Prevention paradox logic and problem gambling: Does low-risk gambling impose a greater burden of harm than high-risk gambling?

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Background and aims: The aim of this paper is to examine the evidence and arguments in favor of prevention paradox (PP) logic in the context of problem gambling. Evidence from recent studies of gambling and the distribution of harm across lower and higher risk gamblers is reviewed to examine the contention that the absolute burden of harm is greater in low-risk (LR) gamblers than the problem gamblers. *Methods:* The review examines a number of methodological and conceptual concerns about existing evidence in support of the PP. *Results:* The principal problems identified include the misclassification of LR gamblers; the use of binary scoring method that understates the frequency of harms in high-risk populations; a tendency to confuse behavior and harm; and the use of potentially overly inclusive definitions of harm with low thresholds of severity. *Discussion and conclusions:* This paper makes a number of recommendations for enhancement of this area of research, including the use of clear definitions of harm and LR behavior and a greater focus on harm with material impacts on people's quality of life.

Keywords: gambling, prevention paradox, harm, risk

INTRODUCTION

Since the late 1990s, there has been general acceptance of the view that problem or pathological gambling can be examined from a public health perspective (Korn & Shaffer, 1999; Productivity Commission, 1999). Central to these approaches is the assumption that the role of public policy should be to reduce harm and to emphasize early intervention and prevention rather than just the treatment of clinical cases. As with other addictions, people affected by gambling are no longer considered to fall into neat binary categories. Instead, reference is made to a "risk continuum." A small percentage of pathological cases will feature at one end (usually 0.5%–1.0%), a group of moderately affected individuals (2%–3%) will fall in the middle, and a larger low-risk (LR) population will form the longer tail of the distribution. Such perspectives usually assume some movement between categories. Some people who start off as LR may progress along the continuum and develop difficulties with gambling; therefore, the aim of good public policy is to prevent this progression. Accordingly, an extensive literature has developed that provides recommendations concerning the best ways to prevent the development of gambling-related harm. Such recommendations can range from reducing the accessibility of gambling, changing the structural characteristics of activities, community education to self-help guides (physical or online), which encourage people to adopt safe and responsible gambling practices (Ontario Problem Gambling Research Centre [OPGRC], 2013; Productivity Commission, 2010).

Such approaches assume that investment in the welfare and status of LR cases is preferred because of the ethical responsibility of policy-makers to prevent harm before it occurs. Another important consideration is that LR gamblers greatly outnumber higher risk gamblers. Therefore, anything which can be done to influence LR behavior may have larger overall community benefits and potentially be more cost effective. Given this logic, it is not unsurprising to find that there are increasing references to the so-called "prevention paradox" (PP) in the gambling literature. The term, first coined by Rose (1985, 1992), refers to the assumption that the majority of cases of a disorder or disease (in absolute numbers) arise in populations that only have an LR of that disease, and that relatively few cases arise from smaller high-risk populations. It is then assumed that interventions that focus on LR populations have the potential to reduce a much greater burden of harm and reach a greater number of individuals than if the sole focus of public policy was on high-risk individuals. The "paradox" arises because most individuals affected by the intervention do not often receive any meaningful benefit and, in fact, may even be inconvenienced.

When Rose (1985, 1992) proposed this notion and it was adopted by others, the principal focus was on physical diseases or disorders; and, in this context, the approach appears entirely valid. Most, if not all, individuals in the general population are at risk of harm from communicable diseases (e.g., measles, mumps, and influenza). For this

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reason, directing attention toward population-level strategies (e.g., immunization and sanitary practices) would appear to have considerable benefits. It would serve to reduce future harm or clinical cases developing. There would also be a strong argument that more cases of, for example, influenza probably will emerge in the general population than in smaller high-risk populations (which might include pregnant women, the elderly, or vulnerable infants in this context). Rose (1985, 1992) has similarly extended such logic to disorders such as Down's syndrome, where it is thought that a focus on general populations of women yields greater reductions in harm than if one were to only focus on women with higher risk profiles.

PP logic appears to involve two lines of argument. The first is the view that the highest number of problem cases should emerge from the larger lower risk population; the second is that the burden of harm, and therefore, the benefits of intervention (or harm reduction) is greater in LR populations. Although both arguments would appear to be sound, not all PP arguments or studies necessarily refer to both arguments. Nor is evidence very often advanced to demonstrate that one condition predicts the other. For example, it is conceivable that there may be some disorders which have few associated harms when they are not present. Thus, while one might argue that currently LR populations have the greatest pool of people from which clinical cases might emerge in the future, it does not mean that the *current* burden of harm is higher in those LR populations. For some conditions, one is either a clinical case or not a clinical case. However, alcohol use would appear to belong to a category of disorders, where it is possible to place behavior on a continuum where it is easier to identify individuals who are less, moderately, and significantly affected. For example, Rossow and Romelsjö (2006) in *Addiction* reported a Norwegian research which showed that the majority of people who have experienced serious harms associated with alcohol are in so-called low- to moderate-drinking populations as opposed to the top 10% of drinkers based on total consumption. They showed that around 60% of alcohol-related quarrels and over 50% of alcohol-related fights were reported by people who drink at "lower-risk" volumes or who reported getting intoxicated less frequently. They also showed that at least 75% of hospital admissions for suicide and violence did not involve the top 10% of high-consumption drinkers.

