BEHAVIORAL ECONOMICS AND GAMBLING: A NEW PARADIGM FOR APPROACHING HARM-MINIMIZATION

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Gambling is a historically and culturally prevalent pastime that is broadly accepted in many cultures and societies in its various forms. Evidence suggests that most people who engage in gambling activities do so at low levels and

experience no negative consequences of their behavior.¹ However, it is increasingly recognized by communities, industry groups, gambling regulators, and politicians that there are serious harms associated with gambling for at least a subset of individuals, and all of these groups have a responsibility to undertake efforts to address these issues.² Yet, despite decades of efforts to develop and implement harm-minimization gambling interventions, few have been effective.³ Gambling-related problems at various levels are relatively widespread in the population, including those experiences related to another person's gambling. For example, Australian research indicates that up to six people are affected by every problem gambler, and gambling problems are a social issue on a similar order of magnitude to major depressive disorder and alcohol misuse and dependence.⁴ Even those who experience less serious impairments stand to benefit from initiatives to minimize gambling-related harms, as would the many people affected by another person's gambling.⁵ Consideration of a new approach to reframe our thinking and look more broadly across academic disciplines to address gambling harms would be beneficial for policymakers, researchers, stakeholders, and gamblers themselves.

The current article proposes that the field of behavioral economics offers a valuable perspective for the gambling and broader addiction fields. This article focuses on understanding the heuristics and biases that drive behavior with an aim of guiding the development of effective interventions to minimize gambling-related harms. We conclude that greater cooperation between stakeholders to conduct real-world trials of policies that preserve autonomy,

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¹S. Castrén, J. Kontto, H. Alho, and A.H. Salonen, (2018). *The Relationship between Gambling Expenditure, Socio-Demographics, Health-Related Correlates and Gambling Behaviour—A Cross-Sectional Population-Based Survey in Finland*, 113(1) ADDICTION 91–106 (2018), <https://doi.org/10.1111/add.13929>; P. Delfabbro and D. King, *Gambling in Australia: Experiences, Problems, Research and Policy*, 107(9) ADDICTION 1556–1561 (2012), <https://doi.org/10.1111/j.1360-0443.2012.03802.x>

²R. Ladouceur, A. Blaszczynski, H.J. Shaffer, and D. Fong, *Extending the Reno Model: Responsible Gambling Evaluation Guidelines for Gambling Operators, Public Policymakers, and Regulators*, 20(7) GAMING L. REV. & ECON. 580–586 (2016), <https://doi.org/10.1089/glr.2016.2074>.

³R. Ladouceur, P. Shaffer, A. Blaszczynski, and H.J. Shaffer, *Responsible Gambling: A Synthesis of the Empirical Evidence*, 25(3) ADDICTION RES. & THEORY 225–

235 (2017), <https://doi.org/10.1080/16066359.2016.1245294>; C. Livingstone, A. Rintoul, and L. Francis, *What Is the Evidence for Harm Minimisation Measures in Gambling Venues*, 2 EVIDENCE BASE 1–24 (2014).

⁴M. BROWNE, E. LANGHAM, V. RAWAT, N. GREER, E. LI, J. ROSE, J., M. ROCKLOFF, P. DONALDSON, H. THORNE, B. GOODWIN, G. BRYDEN, AND T. BEST, *ASSESSING GAMBLING-RELATED HARM IN VICTORIA: A PUBLIC HEALTH PERSPECTIVE* (Melbourne: Victorian Responsible Gambling Foundation 2016). B.C. Goodwin, M. Browne, M. Rockloff, and J. Rose, *A Typical Problem Gambler Affects Six Others*, 17(2) INT'L GAMBLING STUD. 276–289 (2017), <https://doi.org/10.1080/14459795.2017.1331252>.

⁵Goodwin et al., *supra* note 4; E. Langham, H. Thorne, M. Browne, P. Donaldson, J. Rose, and M. Rockloff, *Understanding Gambling Related Harm: A Proposed Definition, Conceptual Framework, and Taxonomy of Harms*, 16 BMC PUBLIC HEALTH 80 (2016), <https://doi.org/10.1186/s12889-016-2747-0>; E. Li, M. Browne, V. Rawat, E. Langham, and M. Rockloff, M. (2017). *Breaking Bad: Comparing Gambling Harms among Gamblers and Affected Others*, 33(1) J. GAMBLING STUD. 223–248 (2017), <https://doi.org/10.1007/s10899-016-9632-8>.

but are persuasive and make it easier for individuals to enact behaviors that would minimize gambling-related harms, would make a significant impact on the serious public health issue of problem gambling.

BRIEF INTRODUCTION TO GAMBLING

Gambling is an instance of risky decision making whereby money is staked on the uncertain prospect of a larger outcome. Given this strong element of risk, gambling has long been a topic of interest for economists. “Gambling” tasks have often been used to simulate risk-taking scenarios to study human behavior and decision making in psychology and economics.⁶ The harm associated with gambling behavior is thought to lie along a spectrum of risk, with such risks including increased investment of time and money spent gambling, a preoccupation with gambling and gambling losses, and continued gambling despite negative personal, financial, and familial outcomes.⁷

Problem gambling is an important public health issue. The costs to society have been estimated to be as much as AUD \$7 billion in the Australian state of Victoria alone, and the UK government is estimated to spend £1.2 billion per annum on gambling-related social costs,⁸ including substantial costs related to low and moderate levels of gambling problems. From a purely economic perspective, these figures suggest that investment in efforts to develop and evaluate effective prevention and treatment strategies would be highly beneficial for individuals, families, and society.

BEHAVIORAL ECONOMICS AND CONCEPTUAL MODELS OF GAMBLING

Traditional economic theory postulates that human decision making and behavior are based on purely rational choice, whereby humans act to maximize benefits and minimize costs.⁹ Neoclassical economics assumes that people have rational preferences among outcomes, strive to maximize utility, and act independently based on full and relevant information.¹⁰ Recent empirical research has increasingly demonstrated that behavior systematically deviates from what traditional models predict, with individuals frequently acting against their own long-term interest, reflecting the tension between immediate and delayed gratification.¹¹ Given the widespread recognition that “the house always wins,” gambling is a key example of this deviation.

Behavioral economics increases the explanatory power of economics by incorporating concepts from psychology that influence decision making.¹² For instance, behavioral economics suggests that individuals cope with uncertainty and complexity in their lives by using a small number of general purpose heuristics (shortcuts to decision making that bypass formal cost-benefit analysis) for simplifying judgments and making decisions. These tools work reliably and save time and effort but can also lead to predictable errors called “biases.”

Many biases are exhibited in gambling, even by low-risk social gamblers,¹³ and many of the heuristics discussed in behavioral economics parallel gambling cognitions. The “sunk cost” effect is a type of loss

⁶M.T. Buelow and J.A. Suhr, *Construct Validity of the Iowa Gambling Task*, 19(1) NEUROPSYCHOLOGY REV. 102–114 (2009), <http://dx.doi.org.ezproxy1.library.usyd.edu.au/10.1007/s11065-009-9083-4>.

