem gambling.

“non-rational” factors that affect their behavior. This is unsurprising, given behavioral economics traces its roots to the work of Kahneman and Tversky.

B. Gambling disorder

The majority of gambling research over the past three decades has focused on “gambling disorder” (GD). Although the terminology has changed over this period, the fundamental problem has remained the same.⁵ GD refers to gambling to such an extent that it causes problems in a person’s personal, professional, or financial life. For example, a person who spends too much time and money gambling may skip work too often and get fired. Or he might create serious friction in his marriage, or his gambling losses might lead to bankruptcy. The American Psychiatric Association (APA) provides a list of indicators of GD in its *Diagnostic and Statistical Manual* (American Psychiatric Association, 2013).⁶

⁵ The appropriate term depends on the degree of the problem, which is beyond the scope of this paper. For the discussion here, GD can be thought of as a gambling habit or addiction, or as compulsive, problem, or pathological gambling.

⁶ Other diagnostic instruments are available. However, the DSM is perhaps the best known. At least four of the following criteria during the past year indicates a gambling disorder: (1) Need to gamble with increasing amount of money to achieve the desired excitement; (2) Restless or irritable when trying to cut down or stop gambling; (3) Repeated unsuccessful efforts to control, cut back on or stop gambling; (4) Frequent thoughts about gambling (such as reliving past gambling experiences, planning the next gambling venture, thinking of ways to get money to gamble); (5) Often gambling when feeling distressed; (6) After losing money gambling, often returning to get even (referred to as “chasing” one’s losses); (7) Lying to conceal gambling activity; (8) Jeopardizing or losing a significant relationship, job, or educational/career opportunity because of gambling; (9) Relying on others to help with money problems caused by gambling. (American Psychiatric Association, 2013)

In recent years, this research has become somewhat hyper-focused, with studies on various jurisdictions and populations, yet the same basic issues remain: what are the causes of and effective treatments of GD?⁷ Prevalence rate estimates vary from around 1% to 5% of adults (Calado & Griffiths, 2016, Table 1), and it is not clear whether such rates change significantly as the availability of gambling increases (St-Pierre, Walker, Derevensky, & Gupta, 2014).

C. Responsible gambling

Recently, research effort has begun to shift more toward “responsible gambling” (RG) and so-called “positive play.” Positive play refers to gambling that shows no signs of GD; this makes up gambling by the large majority of gamblers (Wood & Griffiths, 2014). RG research has focused on strategies gamblers can use to avoid developing a gambling problem. In this sense, RG can be seen as analogous to “responsible drinking” – or drinking in moderation – so that it does not cause problems in person’s life (Currie et al., 2006).⁸ The two most common suggestions for RG is to set a monetary and time limit gambling, so as to keep financial losses in check. In addition, RG tools such as pop-up messages and voluntary

⁷ Much of gambling research is published in the field’s top two journals, *Journal of Gambling Studies*, *International Gambling Studies*. A variety of other psychology and medical journals also publish research on gambling.

⁸ Similar to a “functional alcoholic,” a person may spend a lot of time gambling, losing lots of money, and yet not show any significant negative impacts on their life.

betting limits have been incorporated into some electronic gaming machines (EGMs) and have been analyzed by researchers.

Research on the effectiveness of RG strategies is still in its infancy (Forsström, 2017; Ladouceur, Shaffer, Blaszczynski, & Shaffer, 2017). Nevertheless, efforts on the part of researchers, industry, and government to understand RG continue. Norway might be considered to be on the cutting edge of policy in this area.⁹ Among U.S. jurisdictions, Massachusetts is probably at the forefront of the utilization of RG tools; and with a sizable budget for research, it is also likely to lead U.S. jurisdictions in analyzing the effectiveness of RG measures.¹⁰

D. Summary

The economics perspective on addiction, or on gambling disorder in particular, is quite different from how most gambling researchers view it. In particular, economists tend to look at gambling as a form of entertainment for which people are willing to pay; the price is related to the negative expected value of games of chance (Siu, 2011). Thus, from this perspective the decision to gamble is a “rational” one. Even a bad outcome – such as the

⁹ See Norsk Tipping (<https://www.norsk-tipping.no>), or the presentation by Hoffman (2017) for more information.