METHODS

Accordingly, in several recent papers and reports, a question has been raised as to whether a similar logic can be applied to gambling and the harms associated with gambling (Browne et al., 2016; Canale, Vieno, & Griffiths, 2016; Raisamo, Makela, Salonen, & Lintonen, 2014). For example, as Raisamo et al. (2014) argue, because gambling occurs along a continuum "it seems necessary to consider the harms experienced at any gambling involvement level and among individuals who do not meet the criteria for problem gambling" (p. 716). In the Raisamo et al.'s (2014) study, data from a 2011 Finnish gambling prevalence study

($n = 4,484$) were analyzed. Gamblers were classified into groups based on the Problem Gambling Severity Index (PGSI; Ferris & Wynne, 2001) and the prevalence of different forms of gambling harm was assessed for problem, moderate-risk, and LR gamblers. Harms included chasing losses, feeling guilty about gambling, criticism by others, health problems, financial problems, borrowing money to gamble, and other items. The results appeared to support the PP argument. The study reported that 68% of cases of feeling guilty about gambling were LR gamblers and figures of 48% were obtained for "been criticized" and 53% for "borrowing money." Similar findings are reported by Canale et al. (2016) in analyses based on the 2010 British Gambling Prevalence Survey. Several different categories of harm (dependence related, e.g., withdrawal or mood modification, and social, e.g., problems with spouse or other people) were considered and the prevalence of these was cross-tabulated by PGSI classifications. It was found that 62% of dependence harms and 26% of social harms were among individuals classified as LR gamblers.

RESULTS

Although these figures appear to provide impressive support for the PP argument, an identical problem is present in both studies. The PGSI is usually scored so that totals of 1–2 are considered LR gambling; scores of 3–7 indicate moderate-risk gambling (people who are thought to be experiencing some degree of gambling-related harm) (Ferris & Wynne, 2001). In both the Raisamo et al. (2014) and Canale et al.'s (2016) studies, "LR gamblers" are classified based on scores of 1–4. This is not consistent with the usual PGSI scoring and clearly would have the effect of including higher risk gamblers in the LR group. Thus, if a substantial proportion of the positive instances of harm were from those who scored 3 and 4 on PGSI (people who should usually be in the moderate-risk group), then the harm percentages for LR gamblers could be much lower. For example, in the Canale et al.'s (2016) study, instead of 26% of social harm arising from LR gambling, it might only be 10%. Similarly, in the Raisamo's (2014) study, the figure of 20% for health problems and 5% for financial problems associated with gambling might be very low indeed once the moderate-risk gamblers are removed from the LR group. Although the authors conducted some validation analyses to ascertain that there was evidence for concurrent and discriminant validity for the groups based on the non-standard scoring, this still does not deny the fact that the LR group was more likely to have included gamblers who would usually be classified as higher risk in other studies.

A second point to note with both of these studies is that it is questionable whether some of the items identified are really indicators of harm. For example, chasing losses, gambling more to obtain the same excitement, or betting more than one could afford are really behaviors that might lead to harm if repeated too often. This ambiguity is borne out, for example, in a study by Miller, Currie, Hodgins, and Casey (2013), who conducted a Rasch analysis on items from the PGSI. Feeling guilty, chasing losses, and betting

more than one could afford were identified as being "typical of low levels of gambling severity," although a separate appraisal of expert opinion indicated that chasing was considered a higher risk indicator. These results very likely reflect the fact that significant chasing is known to be a major aspect of problematic behavior, but it is also not difficult to understand how most gamblers (even LR ones) might report at least occasionally going back to win after having lost on a previous occasion. Similar arguments about the validity of standardized instruments have been made by Svetieva and Walker (2008), who argue that most items in measures, such as the PGSI, are not really true measures of harm. A third point relates to the use of binary scoring. In the Canale et al.'s (2016) study, for a harm of a given kind (e.g., social harm) to be registered, one only needed to have reported occasionally having experienced one of four social behaviors. Thus, a problem gambler who reported "always" having experienced all four possible social harms would be considered a positive instance of harm, but so would a LR gambler who only reported one form of harm occasionally. Similar criticisms of this nature are raised by Sinclair and Sillanaukee (1993).