⁷D.C. Hodgins, J.N. Stea, and J.E. Grant, *Gambling Disorders*, 378(9806) THE LANCET 1874–1884 (2011), [https://doi.org/10.1016/S0140-6736\(10\)62185-X](https://doi.org/10.1016/S0140-6736(10)62185-X); Langham et al., *supra* note 5.

⁸M. BROWNE, N. GREER, T. ARMSTRONG, C. DORAN, I. KINCHIN, E. LANGHAM, AND M. ROCKLOFF, *THE SOCIAL COST OF GAMBLING TO VICTORIA* (Melbourne: Victorian Responsible Gambling Foundation 2017); *Problem Gamblers Cost the UK Government Up to £1.2 billion per Year*, GAMBLEAWARE (Dec. 13, 2016), retrieved from <https://about.gambleaware.org/media/1366/2016-057-2016-12-13.pdf>.

⁹G.S. Becker, *Irrational Behavior and Economic Theory*, 70(1) J. POL. ECON. 1–13 (1962); H.A. Simon, *A Behavioral Model of Rational Choice*, 69(1) Q. J. ECON. 99–118 (1955), <https://doi.org/10.2307/1884852>.

¹⁰J.F. HENRY, *THE MAKING OF NEOCLASSICAL ECONOMICS* (Routledge 2012); E.R. Weintraub, *How Should We Write the History of Twentieth-Century Economics?*, 15(4) *Oxford Rev. Econ. Pol'y* 139–152 (1999), <https://doi.org/10.1093/oxrep/15.4.139>

¹¹F.C.M. Dassen, K. Houben, and A. Jansen, *Time Orientation and Eating Behavior: Unhealthy Eaters Consider Immediate Consequences, While Healthy Eaters Focus on Future Health*, 91 APPETITE 13–19 (2015), <https://doi.org/10.1016/j.appet.2015.03.020>

¹²A. Tversky and D. Kahneman, *Availability: A Heuristic for Judging Frequency and Probability*, 5(2) COGNITIVE PSYCHOL. 207–232 (1973), [https://doi.org/10.1016/0010-0285\(73\)90033-9](https://doi.org/10.1016/0010-0285(73)90033-9); A. Tversky and D. Kahneman, *Judgment under Uncertainty: Heuristics and Biases*, 185(4157) SCIENCE 1124–1131 (1974), <https://doi.org/10.1126/science.185.4157.1124>.

¹³A. Blaszczyński and L. Nower, *A Pathways Model of Problem and Pathological Gambling*, 97(5) ADDICTION 487–499 (2002), <https://doi.org/10.1046/j.1360-0443.2002.00015.x>; P.H. Delfabbro and A.H. Winefield, *Predictors of Irrational Thinking in Regular Slot Machine Gamblers*, 134(2) J. PSYCHOL. 117–128 (2000), <https://doi.org/10.1080/00223980009600854>; N.V. Miller and S.R. Currie, *A Canadian Population Level Analysis of the Roles of Irrational Gambling Cognitions and Risky Gambling Practices as Correlates of Gambling Intensity and Pathological Gambling*, 24(3) J. GAMBLING STUD. 257–274 (2008), <https://doi.org/10.1007/s10899-008-9089-5>.

aversion in economics that explains how people will persist with an activity in which they have already invested time, money, and effort, in order to recover their losses.¹⁴ This fixation on recovering losses is similar to the concept referred to in psychology as “loss chasing,” commonly seen amongst gamblers and exaggerated in problem gamblers.¹⁵ “Mental accounting” refers to people perceiving money differently depending on factors such as the origin, form, or intended use of the money.¹⁶ Gambling operators benefit from this heuristic by reducing the salience of money (or the “pain of paying”) through credits, casino chips, and online funds transfers.¹⁷ For example, online gamblers who experience gambling problems commonly report that using electronic funds to transact increases their gambling expenditure more than cash transactions.¹⁸ Once money is within an online gambling account, this may lead customers to “bracket” their funds for gambling specifically, rather than using their funds for other activities.¹⁹

Even the most common psychological biases reported in gambling stem from well-referenced heuristics. The “gambler’s fallacy” and “hot hand” effect rely on the “representativeness heuristic” which assumes short sequences of events should

represent the larger distribution of the outcome (s).²⁰ In the case of the gambler’s fallacy, after a sequence of the same outcome (e.g., three reds), a negative autocorrelation is predicted (e.g., black), whereas for the hot hand effect, after a sequence of wins or losses, a positive autocorrelation is predicted.²¹ Whilst the direction of the autocorrelation predicted are different in these two phenomena, in both cases, the flawed assumption stems from viewing a series of independent (chance) events as dependently related, so that the outcome of one event affects the outcome of the next.²² Other examples of this effect in gambling are loss chasing, where players on a long losing streak believe that a win is owed or due, and in lottery players, where players avoid choosing runs (1, 2, 3, 4) or patterns.²³

The “illusion of control” heuristic is also prevalent in gambling, whereby players show an enhanced belief in their own skill (even in a chance-based game), related to the “overconfidence” effect and “optimism” bias in behavioral economics.²⁴ These (and other) gambling biases have been linked to increased gambling expenditure and time spent gambling, despite the occurrence of losses.²⁵ Yet, gambling venues and games exploit these heuristics. For instance, stopper buttons on slot machines encourage illusory

¹⁴H.R. Arkes and C. Blumer, *The Psychology of Sunk Cost*, 35(1) ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 124–140 (1985), [https://doi.org/10.1016/0749-5978\(85\)90049-4](https://doi.org/10.1016/0749-5978(85)90049-4); H. Garland and S. Newport, *Effects of Absolute and Relative Sunk Costs on the Decision to Persist with a Course of Action*, 48(1) ORGANIZATIONAL BEHAV. & HUM. DECISION PROCESSES 55–69 (1991), [https://doi.org/10.1016/0749-5978\(91\)90005-E](https://doi.org/10.1016/0749-5978(91)90005-E); R. Thaler, *Toward a Positive Theory of Consumer Choice*, J. ECON. BEHAV. & ORG. 39–60 (1980), [https://doi.org/10.1016/0167-2681\(80\)90051-7](https://doi.org/10.1016/0167-2681(80)90051-7).

¹⁵Blaszczynski and Nower, *supra* note 13; S. Gainsbury, N. Suhonen, and J. Saastamoinen, *Chasing Losses in Online Poker and Casino Games: Characteristics and Game Play of Internet Gamblers at Risk of Disordered Gambling*, 217(3) PSYCHIATRY RES. 220–225 (2014), <https://doi.org/10.1016/j.psychres.2014.03.033>; T. Toneatto, *Cognitive Psychopathology of Problem Gambling*, 34(11) SUBSTANCE USE & MISUSE 1593–1604 (1999), <https://doi.org/10.3109/10826089909039417>.