¹⁰ See FocusGN (2018) for a brief discussion of the “Play My Way” RG tool. For more information see <https://www.umass.edu/seigma/>.

development of GD – can be seen as the result of a rational decision. Gambling researchers might consider the economic perspective on addiction questionable, if not outright silly, as it seems to suggest that “addictions” are just strong preferences, even if the result is self-destruction. Regardless of its merits within the economics profession, this perspective may not be particularly helpful for understanding GD or RG. In the next section, we introduce several ideas from behavior economics that might inform the economic perspective on gambling behaviors.

3 Concepts from Behavioral Economics

Gambling research deals with a variety of topics from BE, although not always explicitly. Here we elaborate on some of these concepts, and how BE can contribute to our understanding of gambling.

A. Prospect theory

Much of behavioral economics traces its roots back to Kahneman and Tversky’s “prospect theory” (Kahneman & Tversky, 1979; Thaler, 2015). One of the fundamental ideas from prospect theory is that “losses hurt about twice as much as gains make you feel good” (Thaler, 2015, p. 34). A gambler enjoys winning \$100 on a slot machine, and a \$50 loss would

hurt about as much as the \$100 win was good. This effect is called “loss aversion.” Thaler describes this concept as the single most important one in BE.

One implication of prospect theory is that many people will tend to enjoy gambling. Losses are completely within the player’s control, and can be small in magnitude, such as one credit on an EGM or a \$5 minimum bet on a table game. Most casino games are characterized by frequent losses of relatively small bets. Wins are often the same magnitude as the more frequent losses, such as a one-unit win on an EGM or a pass-line bet in craps or red/black in roulette. Occasionally, however, wins are much larger, such as a jackpot win on an EGM, a number bet in roulette, or a hardway bet in craps. Many casino games are characterized by consistently small losses (small harm), but with occasional large wins (large benefit). This recipe is then naturally attractive to casino patrons.¹¹

B. Decoupling

Casinos have long used chips at table games because they are easier to deal with than cash. Similarly, many modern EGMs show a player’s machine balance as “credits” denominated by the machine’s minimum bet, rather than showing a cash balance. (In some

¹¹ Other people may also find this recipe attractive. Consider how often merchants offer customers or potential customers a small chance at winning a shopping spree if they take the time to complete some survey about a product or the services they have already received from a merchant. Apparently, many people are willing to spend their scarce time for a very small chance to win something of value.

cases, a player's balance is displayed in both credits and currency.) Since the 1990s, the advancing technology of EGMs has enabled coinless payouts, or "cashout vouchers."

Aside from the convenience of using chips, and the reduced noise of EGM credits and cashout vouchers instead of coins, their use may also have important psychological implications for players. The relationship between chips/credits and cash is akin to that between credit/debit cards and cash. Studies have shown that spending tends to be greater when consumers use credit cards rather than cash, due in part to certain behavioral cues that using credit cards may create (Feinberg, 1986). One effect is that a credit card "decouples" the act of purchasing from the consumer's wealth – "get it now, pay later."

Gambling with casino chips and cashout tickets from EGMs may have a similar effect on gamblers' behavior, with the result being higher spending or losses. Aside from the initial purchase of chips or insertion of cash into a machine, the games are not physically played with cash or coins. Thus, individual wins and losses may not be experienced the same way – or feel as "real" – as they would be with individual plays triggered by inserting cash or coins for that individual bet, and receiving coins/cash for any bets won. The act of betting and the resulting wins and losses are decoupled from the player's wealth, which might be the catalyst for more gambling relative to using cash directly. Indeed, the gambler may "write off" a particular amount of money once it is inserted into the machine.

At table games, chips are substituted for cash, enabling gamblers to think they're just betting a few "greens" instead of \$75 on a hand of blackjack. A similar effect might exist as a result of EGMs showing a customer's balance in terms of "credits" instead of a monetary value. Credits may represent 1¢ up to \$100. Put \$100 in a \$5 slot machine and you get 20 credits. With each spin your credits balance diminishes slightly. But you may not bother to think about the fact that the last spin cost you \$5. Did you receive a benefit from that play in excess of the \$5 spent? Your perception might be different if you had to insert a \$5 bill each time you spin the reels. You may not perceive a \$5 bill and one "credit" to be the same.