To date, the most comprehensive study of the prevalence of harm in gamblers was undertaken in Australia by Browne et al. (2016). In this study, 4,136 people completed the PGSI as well as a 73-item harm scale that captured harm along a number of different dimensions: decrements to the person's health; emotional and psychological distress; financial difficulties, diverted financial resources, bankruptcy, or reduction of financial situation; reduced performance/loss of role at employment or study; relationship conflict or breakdown; and criminal activities. Cross-tabulation of harm categories with PGSI classifications showed that harm was much more prevalent as the level of gambling risk increased. However, using PP logic, the authors argued that the burden of harm in the community (in this case, the State of Victoria) is disproportionately higher in LR gamblers due to their large numbers. Further analysis is then presented using a health-related quality of life analysis, which is a method designed to estimate the burden of disease in terms of the number of days of life lost per individual due to a disorder or disability. The researchers argued that total years of life lost to disability were 51,000 years for LR gamblers compared with 35,000 for moderate risk and 15,000 for problem gamblers.

The Browne et al.'s (2016) study is an improvement on the earlier studies in that it uses the correct scoring for the PGSI and includes a detailed and dedicated harm measure. It also attempts to measure the impact of gambling-related harm in terms of lost quality of life. However, it raises a number of conceptual issues that need to be considered in the PP arguments. The first issue is to do with the nature of the harms assessed. Gambling-related harm is usually assumed to be serious. It refers to significant disruptions to a person's psychological, social, legal, or financial well-being. Even if one believes that the harms identified in the current DSM-5 classification for gambling disorder are too limited, it would still be reasonable to consider harm to refer to something which causes some significant reduction in a person's quality of life. One might refer to the current World Health Organization (WHO) definition of healthy

functioning which refers to "a state of complete physical, mental and social well-being" and argue that harm would need to entail a meaningful deviation from this state of being. In the alcohol research described earlier (Rossow & Romelsjö, 2006), it is clear that genuinely harmful events were central to the analysis. People were classified based on the number of intoxication events and the outcomes were alcohol-related quarrels and fights with others and hospital admissions. In the Browne et al.'s (2016) research, the list of 73 harms range from very severe items relating to loss of employment and bankruptcy to items such as: increased credit card debt; less spending on other recreational activities, such as eating out; reduction in my savings; reductions in my available spending money; and spending less time attending non-gambling social events. Inspection of the findings from this study shows that the percentage endorsement of serious harms by LR gamblers was usually very close to 0%, whereas the principal items where there was modest endorsement (10%–30%) related largely to the diversion of expenditure or the "opportunity cost" of gambling.

A very similar conclusion was reached by Li, Browne, Rawat, and Rockloff (2017) in Rasch modeling study of 5,597 gamblers and a hold-out sample used to validate the modeling. Reduced spend on non-gambling leisure and reduced disposable income from spending money on gambling were the only "harms" that were reported by more than 5% of LR gamblers. In another study, Abbott, Bellringer, Garrett, and Mundy-McPherson (2014) presented findings from the national New Zealand prevalence study and showed that a larger number of lower risk gamblers reporting betting "more than [they] could really afford to lose." However, it is important to observe that this item was only endorsed "most of the time" or "always" by 0.2% of LR gamblers and is NOT strictly speaking a harm item but a measure of impaired control. Only 0.5% of LR gamblers indicated that gambling caused "stress and anxiety" for them "most of the time" and 4.2% said sometimes vs. 33% of LR gamblers. Once again, these results do not provide strong evidence of genuine cases of harm being more numerous in LR populations.

A question, therefore, has to be raised as to whether these are genuine forms of harm. If one were to spend more money on shopping, subscribing to a new television channel, or going to sporting events, would not the same sorts of harm occur? The danger here is that if one softens the definition of harm, then it becomes possible to show that harm occurs at any point at the continuum, and therefore, the PP hypothesis becomes very easy to confirm. However, unlike in alcohol research, there is not a lot of evidence that any LR gamblers are likely to be "harmed individuals" as a result of these behaviors. For example, the research does not show evidence of significant binge gambling events in LR groups commensurate with the alcohol research. Nor does it show that the burden of significant harm (e.g., relationship difficulties) extends strongly into LR populations. A problem with such approaches is that harm is considered to be something of a "liquid" quality. One can, in effect, harvest small blocks of minor harm from LR cases and then aggregate them and compare this block with serious harm events. This is done by mapping harm to the

number of days of quality of life lost or disability incurred. But is this valid? Does it really make sense to aggregate what are essentially minor and possibly incipient symptoms of a disorder and then compare these with a full manifestation of the disorder? In effect, this becomes close to arguing that a person who has one or two symptoms of a disorder has some fraction of that disorder (e.g., 1/20 or 1/10, so that 10 × these individuals = 1 full disorder). How similar is this to surveying a room of people and identifying 50 who have some minor medical complaint (e.g., a tickle in the nose) which is causing them minimal discomfort and then arguing that their total harm is equivalent to the one person who has a full-blown head cold (and is miserable)? Only one person very likely has genuine harm of the nature that might make them (at least temporarily) not fully functioning as according to the WHO definition. In our view, the argument in favor of the PP would be stronger if the focus remains on the extent to which genuine harm extends into LR populations. Alternatively, we would encourage researchers to focus on the accumulation of minor harms, rather than to document to putative harm associated with isolated low-severity harm indicators.