¹⁶D. Prelec and G. Loewenstein, *The Red and the Black: Mental Accounting of Savings and Debt*, 17(1) MARKETING SCI. 4–28 (1998), <https://doi.org/10.1287/mksc.17.1.4>.

¹⁷A. Shah, J. Bettman, and J. Payne, *Greedy Loss Prevention in Economic Decision-Making*, 42 ADVANCES IN CONSUMER RES. 184–188 (2014).

¹⁸S. Gainsbury, A. Russell, R. Wood, N. Hing, and A. Blaszczynski, *How Risky Is Internet Gambling? A Comparison of Subgroups of Internet Gamblers Based on Problem Gambling Status*, 17(6) NEW MEDIA & SOC’Y 861–879 (2015), <https://doi.org/10.1177/1461444813518185>; N. Hing, L. Cherney, S.M. Gainsbury, D.I. Lubman, R.T. Wood, and A. Blaszczynski, *Maintaining and Losing Control during Internet Gambling: A Qualitative Study of Gamblers’ Experiences*, 17(7) NEW MEDIA & SOC’Y 1075–1095 (2015), <https://doi.org/10.1177/1461444814521140>.

¹⁹A. Imas, *The Realization Effect: Risk-Taking after Realized versus Paper Losses*, 106(8) AM. ECON. REV. 2086–2109 (2016); V.A.R. ZELIZER, *THE SOCIAL MEANING OF MONEY* (Princeton University Press 1997).

²⁰P. Ayton and I. Fischer, *The Hot Hand Fallacy and the Gambler’s Fallacy: Two Faces of Subjective Randomness?*, 32(8) MEMORY & COGNITION 1369–1378 (2004), <https://doi.org/10.3758/BF03206327>.

²¹*Id.*; J. Sundali and R. Croson, *Biases in Casino Betting: The Hot Hand and the Gambler’s Fallacy*, 1(1) JUDGMENT & DECISION MAKING 1 (2006); A. Tversky and D. Kahneman, *Belief in the Law of Small Numbers*, 76(2) PSYCHOL. BULL. 105–110 (1971).

²²T. Gilovich, R. Vallone, and A. Tversky, *The Hot Hand in Basketball: On the Misperception of Random Sequences*, 17(3) COGNITIVE PSYCHOL. 295–314 (1985), [https://doi.org/10.1016/0010-0285\(85\)90010-6](https://doi.org/10.1016/0010-0285(85)90010-6).

²³B. Studer, E.H. Limbrick-Oldfield, and L. Clark, *“Put Your Money Where Your Mouth Is!”: Effects of Streaks on Confidence and Betting in a Binary Choice Task*, 28(3) J. BEHAV. DECISION MAKING 239–249 (2015), <https://doi.org/10.1002/bdm.1844>.

²⁴E.J. Langer, *The Illusion of Control*, 32(2) J. PERSONALITY 311–328 (1975); D.A. Moore and P.J. Healy, *The Trouble with Overconfidence*, 115(2) PSYCHOL. REV. 502–517 (2008), <https://doi.org/10.1037/0033-295X.115.2.502>; T. Sharot, *The Optimism Bias*, 21(23) CURRENT BIOLOGY R941–R945 (2011), <https://doi.org/10.1016/j.cub.2011.10.030>.

²⁵K. Harrigan, V. MacLaren, D. Brown, M.J. Dixon, C. Livingstone, *Games of Chance or Masters of Illusion: Multiline Slots Design May Promote Cognitive Distortions*, 14(2) INT’L GAMBLING STUD. 301–317 (2014), <https://doi.org/10.1080/14459795.2014.918163>; C. Jensen, M.J. Dixon, K.A. Harrigan, E. Sheepy, J.A. Fugelsang, and M. Jarick, *Misinterpreting “Winning” in Multiline Slot Machine Games*, 13(1) INT’L GAMBLING STUD. 112–126 (2013), <https://doi.org/10.1080/14459795.2012.717635>.

control beliefs.²⁶ Roulette games display a history of red/black outcomes, which fosters the gambler's fallacy,²⁷ and slot machines provide losses disguised as wins whereby the player is congratulated for a win, with the value being less than that of the bet.²⁸ This is particularly concerning considering that gambling biases are elevated in clinical Gambling Disorder and have been found to activate areas in the brain associated with an actual win.²⁹

From a policy and treatment standpoint, it is important to recognize that gambling-related cognitions are not static. Individuals may have intentions to limit their spending during sessions, but subsequently change their minds, or fail to adhere to their preset limits.³⁰ Gamblers also often acknowledge their faulty beliefs outside of the game.³¹ During the action of the game, gamblers appear to "switch" to a more biased state. This switching is compatible with the "dual systems" models of decision making that describe the balance between an emotional, impulsive system and a calculative, reflective system.³² An obstacle for problem gambling prevention programs, such as education on the statistics of gambling, is that training the reflective system may fail to stop gamblers switching into the more emotional mode.³³

The heuristics described here are a partial list. They help to explain the lack of success of information-

based interventions designed to change gambling behavior by simply informing people about the risks of gambling and the low chances of winning jackpots.³⁴ The strength of biased cognitions and their impact on gambling behavior is also exemplified in the effectiveness of cognitive treatment programs focusing on correcting erroneous perceptions of randomness,³⁵ and in one of the most widely provided programs to minimize gambling harms, self-exclusion. Self-exclusion is a voluntary agreement that an individual enters into with a gambling operator, acknowledging that they are not able to control their gambling behaviors and will likely act against their own self-interest, particularly during play.³⁶ Gambling policy should also recognize the importance of heuristics and biases in gambling behavior and assist in overcoming them. Addressing biases within gambling may occur at an individual or population level depending on the strategies used.

BARRIERS TO EFFECTIVE GAMBLING HARM-MINIMIZATION POLICIES

There are several barriers to policies that aim to minimize gambling-related harms. First, despite high social costs, gambling generates significant funds for the gambling industry and governments either directly through ownership or indirectly through taxation.³⁷

²⁶S. Chu, E.H. Limbrick-Oldfield, W.S. Murch, and L. Clark, *Why Do Slot Machine Gamblers Use Stopping Devices? Findings from a "Casino Lab" Experiment*, 18 (2) INT'L GAMBLING STUD. 1–17 (2017), <https://doi.org/10.1080/14459795.2017.1413125>.

²⁷G. Barron and S. Leider, *The Role of Experience in the Gambler's Fallacy*, 23 J. BEHAV. DECISION MAKING 117–129 (2010); R. Croson and J. Sundali, *The Gambler's Fallacy and the Hot Hand: Empirical Data from Casinos*, 30(3) J. RISK & UNCERTAINTY 195–209 (2005).

²⁸M.J. Dixon, K.A. Harrigan, R. Sandhu, K. Collins, and J.A. Fugelsang, *Losses Disguised as Wins in Modern Multi-Line Video Slot Machines*, 105(10) ADDICTION 1819–1824 (2010), <https://doi.org/10.1111/j.1360-0443.2010.03050.x>.