It's unlikely that technology will devolve, so casino chips and cashout vouchers at EGMs will be in use for the foreseeable future. Still, it may be useful for researchers to keep in mind the potential cognitive effects of these aspects of casino games in formulating strategies for RG and treating GD.

Casino loyalty cards (e.g., Caesars' *Total Rewards* card program) can have a significant effect on gamblers' behavior. The programs enable the card issuers to track all sorts of player data, such as bet size and frequency. In addition, loyalty cards typically offer customers free rooms, lower rates, or upgrades, as well as other rewards. For example, 200 of Caesars reward credits can be turned into \$1 of free casino play.¹² Such programs effectively lower prices for customers, but perhaps not substantially.

¹² www.caesars.com/total-rewards/benefits-overview

Now consider if loyalty cards also functioned as a type of debit card to be used within the casino property. What would the implications be if customers loaded money onto the cards, instead of inserting cash into machines, for example?¹³ That is, instead of a balance of credits being stored on the machine, the money is being taken directly from the player's card – a reduction in their wealth. This simple change might – or might not – mitigate the decoupling effect normally associated with using credits on machines. It seems difficult to imagine that this would make a difference to anyone, as objectively there is no substantive difference. But one lesson from behavioral economics is that people's cognitions or perceptions can often be surprising or irrational.

If player cards tracked play but also stored the player's money balance, then each gamble might be tied directly to the patron's cash balances. This might make them more conservative in betting.¹⁴ The effect may be similar to that of having bets shown in terms of a cash amount, rather than just "credits" on the EGM display (Ladouceur & Sevigny, 2009). The impact of these types of changes would likely depend upon several issues associated with the gambler's "mental accounting," components of which are discussed below.

¹³ Many arcades, such as Dave & Buster's, use such cards. Customers see a cashier or machine and load their cards with cash. Then to play an arcade game you must swipe your card, rather than deposit cash or coins. However, the use of this card itself decouples game play from a person's cash balance.

¹⁴ On the other hand, it might also result in more betting since they had to pay cash to get a balance on their player card. It does not seem obvious which scenario – other than inserting cash directly into the EGM for each bet – represents the gamble least "decoupled" from one's money.

C. Mental accounting

When we think about government taxing and spending, or even a person's household budget, economists often argue that budgets are "fungible." That is, the individual sources or revenue do not really matter in deciding how to spend money. Educational earmarks for lottery revenues, for example, might be popular with voters because the earmark would seem to increase overall spending on education. But if politicians simply reduce education spending from the general fund as lottery revenues increase, then total education spending does not necessarily increase with the lottery subsidy. Government revenue and spending are fungible. Similarly, even though most working Americans pay into the social security system, there is no actual "account" where one's contributions are held until retirement. Tax revenues in the current year are spent immediately, leaving it up to future politicians to ensure that one's social security benefits are available. But individuals typically do their personal budgeting different than governments do.

Dave Ramsey is a popular US radio show host whose focus is personal finance. Ramsey suggests that people use an "envelope system" to budget their money.¹⁵ He advocates that people spend cash instead of use credit cards – even when credit cards offer cash back or other "rewards." He advises people to put their cash into different envelopes, labeled with things like "groceries," "rent", "utilities," and "entertainment." This process helps individuals

¹⁵ www.daveramsey.com

to identify and plan their different expenses. Although the amounts put to each envelope each month might change with experience, the key point is to earmark all one's money for specific uses. In effect, Ramsey advocates the opposite of fungible budgets. This is because people often like to spend now (or charge it) and figure out how to pay later. In assigning a particular budget for each individual purpose, Ramsey argues, people can better control their total spending.

Thaler (2015, p. 76) explains that people's wealth is often separated into different mental accounts, with "cash in the pocket" being the lowest in the hierarchy, and retirement savings at the top. People are much less careful with cash on hand than they are likely to be with their retirement savings. Of course, part of this has to do with how liquid the money is, and the difficulty involved in getting it "here and now." As Thaler notes, the phrase, "money burns a hole in your pocket" indicates the ease with which people seem to part with the cash they're currently holding. Some of this is likely intent. If I leave my home intending to visit a casino, I'm likely to take with me an amount of cash I think suitable to spend or lose gambling. If my intent is to spend at most \$100, I would not take \$500 to the casino.

