Sapthiang, S., Van Gordon, W., Shonin, E., Campayo, J.G., Griffiths, M.D. (2019). Adolescent problem gambling requires community-level health promotion approaches. *Addiction Research and Theory,* in press.

Adolescent problem gambling is increasingly becoming a global public health concern. Consequently, there is a need for more effective population- and community-level health promotion responses. Indeed, prevalence estimates indicate that adolescents engage in gambling at a higher rate than adults, and that up to 12.3% of youth internationally exhibit problem gambling behaviour (Calado et al., 2017; Dowling et al, 2017). Problematic youth gambling can lead to a range of negative consequences during adolescence, such as mental and somatic health problems, conflict in the family and relationships, financial problems, hygiene problems, educational impairment, impaired employment prospects, delinquency and criminal behaviour, and legal complications (Derevensky and Gupta, 2004; Dowling et al., 2017; Griffiths, 2011). Furthermore, adolescent gambling incurs a higher risk of serious gambling problems in adulthood (Granero et al., 2014; Griffiths, 2011), and may predict substance use disorders and serious psychiatric illnesses later in life (Grant et al., 2010).

Compared to public health concerns such as tobacco and alcohol control, immunisation, road safety, obesity, mental illness, and environmental contaminants control, a public health approach towards assessing the disease burden of problem gambling has been slow to develop (although a number of scholars suggested such an approach going back over 15 years; Griffiths, 2001; Shaffer & Korn, 2002). This is particularly the case for adolescent gambling that, due to liberalising policy changes, has been influenced by a proliferation of gambling products in both online and offline (i.e., land-based community) settings (Calado et al., 2017; Thomas et al., 2017; Wijesingha, Leatherdale, Turner, & Elton-Marshall, 2017). For example, increased gambling participation amongst adolescents (and adults) has been facilitated by commercial strategies such as (i) developing new (including remote) gambling technologies that often bear similarities to popular

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technology-based games) (Lopez-Gonzalez & Griffiths, 2018), (ii) using social media to promote and incentivise gambling engagement (Gainsbury et al., 2016), and (iii) aligning gambling with culturally-acceptable activities such as sport (Lopez-Gonzalez et al., 2017; Thomas et al., 2017).

While legislative and regulatory measures have been widely implemented (such as making gambling illegal for individuals aged under 18 years old [Griffiths, 2003]), some forms of underage gambling are hard to regulate (Public Health England, 2013). Indeed, the effectiveness of government-enforced measures remains highly questionable, and research over the past two decades has frequently found evidence of illegal underage gambling in many countries (e.g., Griffiths & Sutherland, 1998; Molinaro et al., 2014; Tong et al., 2017). For example, in Italy, 44% of students aged 15-19 years report having engaged in some form of underage illegal gambling during the past 12 months (Molinaro et al., 2014).

Underage adolescent problem gamblers are now more likely to gamble online rather than in land-based venues, because it is easily accessible and provides convenience, affordability, and anonymity (Canale, et al., 2016; Griffiths & Parke, 2010). Remote forms of gambling are also easier for young people to circumvent age verifications and parental supervision (Delfabbro et al. 2009). Another popular form of underage youth gambling activity is the use of slot machines which can become repetitive and habitual as a result of operant conditioning processes, high event frequencies, near miss opportunities, and short intervals between the staking of money and pay out (Canale et al., 2016; Griffiths, 2011). Slot machines are readily available in many countries as they are frequently located in bars, restaurants, motorway services, and amusement arcades (Choliz, 2010).

Youth vulnerability to gambling is also increased due to the fact that most industry-implemented or environmental-level problem gambling reduction strategies do not focus on adolescents *per se* (see Tanner et al., 2017). Furthermore, in some countries, the government provides conflicting messages to adolescents concerning the risks and legality of gambling. For example, in the United Kingdom, protection of youth is a key component of the Gambling Act

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2005, and individuals under the age of 18 years are not permitted to enter most gambling venues. However, UK adolescents aged 16 years or older can legally gamble on the National Lottery, scratchcards, some other lotteries, and football pools, as well as there being no restriction on children gambling on coin pushers and low-stake slot machines in family entertainment venues (BeGambleAware, 2018; Griffiths, 2011). Furthermore, although most national lotteries do not explicitly target youth in marketing campaigns, many lottery corporations actively promote and associate the use of lottery proceeds for funding health and social welfare initiatives, including those relevant to and used by adolescents (Messerlian et al., 2005).

In addition to the aforementioned commercial and environmental pre-disposing factors, adolescence is a transitional period in which risk-taking behaviours are typically pronounced. For example, while adolescents are generally able to undertake a cost-benefit analysis in respect of a given choice, their levels of deliberative decision-making are lower compared to young adults (Canale et al., 2015). Furthermore, given that adolescents are likely to have a myopic focus on reward, they are more susceptible to gambling-related cognitive distortions such as superstitions and the inability to understand independence of turns (Canale et al., 2015). Compared to previous generations, the youth of today are also likely to regard gambling as a much more socially acceptable and widely promoted activity (Canale et al., 2016).