²⁹L. Clark, A.J. Lawrence, F. Astley-Jones, and N. Gray, *Gambling Near-Misses Enhance Motivation to Gamble and Recruit Win-Related Brain Circuitry*, 61(3) NEURON 481–490 (2009), <https://doi.org/10.1016/j.neuron.2008.12.031>; R. Michalczuk, H. Bowden-Jones, A. Verdejo-Garcia, and L. Clark, *Impulsivity and Cognitive Distortions in Pathological Gamblers Attending the UK National Problem Gambling Clinic: A Preliminary Report*, 41(12) PSYCHOL. MED. 2625–2635 (2011), <https://doi.org/10.1017/S003329171100095X>; Miller and Currie, *supra* note 13.

³⁰S. HARE, *FACTORS THAT INFLUENCE GAMBLER ADHERENCE TO PRE-COMMITMENT DECISIONS* (Brisbane: Schottler Consulting 2006), retrieved from <http://www.liquorandgaming.nsw.gov.au/Documents/gaming-and-wagering/problems-with-gambling/research/10.%20Factors%20that%20Influence%20Gambler%20Adherence%20to%20Pre-Commitment%20Decisions.pdf>; D.R. Lalande and R. Ladouceur, *Can Cybernetics Inspire Gambling Research? A Limit-Based Conceptualization of Self-Control*, 11(2) INT'L GAMBLING STUD. 237–252 (2011), <https://doi.org/10.1080/14459795.2011.598540>; L. Nower and A. Blaszczynski,

Gambling Motivations, Money-Limiting Strategies, and Precommitment Preferences of Problem Versus Non-Problem Gamblers, 26(3) J. GAMBLING STUD. 361–372 (2010), <https://doi.org/10.1007/s10899-009-9170-8>.

³¹R. Ladouceur, S. Sévigny, A. Blaszczynski, K. O'Connor, and M.E. Lavoie, *Video Lottery: Winning Expectancies and Arousal*, 98(6) ADDICTION 733–738 (2003), <https://doi.org/10.1046/j.1360-0443.2003.00412.x>.

³²D. KAHNEMAN, *THINKING FAST AND SLOW* (London: Penguin 2011).

³³R.J. Williams and D. Connolly, *Does Learning about the Mathematics of Gambling Change Gambling Behavior?*, 20(1) PSYCHOL. ADDICTIVE BEHAV. 62–68 (2006), <https://doi.org/10.1037/0893-164X.20.1.62>.

³⁴S. Monaghan and A. Blaszczynski, *Electronic Gaming Machine Warning Messages: Information versus Self-Evaluation*, 144(1) J. PSYCHOL. 83–96 (2009), <https://doi.org/10.1080/00223980903356081>.

³⁵R. Ladouceur, C. Sylva, C. Boutin, S. Lachance, C. Doucet, J. Leblond, and C. Jacques, *Cognitive Treatment of Pathological Gambling*, 189(11) J. NERVOUS & MENTAL DISEASE 774 (2001).

³⁶S.M. Gainsbury, *Review of Self-exclusion from Gambling Venues as an Intervention for Problem Gambling*, 30(2) J. GAMBLING STUD. 229–251 (2014), <https://doi.org/10.1007/s10899-013-9362-0>.

³⁷D.A. Korn, *Expansion of Gambling in Canada: Implications for Health and Social Policy*, 163(1) CANADIAN MED. ASS'N J. 61–64 (2000); PRODUCTIVITY COMMISSION, *GAMBLING* (Canberra: Productivity Commission 2010); D.M. Walker and J. D. Jackson, *The Effect of Legalized Gambling on State Government Revenue*, 29(1) CONTEMP. ECON. POL'Y 101–114 (2011), <https://doi.org/10.1111/j.1465-7287.2010.00198.x>.

This creates a conflict of interest for government and industry bodies, as strategies that lead to a reduction in gambling have an impact on revenue, particularly when most gamblers gamble without harm.³⁸ The widely known Reno model, a science-based responsible gambling framework, recognizes that effective harm-reduction policies should not unnecessarily disrupt non-problematic gamblers.³⁹ Evidence also suggests that many gamblers are supportive of efforts to address gambling harms, and are willing to accept mild disruptions to their own gambling if the strategy is perceived to benefit others.⁴⁰

Second, strategies that rely on voluntary use by individuals, such as self-imposed restrictions on gambling expenditure and monitoring of play, are poorly utilized by gamblers.⁴¹ These interventions have often been implemented following community consultation and/or surveys suggesting support for government-led gambling harm-reduction strategies, rather than based on empirical evidence for their likely impact.⁴² These voluntary strategies fail to bridge the “intention-action gap,” whereby people frequently fail to act on their intentions.⁴³ For instance, many gamblers report setting time or expenditure limits, but fail to adhere to these limits during play.⁴⁴ This lack of action can result from more immediately gratifying outcomes (i.e., the potential to win), from individuals perceiving the resource not to be relevant for them, or from a failure in the design environment such that the intervention does not sufficiently meet a gambler’s needs or is too difficult to use.⁴⁵ Harm re-

duction strategies must be better tailored towards overcoming a gambler’s action-intention gap.

A third barrier to the success of gambling harm reduction policies is a failure to identify and target a specific behavior. There is no robust or inclusive definition of gambling harm, as it is difficult to determine the size of bet, frequency of gambling, or level of negative personal, financial, or familial consequences that classifies problematic gambling behavior.⁴⁶ This is further complicated by the diverse selection of gambling games offered, ranging from purely chance-based games (e.g., slot machines) to games that involve skill and chance (e.g., blackjack), and by different definitions of “risky” gambling behavior used in experiments (e.g., bet size, doubling up, etc.). Further problems with the specificity of gambling policies include: 1) the lack of clearly defined harms related to gambling; 2) the use of non-specific terms, such as “responsible gambling”; and 3) an absence of relevant metrics broadly collected, such as the involvement of gambling in divorce and custody hearings, crime, incidents of domestic violence, and presentation for nonspecialist gambling treatment mental health and medical services.⁴⁷ These problems present difficulties in measuring the success of programs and need to be addressed in order to create specific and measurable program and policy outcomes.

As discussed in the following sections, a behavioral economics approach offers promising solutions to address these three overarching harm-minimization

³⁸Korn, *supra* note 37; Ladouceur et al., *supra* note 2.

³⁹A. Blaszczynski, R. Ladouceur, and H.J. Shaffer, *A Science-Based Framework for Responsible Gambling: The Reno Model*, 20(3) J. GAMBLING STUD. 301–317 (2004), <https://doi.org/10.1023/B:JOGS.0000040281.49444.e2>.