Is there a difference then between taking out another \$20 from one's pocket to gamble, and going to an ATM to get another \$20? The two acts may seem to be identical, although going to the ATM might take a couple of minutes longer and result in a hefty fee. But the act of going to an ATM at a casino does have other implications about one's behavior. Walker, Nelson, LaPlante, and Shaffer (2018) find, unsurprisingly, that individuals who do

not go to ATMs during gambling sessions are more likely to adhere to self-set betting limits, compared to other gamblers. Policymakers seem well aware of the potential problems associated with access to ATMs within casinos, as many jurisdictions limit the placement of ATMs within casinos.

One example of how mental accounting might affect gambling is to consider the time period over which people keep their “gambling account.” Consider, for example, a casino patron who wishes to keep her weekly losses at a maximum of \$200. If she lost \$50 two days ago, then she may attempt to keep her loss at \$150 on the current visit, to adhere to her \$200 weekly loss limit. The gambler’s behavior may be significantly different, however, if instead focusing on a weekly budget, attempts to balance her lifetime gambling account. Then if she believes she is currently up by \$500, she may be willing to lose up to \$500 on the next gambling trip. The time frame over which one balances their mental accounts could have a significant impact on their gambling behavior.

There are several other potentially interesting applications of mental accounting concepts to gambling:

(1) Endowments

Thaler (2016, p. 18) discusses the “endowment” effect. A person’s endowment is the money and other property that they own. Thaler suggests that people value things that are part of their endowment more than other things. In the context of gambling, we might think

of a distinction between a person's checking account balance (part of his endowment) and the money available on a EGM cashout ticket or chips at a casino. Once the person inserts cash into the EGM or uses their cash to buy casino chips, in mental accounting terms, they may no longer consider the money to be a part of the person's endowment. If the person wins at a table game or EGM and accumulates a balance in chips, credits, or cashout tickets in excess of their initial buy-in, we call that "house money."

(2) House money effect

One example of mental accounting to which many casino gamblers subscribe is the separation of their initial budget from their winnings. Suppose a person walks into a casino with \$200, and gambles for a while, and wins \$100. Rather than keeping all \$300 in chips on the blackjack table, for example, the person might put the original \$200 budget in their pocket and play with the \$100 winnings (house money). Studies have shown that people will often take larger risks with house money (Thaler & Johnson, 1990), up to the point that they might even seem eager to lose that amount back to the casino.

This practice of partitioning cash or chip balances into different pockets (or "accounts") suggests people may consider different ownership of them. This is similar to the different treatment of retirement savings versus the money kept in a checking account or under the mattress at home. As Thaler explains, the two-pocket accounting at casinos

(described above) is “about as blatant a violation of the rule that money is fungible as one can find” (2016, p. 82).

Later we discuss how breaks in play might take advantage of this hierarchy or mental accounting that assigns a fictional type of ownership.

D. The “planner” and “doer”

Mainstream economics has many applications dealing with “time preference.” The fundamental idea is that people tend to put a higher preference on their status in the immediate future compared to the distant future. For example, many people would prefer to win a \$100 prize today over winning \$200 to be deposited in their retirement account, even if they understand the value of the retirement investment will grow over time. People often have a strong time preference even when the “future” is not all that far away.¹⁶

Thaler explains this idea in the context of the planner and the doer, as components of a “two self model” of behavior (Thaler 2015, p. 103). The planner is benevolent, working to maximize the longer-run utility of many short-term doers, who focus on instant gratification. For example, the planner in us might want to visit a casino just once a month, and limit losses to \$200. The tools available to the planner include commitment devices, such

¹⁶ Time preference has other implications too. Empirical evidence has even suggested that the time preference of children can be an important predictor of adolescents’ success (Shoda, Mischel, & Peake, 1990).

as leaving the ATM card at home, and taking a limited amount of cash to the casino. The doer, on the other hand, may ask a friend for a loan, or use the credit card for a costly cash advance from the casino ATM, in order to gamble more than planned on a particular outing.

