Dark nudges in gambling

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'Nudge' has come into common usage in behavioral science, the intersection of psychology and economics, for situations where a 'choice architect' aligns a system with consumers' best long-term interests (Thaler & Sunstein, 2008). A cafeteria designer might 'nudge' her customers by placing the salad bar centrally, while relegating unhealthier foods to a corner. In this editorial I argue that, in gambling, nudging works differently. Gambling's 'dark nudges' are designed to exploit gamblers' biases, as economic rationality on the part of gambling firms predicts. Gambling's dark nudges reveal the contradictions of industry-led responsible gambling initiatives, and show how stronger regulation is required to reverse gambling's spiralling public health costs (Korn & Shaffer, 1999; Livingstone & Adams, 2011; Markham & Young, 2015; Orford, 2005; Orford, 2010).

Figures show that many countries have a large gambling problem (The Economist, 2017). Australia, for example, leads the way with annual losses of $990 per-resident adult in 2016, while the United States had the fifth highest per-resident adult losses of over $450 in 2016, corresponding to the highest overall per-country loss of $116.9 billion. Gambling losses – the gambling industry's profits – have increased as jurisdictions compete to deregulate gambling and gain a short-term economic boost, while hoping the costs will mostly fall on their neighbours (Atkinson, Nichols, & Oleson, 2000; Grinols, 2004). The result is record worldwide gambling losses, which are forecast to continue rising (The Economist, 2017). This is generally puzzling, as competition between gambling firms should benefit consumers, as is assumed in the standard economic model (Akerlof & Shiller, 2015; Bar-Gill, 2012). Recent theoretical analysis by Heidhues, Kőszegi, and Murooka (2016b), however, reveals how market competition can instead produce consumer exploitation in "socially-wasteful" products.

Gambling is socially-wasteful: gamblers' losses are transferred to gambling firms and professional gamblers, with gamblers, their families, and society suffering the social costs. This simple fact radically alters the standard economic model (Heidhues, Kőszegi, & Murooka, 2016b). Consider a completely truthful new gambling firm, whose marketing campaigns educate potential gamblers about these facts. This firm creates aware and informed consumers, who therefore refuse to gamble there or elsewhere on unfair terms (since gambling is socially wasteful). Of course this noble firm makes no profit, which can explain why no profit-maximizing gambling firm acts in this way! Instead, a profit-maximizing firm should exploit the same biases as incumbents, and even innovate new exploitative products (Heidhues, Kőszegi, & Murooka, 2016a).

Modern electronic gambling machines are a good example of dark nudging in practice (Schüll, 2012). Previous mechanical gambling machines were slow and simple. The gambler entered some money, pulled a lever, and waited for their feedback on one of only a few potential outcomes. Electronic machines, in contrast, optimize each step of the gambler's experience. Large denominations of money, or token equivalents, are inserted for a continuous gambling experience. Touchscreen buttons minimize the physical effort of long gambling sessions. Additionally, in modern machines the number of gambling options has increased, while outcome feedback is considerably harder to interpret than ever before. Mechanical machines had two designed outcomes: win, and lose. A third psychologically-meaningful "near-miss" outcome was created by chance. A "near-miss", of say apple-apple-pear, was found to reinforce gamblers despite no payout (Reid, 1986). Nowadays, near-miss frequencies are optimized with industrial precision (Parke & Griffiths, 2004). Many modern gambling machines utilize "losses-disguised-as-wins", where the gambler loses money overall, but nevertheless receives

simultaneously-delivered audio and visual positive reinforcement indicative of a partial "win" (Dixon, Harrigan, Sandhu, Collins, & Fugelsang, 2010). An increasing number of potential gambling strategies, linked to meaningless bells, whistles, and associations, are deployed to motivate gamblers to search for illusory winning patterns (Langer, 1975). Over time the machines have only become ever more exploitative – as socially-wasteful products tend to – when unchecked by government regulation.

Electronic gambling machines are a key driver of gambling's public health costs and an absolute priority for gambling research (Livingstone & Adams, 2011; Markham & Young, 2015). From October 2015 to September 2016 British gamblers lost £1.8 billion on electronic gambling machines (Gambling Commission, 2017). But exploitative innovation never sleeps. "Remote" online and mobile gambling now brings electronic gambling machine's same exploitative features into the home and on the go. British gamblers lost £4.5 billion on remote gambling over that same time period (Gambling Commission, 2017). Remote gambling overcomes physical limitations on gambling harm, just like the move from mechanical to electronic gambling machines.