⁴⁰S. Gainsbury, D. Aro, D. Ball, C. Tobar, and A. Russell, *Determining Optimal Placement for Pop-Up Messages: Evaluation of a Live Trial of Dynamic Warning Messages for Electronic Gaming Machines*, 15(1) INT’L GAMBLING STUD. 141–158 (2015), <https://doi.org/10.1080/14459795.2014.1000358>; S.M. Gainsbury, L. Jakob, and D. Aro, *Understanding End-User Perspectives to Enhance Perceived Value Uptake of Harm-Minimization Tools: Considering Gambler’s Views of a Pre-Commitment System*, 18(1) INT’L GAMBLING STUD. 22–38 (2018), <https://doi.org/10.1080/14459795.2017.1370723>.

⁴¹R. Ladouceur, A. Blaszczynski, and D.R. Lalande, *Pre-Commitment in Gambling: A Review of the Empirical Evidence*, 12(2) INT’L GAMBLING STUD. 215–230 (2012), <https://doi.org/10.1080/14459795.2012.658078>; Livingstone et al., *supra* note 3.

⁴²Gainsbury, Jakob, and Aro, *supra* note 40; Ladouceur et al., *supra* note 41.

⁴³F.F. Sniehotta, U. Scholz, and R. Schwarzer, *Bridging the Intention–Behaviour Gap: Planning, Self-Efficacy, and Action Control in the Adoption and Maintenance of Physical Exercise*, 20(2) PSYCHOL. & HEALTH 143–160 (2005), <https://doi.org/10.1080/08870440512331317670>

⁴⁴Lalande and Ladouceur, *supra* note 30.

⁴⁵S. Gainsbury, N. Hing, and N. Suhonen, *Professional Help-Seeking for Gambling Problems: Awareness, Barriers and Motivators for Treatment*, 30(2) J. GAMBLING STUD. 503–519 (2014), <https://doi.org/10.1007/s10899-013-9373-x>; Gainsbury, Jakob, and Aro, *supra* note 40; Ladouceur et al., *supra* note 3; S. Nisbet, A. Jackson, and D.R. Christensen, *The Influence of Pre-Commitment and Associated Player-Card Technologies on Decision Making: Design, Research and Implementation Issues*, 14(3) INT’L J. MENTAL HEALTH & ADDICTION 228–240 (2016), <https://doi.org/10.1007/s11469-015-9574-x>; B. ROWE, D. DE IONNO, J. HOLLAND, C. FLUDE, L. BRODRICK, A. VINAY, AND M. MOUTOS, RESPONSIBLE GAMBLING: COLLABORATIVE INNOVATION IDENTIFYING GOOD PRACTICE AND INSPIRING CHANGE (Revealing Reality 2017).

⁴⁶K. Shannon, F. Anjou, and A. Blaszczynski, *Mapping the Proportional Distribution of Gambling-Related Harms in a Clinical and Community Sample*, 17(3) INT’L GAMBLING STUD. 1–20 (2017), <https://doi.org/10.1080/14459795.2017.1333131>

⁴⁷N. Hing, K. Sproston, K. Tran, and A.M.T. Russell, *Gambling Responsibly: Who Does It and To What End?*, 33(1) J. GAMBLING STUD. 149–165 (2017), <https://doi.org/10.1007/s10899-016-9615-9>; Ladouceur et al., *supra* note 2; ROWE ET AL., *supra* note 45; Shannon et al., *supra* note 46.

barriers. However, the authors note that gambling-related harms occur in a broad social-political context and behavioral economic-based strategies do not address the entire range of factors requiring consideration. Further, behavioral economic approaches may be less suitable for those experiencing severe gambling-related harms given that “nudge” approaches tend to be most effective when they assist people to behave in ways that they are ultimately inclined to agree are important.

BEHAVIORAL ECONOMIC APPROACHES TO PUBLIC POLICY

A behavioral economics approach to public policy acknowledges that humans do not always act in their best interest and focuses on developing solutions that put real human behavior at the center of policy and program design.⁴⁸ These policies often use a “libertarian paternalism” approach, whereby the intervention is designed using behavioral insights to bring large benefits to those exhibiting poor behaviors, while imposing little or no cost to those acting responsibly.⁴⁹ These policies shift customers toward a normative or desired behavior whilst preserving a customer’s ability to choose between the available options. Many successful interventions have used carefully designed and tested “nudges,” which involve making subtle alterations in the choice environment to encourage behavior change.⁵⁰ One example is the inclusion on letters of notice from the UK taxation office that “most citizens pay their taxes on time.” This did not inconvenience those who pay their taxes, but resulted in an increase in taxes collected within the specified timeframe.⁵¹ These types of nudging interventions are often based on inexpensive, small environmental tweaks that promote agency, quantify behavioral outcomes, and shift large populations in predictable directions when designed well. Nudges may focus on changing behavior at an individual level, and although they are not intended

to address some of the broader issues, they may be politically easier to implement than larger changes to the provision or availability of gambling.

There are many benefits to incorporating behavioral economics into policy development for public health issues.⁵² First, the multidisciplinary perspective of behavioral economics allows a broad conceptual base from which policy tools can be developed to influence behavior. Second, behavioral economics offers more accurate predictions about the effects of policies through the integration of evaluation and testing into policy development. Third, by accounting for people’s decision-making processes and biases, behavioral economics can enhance the expected outcomes of policies. Behavioral economics is already being incorporated into policymaking internationally. However, despite some efforts to facilitate cross-disciplinary collaboration, academic gambling research is largely conducted in disciplinary silos. This limits the potential gains that can be made through multi-disciplinary collaboration. For stakeholders, the disparate field makes it easy to collate and integrate relevant academic research that could inform policy.

APPLYING BEHAVIORAL ECONOMIC PRINCIPLES TO GAMBLING

While conceptual models of gambling consider the role of cognitive distortions (or biases), policies and practices often fail to recognize the heuristics and resulting biases that drive ongoing gambling. Gambling policies have predominately been “think” policies, based on deliberative decision making whereby people are provided with information and subsequently expected to behave rationally based on this.⁵³ Many of the heuristics and biases considered in behavioral economics have potential application to minimize harm during play (e.g., by reducing cognitive distortions and bet size), as well as in prevention and treatment efforts (e.g., through

⁴⁸R.H. Thaler and C.R. Sunstein, *Nudge: Improving Decisions About Health, Wealth and Happiness* (New Haven: Yale University Press 2008).

⁴⁹*Id.*

⁵⁰A. Oliver, *From Nudging to Budging: Using Behavioural Economics to Inform Public Sector Policy*, 42(04) J. SOCIAL POL’Y 685–700 (2013), <https://doi.org/10.1017/S0047279413000299>; R.H. Thaler and C.R. Sunstein, *Libertarian Paternalism*, 93(2) AM. ECON. REV. 175–179 (2003); Thaler and Sunstein, *supra* note 48.