DISCUSSION

If the evidence for a burden of harm among LR gamblers is subject to criticism, this does not necessarily mean, however, that the PP argument is without merit. The value of focusing on lower risk populations is that they are large and may be the source of a larger number of people who subsequently become problem gamblers. Thus, it has been suggested that broader policies which influence total consumption and which reduce regular behavior may also reduce problem gambling (PG) rates. Current evidence suggests that this argument is generally sustainable when widespread liberalization of gambling occurs, but the argument is less sustainable over time. As Abbott (2016) has pointed out, total gambling consumption (in the form of overall participation rates and expenditure) has fallen in many countries while PG prevalence rates have stabilized. In some countries, PG rates have remained the same or fallen, while total expenditure has remained largely static or only been slightly increasing (e.g., Australia and New Zealand). These trends have been attributed to various factors: maturity of the market (e.g., the activities have lost their novel appeal), responsible gambling policies, or people adapting to gambling. However, these trends also suggest that the argument in favor of policies that target the larger population of gamblers to reduce PG may not necessarily be as strong as before. PG appears, to some degree, to affect a small entrenched segment of the population and, as Abbott (2016) has suggested, there may be particular social and individual characteristics shared by those people which make them particularly vulnerable. His argument would, therefore, to some degree, imply some greater focus on high risk or vulnerable populations rather than the existing assumption that population-level changes (apart from a dramatic reduction or ban on some forms of gambling, e.g., electronic gaming machines) will influence PG rates.

Another way to test the PP argument is to consider evidence from longitudinal survey studies that have tracked the status of gamblers over time. If people are classified by PGSI level, it is possible to ascertain what percentage of LR gamblers progress to PG over time and the absolute numbers of people involved when percentages are extrapolated to the general population. A study of this nature has, for example, been undertaken in the Australian State of Victoria, the same location of the Browne et al.'s (2016) harm study, and funded by the same organization (Victorian Responsible Gambling Foundation, 2012). Evidence in support of the PP argument is not strong in this study. For example, of 240 LR gamblers identified in the 2009 wave of this study (LR = 5.77% of the total sample of 4,158), only one LR gambler (0.42%) progressed to PG by 2010 as compared with 12% of the moderate-risk gamblers (93 moderate-risk gamblers were in the total sample). It is clear that, if such figures were extrapolated to the general population, the number of problem gamblers emerging from the moderate-risk cases would be over 10 times higher. For the PP argument to be more sustainable, one might need to examine whether LR gamblers are more likely to transition to moderate-risk gambling at first instance (10% of gamblers in the Victorian studies did this between Waves 2 and 3 of the study), but evidence would need to be obtained to show that these gamblers then progressed to PG over time rather than transitioning back down to LR on the following wave.

CONCLUSIONS

The danger of overextending the PP argument is that it can lead to an overreach of policy and regulation into lower risk behaviors. Although it is valid to draw some parallels between gambling and other potentially addictive behaviors (e.g., smoking and alcohol), it is important to recognize that low-level gambling is not the same as smoking. Smoking is known to cause harm even at low levels. Similarly, there is evidence that even those with lower levels of total alcohol consumption engage in binge drinking on occasions. To advance this area of research, we suggest that several methodological and conceptual issues need to be considered. First, it is important to ensure that LR gamblers are appropriately defined and do not include people that other studies would consider moderate-risk gamblers. Second, we are not suggesting that measures, such as excessive expenditure or reducing one's savings, are invalid items for measuring harm. Such behaviors may indeed be a major source of reduced quality of life for people, including some problem gamblers. What we believe is that one needs to consider some meaningful threshold for these behaviors and that they are seen to reduce people's quality of life or compromise their psychological, physical, or social well-being. Third, we caution against attempts to classify very minor types of harm and then aggregate them. Such approaches may lead to the PP becoming hard to falsify in some cases because the threshold of harm becomes lowered to the extent that it captures even the most minor impacts. Fourth, we would encourage a focus on harms rather than behaviors which may lead to harm: for example,

chasing losses is not a harm, but a form of behavior. Fifth, we would encourage the scrutiny of available longitudinal data sets to look for evidence that documents the extent to which problematic cases of gambling do indeed emerge from LR populations over time. Finally, we should encourage approaches that examine the effects of the accumulation of minor harms as opposed to minor harms in isolation.

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