The conflict between planner and doer could easily be exacerbated in a casino. Consider, for example, if one is with a group of friends at the casino and runs out of money, even though the group was planning to stay at the casino for another couple hours. In this situation the doer may take control and get more money from the ATM. Alternatively, consider a situation in which a craps table is “hot” and all of one’s chips are already on the table. The doer might decide to take more money out of one’s wallet to buy-in more chips to take advantage of the hot roll by increasing bets.

E. Nudges

Among the concepts in behavioral economics, the “nudge” is perhaps best known, due to Thaler and Sunstein’s best-selling book, *Nudge* (2009). Nudges are “some small feature in the environment that attracts our attention and influences behavior...in ways that make us better” (p. 326). Examples might be product placement in retail stores, with particular products in prime locations, or even pop-up messages on EGMs that warn players about potential problems associated with too much gambling. Of course, this latter example is much more noticeable, as the message is likely to be unavoidable.

At the same time, there may be examples in casinos of negative types of nudges. An example might be the irrelevant display that accompanies many roulette wheels, showing the results of the past 10 or so spins. Since each spin is an independent event (i.e., does not depend on the result of previous spins), this display provides useless information. Nevertheless, it may nudge players into betting more than they otherwise might, for example, if they erroneously become more confident that “black is due” since the last three spins have been red. Similarly, EGMs may be programmed to produce near misses, in which the player appears very close to have won a major jackpot, except that one reel was just one position off of the win (Clark, Lawrence, Astley-Jones, & Gray, 2009).

Another example could be “losses disguised as wins.” These are cases on EGMs with multiple simultaneous plays when, despite losing money, the machine provides feedback as if the player had won (Dixon, Collins, Harrigan, Graydon, & Fugelsang, 2015). For example, a casino patron may be playing 10 lines (simultaneous bets) on the machine, and one of the lines wins, while the other nine lose. The player’s “credits” balance will decrease, but the machine makes noises and lights up because one of ten bets won. Unsophisticated players might mistakenly believe that they now have more money than before the last spin. It should be noted that neither losses disguised as wins nor the history display next to the roulette wheel should have any impact if gamblers understand basic statistics and how games operate. Of course, much of the fun of gambling may be due to irrational beliefs about “luck” and the variation of results possible in the short run versus the long run of games of chance.

A final example of a nudge at casinos might be minimum table bets. These have increased over time, but probably at a pace quicker than inflation. The result may be to extract more revenue from customers.

4 Related Concepts in Gambling Research

Although there have been a variety of studies on the economic and social impacts of legalized gambling and casinos, most gambling research focuses on psychological issues, such as the diagnosis, prevalence, and treatment of GD, as well as the more recent focus on RG. In this section we discuss several recent papers from the literature, and how ideas from BE are relevant to the analysis, even if BE wasn't specifically mentioned.

A. Breaks in play

One of the most common strategies suggested for RG is that gamblers limit their time spent gambling. Excessive gambling can mean high financial losses and/or too much time spent gambling. Then taking a break from gambling, or a “break in play” (BIP), might be a useful strategy at mitigating gambling problems or promoting RG. This might occur as a result of the gambler “cooling off” from ongoing gambling activity.

Walker, Litvin, Sobel, and St-Pierre (2015) suggested that a BIP might be important in a gambler's mental accounting. Consider, for example, a gambler who started with \$200

and won \$100 at the casino. Thaler and Johnson (1990) suggest that the gambler will be more careless or more aggressive in betting the \$100 of “house money.” However, if the gambler left the casino, we would expect eventually the \$100 to become a part of the gamblers’ endowment in his mental accounting. But it is unclear how long this would take. A BIP might help this change along, at least for some gamblers. One implication of this is that a BIP imposed by regulation, say a requirement to complete IRS tax forms immediately following a jackpot win of \$1,200 or more, might be consistent with RG.¹⁷