⁵¹M. Hallsworth, J.A. List, R.D. Metcalfe, and I. Vlaev, *The Behaviorist as Tax Collector: Using Natural Field Experiments to Enhance Tax Compliance*, 148 J. PUB. ECON. 14–31 (2017), <https://doi.org/10.1016/j.jpubeco.2017.02.003>

⁵²R. Chetty *Behavioral Economics and Public Policy: A Pragmatic Perspective*, 105(5) AM. ECON. REV. 1–33 (2015), <https://doi.org/10.1257/aer.p20151108>.

⁵³Błaszczynski et al., *supra* note 39; Kahneman, *supra* note 32; K.E. Stanovich and R.F. West, *Individual Differences in Reasoning: Implications for the Rationality Debate?*, 23(5) BEHAV. AND BRAIN SCI. 645–665 (2000).

messaging and commitment devices). The solutions discussed are not intended to be exhaustive, nor are they exclusive to one type of harm.

The behavioral economics heuristic of normative social influence emphasizes that people tend to make social comparisons and modify their behavior based on what they perceive others to be doing.⁵⁴ Providing individuals with tailored normative feedback on how their gambling behavior and expenditure compares with others has been successfully incorporated into gambling treatment programs.⁵⁵ Such strategies are thought to enhance self-awareness of behavior and increase motivations to modify behavior as necessary. Normative messages are an example of a cost-effective, subtle behavioral intervention that could reduce gambling for a proportion of gamblers at-risk of developing problems, whilst minimally disturbing recreational gamblers. For example, individuals could receive activity statements with a clear summary of their monthly net gambling outcome that include a statement or graphic comparing their gambling outcomes with the average bettor. This is similar to techniques used to reduce electricity and water consumption.⁵⁶ However, one should be mindful of, and measure, unintended consequences. For instance, informing people that they are below the average level of consumption can increase poor behavior, termed the “boomerang” effect.⁵⁷ Moreover,

providing feedback on gambling may encourage loss chasing for problem gamblers, if the feedback reminds them of their losses, which they wish to recoup through further gambling in the anticipation of wins.⁵⁸ To achieve optimal behavior modification, policy initiatives should combine normative messages with other nudges, such as nonfinancial penalties or incentives like smiley faces and words of encouragement, recognizing desirable behavior.⁵⁹

Another cost-effective behavioral economics approach is personalization, which is highly relevant for gambling interventions. An increasing proportion of all gambling is now based on individual player accounts, which allow players to accrue loyalty points; keep track of their gambling expenditure, wins, and losses; and receive updates from gambling operators and regulators. These player accounts have the potential to enable sophisticated harm-minimization strategies, including personalized messages that target players based on individual characteristics and patterns of play.⁶⁰ Such tailored feedback outperforms traditional warning or informative messages as it is more likely to be read, remembered, and viewed as personally relevant.⁶¹ Tailored feedback is common practice in marketing and health communication due to its apparent effectiveness in changing behavior long term.⁶² Furthermore, unlike alcohol, there are no standard guidelines for “safe” levels of gambling that

⁵⁴Cialdini, R. B. (2009). *Influence: Science and practice* (Vol. 4). Boston, MA: Pearson education. R. Cialdini and M. Trost, *Social Influence: Social Norms, Conformity and Compliance*, in THE HANDBOOK OF SOCIAL PSYCHOLOGY, 4th ed. 151–192 (New York: McGraw-Hill 1998); D.C. Feldman, *The Development and Enforcement of Group Norms*, 9(1) ACAD. MGMT. REV. 47–53 (1984), <https://doi.org/10.5465/AMR.1984.4277934>; R.J. Hackman, *Group Influences on Individuals in Organizations*, in HANDBOOK OF INDUSTRIAL AND ORGANIZATIONAL PSYCHOLOGY 199–267 (Palo Alto, CA: Consulting Psychologists Press 1992), retrieved from <http://psycnet.apa.org.ezproxy1.library.usyd.edu.au/record/1993-97201-004>.

⁵⁵J.D. Edgerton, J. Biegun, and L.W. Roberts, *Player Behavioral Tracking and Personalized Feedback in Online Gambling: Implications for Prevention and Treatment of Problem Gambling*, 4 J. ADDICTION PREVENTION 1–8 (2016); S. Gainsbury and A. Blaszczynski, *Online Self-Guided Interventions for the Treatment of Problem Gambling*, 11(3) INT’L GAMBLING STUD. 289–308 (2011), <https://doi.org/10.1080/14459795.2011.617764>.

⁵⁶P.W. Schultz, *Strategies for Promoting Proenvironmental Behavior*, 19(2) EUR. PSYCHOLOGIST 107–117 (2014), <https://doi.org/10.1027/1016-9040/a000163>.

⁵⁷Cialdini and Trost, *supra* note 54; P.W. Schultz, J.M. Nolan, R.B. Cialdini, N.J. Goldstein, and V. Griskevicius, *The Constructive, Destructive, and Reconstructive Power of Social Norms*, 18(5) PSYCHOL. SCI. 429–434 (2007).

⁵⁸Ladouceur et al., *supra* note 41; R. Mizerski, A. Lee, S. Sadeque, W. Jolley, S. Wang, J. Jiang, and C. Osborne, *Boomerang Effects of Gambling Warnings Exposed to Non-Problem Gamblers*, in ANZMAC 2012: PROCEEDINGS OF AUSTRALIAN AND NEW ZEALAND MARKETING ACADEMY 1–7 (ANZMAC 2012).

⁵⁹Schultz et al., *supra* note 57.

⁶⁰S. Gainsbury, *Player Account-Based Gambling: Potentials for Behaviour-Based Research Methodologies*, 11(2) INT’L GAMBLING STUD. 153–171 (2011), <https://doi.org/10.1080/14459795.2011.571217>.

⁶¹M.E. Larimer, C. Neighbors, T.W. Lostutter, U. Whiteside, J.M. Crouce, D. Kaysen, and D.D. Walker, *Brief Motivational Feedback and Cognitive Behavioral Interventions for Prevention of Disordered Gambling: A Randomized Clinical Trial*, 107(6) ADDICTION 1148–1158 (2012), <https://doi.org/10.1111/j.1360-0443.2011.03776.x>.