Remote gambling means that sports bets can be made at a higher-frequency now than ever before (Lopez-Gonzalez, Estévez, & Griffiths, 2017), with gambling frequency being a risk factor in problem gambling (Griffiths, 1999). Gambles are available on many sports and competitions from all over the world. "In-play" gambling further increases gambling frequency, encouraging repeat gambling as a sporting event unfolds with betting odds updating in real time (Killick & Griffiths, 2018). And while, for example, in soccer only a few possible gambles could previously be made per-match (Forrest & Simmons, 2001), now gambles can be made on almost any imaginable combination of events. Advertising patterns from British bookmakers show how it is possible to engineer gambles which are both psychologically-alluring and which can

increase the bookmaker's profit margin by a factor of six – from 5.7% to 34.6% or higher (Newall, 2017). Here I will use an example advert from the 2014 soccer World Cup, although the key psychological factors are used more broadly: 'Thomas Müller to score first and Germany to win 3-1' (Newall, 2015).

This bet can be advertised to consumers with a high potential win, if the match unfolds exactly as specified. However, the size of that win is less than it 'should' be, as the bookmaker profit margin increases as more events are chained together to create the bet (Ayton, 1997; Newall, 2015). This increase in the bookmaker profit margin goes unnoticed, since soccer fans share a broader human tendency to overestimate the probabilities of highly specific events, compared to more inclusive probabilities, such as 'Germany to win' (Newall, 2017; Tversky & Koehler, 1994). The above bet exploits another bias in probabilistic forecasting, known as 'representativeness' (Tversky & Kahneman, 1983). Thomas Müller was the highest goalscorer in both the 2010 and 2014 World Cups, while Germany also won the 2014 World Cup. Therefore, the above bet feels likely to happen, even though it is still very unlikely to happen exactly as specified. It's more likely that the highly specific event 'nearly' happens, for example with Germany winning 3-0 or 3-2 – another example of the exploitative 'near-miss' effect. This results in the creation of a profitable 'longshot' bet for the bookmaker (Buhagiar, Cortis, & Newall, 2018; Constantinou & Fenton, 2013), but a longshot which feels more likely to happen than a 'classical' longshot, e.g. betting on 'San Marino to win' (currently ranked 204th in the world). This example is a dark counterpart of Thaler and Sunstein's (2008) benevolent cafeteria designer, where the choice architecture instead aims to magnify gamblers' biases.

Gambling regulators may hope that exploitative industry incumbents will eventually get displaced as more consumer-friendly firms enter the market. But dark

nudges need not follow from evil design. In online environments, firms can experimentally test many different marketing messages, and see what consumers respond to (Kohavi & Longbotham, 2017). And because gambling is socially-wasteful, new firms cannot gain a profitable foothold by being truthful (Heidhues et al., 2016b). In fact the opposite can even occur, where consumer-friendly firms adapt their business models to become more exploitative. PokerStars and Betfair are two innovators of the early 2000s online gambling boom, which *were* based on consumer-friendly models, allowing "smart" gamblers to win in direct competition against other gamblers. But both companies are perceived by their smart professional gamblers to be moving to reduce the skill element of their offerings, ensuring the house now wins against *everyone*.

A fully-informed consumer, who understands the odds of winning, lies at the heart of "responsible gambling" initiatives (Blaszczynski et al., 2011). An economist, seeing a gambler using a high-risk product, might conclude that this action maximizes the gambler's happiness. But this ignores how the gambler's behavior is as much driven by their immediate context (Reith & Dobbie, 2013), by dark nudges, than by rational reflection. Warning messages have often been added to dangerous gambling products (Ginley, Whelan, Pfund, Peter, & Meyers, 2017), but warning messages do not help when the underlying gambles are complex and difficult to understand (Weiss-Cohen, Konstantinidis, Speekenbrink, & Harvey, 2018). While the gambling industry claims to support responsible gambling (Miller, Thomas, Smith, & Robinson, 2016), the action of these same firms' dark nudges speak louder than words. And responsible gambling messages only increase gamblers' perceived stigma (Miller & Thomas, 2017); a cruel irony given how the system is designed to exploit them.

What should happen next? The modern gambling environment could be likened to a poker game played between gamblers, gambling firms, regulators, and researchers.

While these players each get dealt from the same deck of cards, a poker player's long-term results will depend on what she knows about the other players, and the size of her bankroll. Gambling firms possess detailed customer datasets for marketing optimization (Matz, Kosinski, Nave, & Stillwell, 2017), large public relations budgets (Petticrew et al., 2017), and oftentimes direct control of research funding (Cassidy, Loussouarn, & Pisac, 2013; Livingstone & Adams, 2016). Any expert poker player would exploit such a list of advantages (Newall, 2011; Newall, 2013). Researchers, meanwhile, must do their best with what funding they have, and without access to gambling firms' proprietary data. The end result is an unreasonably large transfer of wealth from gamblers to the gambling industry. Gamblers are not helped by some governmental actors who hesitate over gambling restrictions because of short-run revenue losses (Mairs, 2018), despite the large costs of gambling to society (Coren Mitchell, 2017). Gamblers deserve a fairer game.

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