Research has suggested that breaks in play may have the opposite of the intended effect. The purpose of taking a break from gambling would be generally to reduce harm, through a reduction in craving for the activity. Blaszczynski, Crowley, Anthony, and Hinsley (2016) tested 171 university gamblers who were assigned 3 different BIP conditions: no break, a 3-minute break, or an 8-minute break in play. They found that a longer BIP actually increased craving for gambling, compared to a shorter break. Mainstream economics might suggest that a BIP could provide a rebound to the declining marginal utility we would expect to see from each subsequent gamble. Thus, a BIP might “reset” the sliding marginal utility, resulting in increased craving for the activity the longer the break.¹⁸

¹⁷ In 2015 the IRS floated a proposal to lower the threshold for reporting winning on slots and some other games from \$1,200 to \$600. The casino industry strongly objected because the change would increase compliance costs and interrupt customers. The IRS never implemented the change. (Gruetze, 2017)

¹⁸ We are unaware of economics research on the duration during which the law of decreasing marginal utility holds, or when it might “reset”. This could be interesting with respect to breaks in play and craving.

The finding by Blaszczynski et al. raises questions about the suggestion by Walker et al. (2015) that a BIP may affect the gambler's mental accounting. In particular, they suggested that the BIP might change a gamblers chips from being "house money" to being part of their own "endowment." This might affect how they gamble subsequently. The concepts of house money effect, endowment effect, and breaks in play may all be relevant for better understanding gambling behaviors, and deserve further study by researchers.

B. Pop-up messages

Some machine games include pop-up messages that appear on the screen, interrupting gambling to present the desired, typically RG, message to the gambler. Pop-up messages may represent a nudge, and a short BIP. Do pop-ups affect behavior?

In one study, Wohl, Gainsbury, Stewart, and Sztainert (2013) examine the effect of an educational video and a pop-up reminder on gamblers' adherence to pre-set gambling limits. The findings indicated some positive impact. In another study, Kim, Wohl, Stewart, Sztainert, and Gainsbury (2014) examined the effect of a pop-up message at the beginning of the gambling session, asking players to set a time limit. They found that those with the pop-up spent less time gambling, on average, than those that did not.

In a study of online gamblers using the Austrian cite *win2day*, Auer, Malischnig, and Griffiths (2014) analyzed the effect on continued gambling of a pop-up message. They

analyzed data on the effect of a pop-up message that appeared after 1,000 consecutive slot game plays. The pop-up message reads: “You have now played 1,000 slot games. Do you want to continue? (YES/NO?)” (p. 4) The pop-up message did appear to have an impact, with those who viewed the pop-up being about nine times as likely to stop gambling at 1,000 games, compared to those who did not see the pop-up message.

A variety of other studies have examined the effectiveness of pop-up messages. The evidence suggests that these are promising RG tools for limiting or decreasing gambling.

C. Limit setting

Several studies have examined novel features of EGMs designed to encourage RG, including the ability to pre-set a player’s time spent on a machine and/or monetary losses. As noted above, in the study by Kim et al. (2014), gamblers tended to spend less time gambling when a pop-up asked them to set a time limit. In general, pre-commitments on time or money spent gambling are two of the most common suggestions for RG (Walker et al., 2015). A variety of studies have confirmed that limit-setting has at least some effect of reducing gamblers’ money or time spent gambling (Auer & Griffiths, 2013; Blaszczynski, Gainsbury, & Karlov, 2014; Broda et al., 2008; Hoffman, 2017; Nelson et al., 2008). One can think of pre-commitments as an action taken by the “planner” to control the “doer’s” behavior.

5 Discussion and conclusion

In the previous two sections we have discussed concepts from BE and related current topics dealing with RG. Our discussion of the literature in these areas is limited. However, we believe it may be valuable for researchers to examine some of the work in BE. These researchers may approach the analysis of behavior from a different perspective, but it may be valuable to apply some of their methods to the study of gambling, RG tools, and GD.

The gambling industry and gaming regulators are already developing mechanism which they hope will reduce harms related to gambling and GD. Researchers in psychology and related fields have been studying these issues and the body of evidence is growing. Our hope is that the discussion in this paper might spark some interest among researchers to borrow some of the ideas and methods of study from BE to apply in gambling studies. It seems clear that BE may offer some interesting and valuable perspectives which have yet to be taken advantage of by gambling researchers. At the least, the development of BE is starting to bridge gap between how economists and psychologists view gambling behaviors.

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