⁶²M.E. Jung, K.A.M. Ginis, S.M. Phillips, and C.D. Lordon, *Increasing Calcium Intake in Young Women through Gain-Framed, Targeted Messages: A Randomised Controlled Trial*, 26(5) PSYCHOL. & HEALTH 531–547 (2011), <https://doi.org/10.1080/08870441003611544>; M.W. Kreuter and R.J. Wray, *Tailored and Targeted Health Communication: Strategies for Enhancing Information Relevance*, 27 (1) AM. J. HEALTH BEHAV. S227–S232 (2003); Nicole Nollen, Jasjit S. Ahluwalia, Matthew S. Mayo, Kim Richter, Won S. Choi, Kolawole S. Okuyemi, and Ken Resnicow, *A Randomized Trial of Targeted Educational Materials for Smoking Cessation in African Americans Using Transdermal Nicotine*, 34(6) HEALTH EDUC. & BEHAV. 911–927 (2007), <https://doi.org/10.1177/1090198106294652>; Postma, O.J. and Brokke, M., 2002. Personalisation in practice: The proven effects of personalisation. *Journal of Database Marketing & Customer Strategy Management*, 9(2), pp.137–142. Strickland, J. R., Smock, N., Casey, C., Poor, T., Kreuter, M. W., & Evanoff, B. A. (2015). Development of targeted messages to promote smoking cessation among construction trade workers. *Health Education Research*, 30(1), 107–120. <https://doi.org/10.1093/her/cyu050>; Xu, D.J., Liao, S.S. and Li, Q., 2008. Combining empirical experimentation and modeling techniques: A design research approach for personalized mobile advertising applications. *Decision support systems*, 44(3), pp.710–724.

could be recommended as a public education tool for the whole population.⁶³ Player information can be used to assist players to work out their own affordable gambling limits, as compared to regulatory guidelines. This has been termed “asymmetric paternalism,”⁶⁴ with the term asymmetric referring to the intention of the intervention to help those who need to change their behavior, without disturbing those who are making informed and deliberate decisions.

During play, there are many features of a game that encourage “flow” or continued gambling with attenuated thought (also termed dissociation), thereby minimizing switching behavior.⁶⁵ One basic feature includes the “bet again” button, which saves a player’s previous bet size and pay-line(s) choice, and is common on electronic gaming machines, casino table games, and various online gambling options. The transfer of cash into credit or chips also facilitates flow, by way of it being easier to keep gambling than return to the cashier to exchange chips or credits for money. Creating friction may prompt gamblers to switch from an impulsive to a reflective state, and consider whether they want to continue gambling, take breaks, or stop altogether. Dynamic messages that break any dissociation and attract attention have been more effective when they ask gamblers “Do you need to take a break?,” as opposed to providing factual information about the low chances of winning with no suggested behavioral action.⁶⁶ One of the most effective policy changes in terms of reducing gambling expenditure was the introduction of smoking bans that caused gamblers to take a break

and leave the gambling venue to smoke, resulting in a reduction in gambling among smokers.⁶⁷ Breaking a repeated and default pattern of responding can therefore reduce mindless and unintended continued gambling, and potentially excessive expenditure.

Pre-set courses of actions termed “defaults” are also a powerful determinant of behavior and are recognized in behavioral economic initiatives ranging from enhancing savings for retirement to increasing rates of organ donation.⁶⁸ Default settings require people to make an active choice to opt out of, as opposed to opt into, a desired behavior.⁶⁹ As a default option, credit card companies could block expenditure at gambling venues and sites, and require consumers to opt out of the block by notifying their financial institution if they wish to enable gambling expenditure at certain venues or sites. Gambling operators can set conservative deposit or money transfer limits, lower the default bet size option of a game, or send players’ winnings to a separate “cash out” account, with players having to select to re-gamble their money. The potential power of defaults in gambling was shown in an online sports betting study where less than one percent of 47,000 gamblers exceeded the deposit limits imposed.⁷⁰ Thus, gambling policymakers, operators, and clinicians need to be aware of setting well-designed default options to enhance desired gambling behavior.

Other self-regulatory strategies can assist gamblers to overcome “present bias,” which is the tendency to make decisions that are enjoyable today, even at the expense of greater, long-term benefits.⁷¹ Harm-minimization strategies should include cues encouraging

⁶³S.R. Currie, D.C. Hodgins, J. Wang, N. el-Guebaly, H. Wynne, and S. Chen, *Risk of Harm among Gamblers in the General Population as a Function of Level of Participation in Gambling Activities*, 101(4) ADDICTION 570–580 (2006), <https://doi.org/10.1111/j.1360-0443.2006.01392.x>; S.R. Currie, D.C. Hodgins, D.M. Casey, N. el-Guebaly, G.J. Smith, R.J. Williams, and D.P. Schopflocher, *Deriving Low-Risk Gambling Limits from Longitudinal Data Collected in Two Independent Canadian Studies*, 112(11) ADDICTION 2011–2020 (2017), <https://doi.org/10.1111/add.13909>.

⁶⁴C. Camerer, S. Issacharoff, G. Loewenstein, T. O’Donoghue, and M. Rabin, *Regulation for Conservatives: Behavioral Economics and the Case for “Asymmetric Paternalism.”* 151(3) U. PA. L. REV. 1211–1254 (2003), <https://doi.org/10.2307/3312889>

⁶⁵K.M. Diskin and D.C. Hodgins, *Narrowing of Attention and Dissociation in Pathological Video Lottery Gamblers*, 15(1) J. GAMBLING STUD. 17–28 (1999).

⁶⁶S. Gainsbury, D. Aro, D. Ball, C. Tobar, A. Russell, *Optimal Content for Warning Messages to Enhance Consumer Decision Making and Reduce Problem Gambling*, 68(10) J. BUS. RES. 2093–2101 (2015), <https://doi.org/10.1016/j.jbusres.2015.03.007>.

⁶⁷G.T. Bradley and C. Becker, *Consumer Attitudes and Visit Intentions Relative to a Voluntary Smoking Ban in a Single Casino Resort with a Dense Competitive Set*, 7

(2) ACAD. HEALTH CARE MGMT. J. 41–56 (2011); T.A. Garrett and M. Pakko, *The Revenue Performance of Casinos after a Smoking Ban: The Case of Illinois* (SSRN Scholarly Paper No. ID 1415034) (2010), retrieved from <https://papers.ssrn.com/abstract=1415034>; M. Pakko, *Clearing the Haze? New Evidence on the Economic Impact of Smoking Bans*, REGIONAL ECONOMIST (Jan. 10–11, 2008).

⁶⁸A. Abadie and S. Gay, *The Impact of Presumed Consent Legislation on Cadaveric Organ Donation: A Cross-Country Study*, 25(4) J. HEALTH ECON. 599–620 (2006), <https://doi.org/10.1016/j.jhealeco.2006.01.003>; J.R. BROWN, J.B. LIEBMAN, AND D.A. WISE (EDS.), *SOCIAL SECURITY POLICY IN A CHANGING ENVIRONMENT* (Chicago: University of Chicago Press 2009); E.J. Johnson and D. Goldstein, *Do Defaults Save Lives?* 302(5649) SCIENCE 1338–1339 (2003), <https://doi.org/10.1126/science.1091721>.

⁶⁹Johnson and Goldstein, *supra* note 68.

⁷⁰A. Broda, D.A. LaPlante, S.E. Nelson, R.A. LaBrie, L.B. Bosworth, and H.J. Shaffer, *Virtual Harm Reduction Efforts for Internet Gambling: Effects of Deposit Limits on Actual Internet Sports Gambling Behaviour*, 5 HARM REDUCTION J. 27 (2008), <https://doi.org/10.1186/1477-7517-5-27>.

⁷¹D. Laibson, *Golden Eggs and Hyperbolic Discounting*, 112(2) Q. J. ECON. 443–478 (1997), <https://doi.org/10.1162/003355397555253>.

people to think about the benefits of saving funds. Several apps launched to target tobacco cessation use augmented reality to show smokers what else they could spend their money on,⁷² or show smokers a superimposed photo of how damaged their lungs are likely to be based on their cigarette consumption.⁷³ Another approach to overcoming the discrepancy between short- and long-term preferences is the use of commitment mechanisms, such as pre-setting limits on the time and/or amount of money spent (lost) gambling.⁷⁴ Commitment devices can be formally binding (e.g., mandatory exclusions and limits if certain outcomes occur) or nonbinding but nonetheless psychologically powerful, such as promises to oneself to limit gambling expenditures. Planning prompts and reminders to encourage people to follow through with their preferred and pre-stated course of action can also help facilitate and enhance adherence to desired behavior.⁷⁵ This range of self-regulatory options highlights the potential for a behavioral “toolkit” to assist gamblers in adhering to their pre-set gambling preferences in a way that works best for them.

Finally, a key element in any behavioral economic policy or program is measurement and evaluation. The best method to evaluate an intervention is through a randomized controlled trial (RCT), which is an experimental design that randomly assigns participants to a control (no intervention) or intervention group.⁷⁶ This method allows the impact of the intervention to be determined by comparing behavioral differences between the two groups. Evaluations may also include economic modelling as an additional form of analysis in addition to some of the more commonly used psychology-based methodologies. To ensure that policies and practices are cost-effective and have the desired impact, with minimal negative unintended consequences, it is essential that they are thoroughly evaluated. One common regula-

tory and industry objection to implementing responsible gambling initiatives is the lack of empirical evidence for many proposed interventions.⁷⁷ Yet, the evaluation of interventions often requires field trials and access to industry data, such as player loyalty cards or transactional data, which requires cooperation from the gambling industry. Given the conflict of interest, such data is often difficult to obtain and may require regulatory interventions. It is important that gambling operators partner with academics and policymakers to share data and design experiments. The results from any trials should be published, including null findings, so that these can inform the development of subsequent interventions.

CONCLUSIONS

The effectiveness of policies and practices in place to minimize gambling-related harms are limited in their success. Through understanding how psychology influences decision making, a behavioral economics approach offers promising interventions to minimize gambling-related harms across the spectrum of gambling risk. The appeal of nudging is self-evident: it proposes a set of seemingly subtle, low-cost environmental and policy changes that can be applied to a wide range of individuals, or targeted groups.⁷⁸ However, in gambling, a greater evidence base is required, including both primary research and the evaluation of existing evidence where it is available. Furthermore, greater collaboration between industry, policymakers, and academics is required. It is important to recognize the value of field testing in policy initiatives through RCTs and other experimentation methods.⁷⁹ Field testing provides essential evidence on the groups, behaviors, and contexts that we want to better understand. As gamblers are a diverse group, research is needed to evaluate interventions for specific target populations.

⁷²H. Lake, *Augmented Reality App Urges Smokers to Swap Cigarettes for Cash*, UK FUNDRAISING (Mar. 13, 2013), <https://fundraising.co.uk/2013/03/13/augmented-reality-app-urges-smokers-swap-cigarettes-cash/> (retrieved Jan. 12, 2018).

⁷³*Augmented Reality App Shows Smokers Their Damaged Lungs*, INDEPENDENT (Sept. 1, 2011), <http://www.independent.co.uk/life-style/health-and-families/augmented-reality-app-shows-smokers-their-damaged-lungs-2347454.html> (retrieved Jan. 12, 2018).

⁷⁴Ladouceur et al., *supra* note 41.

⁷⁵M.J.A. Wohl, S. Gainsbury, M.J. Stewart, and T. Sztainert, *Facilitating Responsible Gambling: The Relative Effectiveness of Education-Based Animation and Monetary Limit Setting Pop-up Messages among Electronic Gaming Machine*

Players, 29(4) J. GAMBLING STUD. 703–717 (2013), <https://doi.org/10.1007/s10899-012-9340-y>.

⁷⁶C.G. Victora, J.-P. Habicht, and J. Bryce, *Evidence-Based Public Health: Moving Beyond Randomized Trials*, 94(3) AM. J. PUB. HEALTH 400–405 (2004), <https://doi.org/10.2105/AJPH.94.3.400>

⁷⁷Gainsbury, Jakob, and Aro, *supra* note 40; Livingstone et al., *supra* note 3.

⁷⁸T.M. Marteau, D. Ogilvie, M. Roland, M. Suhrcke, and M.P. Kelly, *Judging Nudging: Can Nudging Improve Population Health?*, 342 BMJ d228–d228 (2011), <https://doi.org/10.1136/bmj.d228>.

⁷⁹A. Etzioni, *Behavioural Economics: Next Steps*, 34(3) J. CONSUMER POL'Y 277–287 (2011).

Greater awareness of the impact of nudges and behavioral economic interventions by gambling regulators and policymakers may lead to greater and safer regulation of game design, and enhanced gambling harm prevention and treatment initiatives. Governments can use behavioral science principles to assist individuals to gamble within their own appropriate limits. Legislation on the testing of interventions in the field should also be implemented to prevent “backfire” effects, or negative consequences.⁸⁰ Where industry operators claim to have responsible gambling policies, these should be monitored to determine whether the practices are effective in achieving the desired level of safe behavioral change, as many inconsistencies in gambling have been seen.⁸¹ Many of the nudges described above have not been implemented or tested to minimize gambling-related harms and the impacts are unknown. Subsequently, it is essential to evaluate gambling policies to ensure efforts to minimize gambling-related harms are appropriately directed. The interventions suggested in this article may provide useful strategies to assist in minimizing gambling-related harms. Given there is increasing evidence that nudging and behavioral economic interventions work across many health-related fields, findings from gambling could be applied to substance abuse and other behavioral addictions.

RECOMMENDATIONS FOR A BEHAVIORAL ECONOMICS APPROACH TO GAMBLING HARM-MINIMIZATION INTERVENTIONS

From a behavioral economics perspective, the development, implementation, and evaluation of a gambling harm-minimization approach should:

1. Identify and measure the specific target behavior(s), population(s), and signs of harm.
2. Consider the context or structure of the decision-making environment to identify inaccurate beliefs (biases) or behavioral barriers preventing a desired behavior.
3. Design a choice environment that equips people with the right tools to follow through with, and adhere to, a desired behavior.
4. Preserve autonomy and empower individuals through freedom of choice.
5. Incorporate evaluation into the implementation process, ideally via an RCT.

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⁸⁰Marteau et al., *supra* note 78.

⁸¹S.F. Kingma, *Paradoxes of Risk Management: Social Responsibility and Self-Exclusion in Dutch Casinos*, 21(1) *CULTURE & ORG.* 1–22 (2015), <https://doi.org/10.1080/14759551.2013.795152>; ROWE ET AL., *supra* note 45.