Community-level health promotion approaches

A key consideration arising from Rose's (1992) work relating to the prevention paradox, is whether to target high-risk individuals who are generally small in number, or target low-risk individuals across the wider population with a view to eliciting greater overall reductions in disease burden. There is conflicting evidence concerning the existence of the prevention paradox in respect of problem gambling (Delfabbro & King, 2017). For example, in a study in Australia, less than 0.5% of 240 low risk adult participants went on to exhibit problem gambling behaviour within a one-year period (Victorian Responsible Gambling Foundation, 2012). However, a study

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based on data from the British Gambling Prevalence Survey 2010 reported that gambling-related harms were distributed across non-high-risk gamblers and were reported by the majority of adult gamblers who exhibited regular (i.e., rather than extreme) gambling patterns (Canale et al., 2016). Similar findings were also reported in Finland (Raisamo et al., 2014).

More research is needed that specifically investigates the existence of the prevention paradox in adolescent gamblers. However, in light of the aforementioned pre-disposing factors, the ineffectiveness of some government-enforced measures, and the use of commercial strategies that resonate with youth gamblers, there is a strong argument for largescale community-level approaches that seek to educate adolescents and build resilience. Further support for such a health promotion approach derives from various behaviour and addiction theoretical models which assert that adolescents that engage in one form of problematic behaviour, are likely to engage in other problematic behaviours. Key examples are problem behaviour theory (Donovan et al., 1991) and the syndrome model of addiction, which conceptualises addiction as a syndrome that can manifest across multiple expressions of addiction (e.g., alcohol, drugs, gambling; Shaffer, 2004).

Another example is 'ontological addiction theory' (OAT), which proposes that most forms of addiction – as well as most forms of mental illness – derive from insecurity due to an individual's faulty beliefs concerning their self-concept (Van Gordon et al., 2018). Indeed, intervention studies based on OAT demonstrate that by undermining such faulty ontological belief structures, there can be improvements across a broad range of somatic, psychological (including behavioural addiction) and psycho-spiritual outcomes (Shonin et al., 2016; Van Gordon et al., 2018). Furthermore, consistent with the need-state and dispositional theories of gambling (Griffiths & Delfabbro 2001), most adolescent problem gamblers engage in gambling as a maladaptive coping strategy to escape underlying problems and unpleasant feelings (i.e., as opposed to monetary reward *per se*) (Canale et al., 2016; Griffiths, 2011).

Consequently, there appears to be a role for broad-based community-level health promotion strategies that target the underlying cause of multiple adolescent problem behaviours, of which

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problem gambling is just one means of expression. Based on recommendations by Dowling et al. (2017), examples of such strategies include (i) mirroring early intervention approaches to reducing youth alcohol and drug problems by screening gambling behaviour in young people to identify profiles likely to be at risk for gambling problems, (ii) delivering broad-based problem-gambling preventative interventions to adolescents, (iii) cultivating protective factors such as parent supervision and socio-economic status, the latter of which can be addressed via enhancing education pathways, and (iv) implementing broad-based interventions that foster healthy child development and ameliorate antisocial behaviours in adolescents. Similarly, in addition to augmenting problem identification and referral pathways for adolescent gamblers, Public Health England (2013) suggest strategies of prevention education in community settings.

In line with these recommendations, studies have started to assess the effectiveness of preventative broad-based adolescent gambling interventions, including those implemented in school settings. One such recent school-based study evaluated the effectiveness of an intervention targeting a general sample of adolescents, including those not deemed to be at risk for problem gambling (Donati et al., 2018). The intervention focussed on undermining gambling-related cognitive distortions by reducing probabilistic reasoning errors and superstitious thinking. The intervention demonstrated significant improvements in gambling-related cognitions and superstitions, and was described by the authors as a "*gambling-specific psychoeducational and skills training prevention program to reduce the erroneous cognitions on gambling acting on gambling-related knowledge, beliefs, attitudes, and skills as well as the awareness about the nature of gambling*" (Donati et al., 2018, p.6).

Broad-based adolescent problem gambling screening and prevention interventions delivered in school settings have also recently started to make use of the internet, as the confidential and anonymous nature of online approaches increases the likelihood of youth divulging accurate information that can inform and facilitate behavioural change (Canale et al., 2016). Similar to traditional classroom-based approaches, web-based interventions typically seek to change

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maladaptive cognitive processes and beliefs relating to gambling. Examples of web-based gambling-reduction intervention strategies that have been proven to be effective for adolescents under research conditions include the (i) use of graphic-based feedback to foster interest and assimilation, (ii) use of personalised feedback relating to risk of developing gambling-related problems, and (iii) provision of accurate information concerning cognitive distortions and superstitions (Canale et al., 2016). Although further research is required to confirm their effectiveness and utility, web-based interventions are likely to be a pragmatic means of delivering community-level adolescent preventative approaches as they are cost-effective and do not substantially impact on school resources.

Another approach with potential for use as a community-level preventative interventional strategy for reducing adolescent gambling is mindfulness, which has been the subject of increased empirical attention in recent years (Sapthiang, Van Gordon & Shonin, 2018). Mindfulness is a form of meditation that involves cultivating present moment awareness as a means of increasing perceptual distance from gambling urges, as well as from distressing emotions and maladaptive cognitive processes more generally (Griffiths et al., 2016). Furthermore, the calm states elicited through mindfulness practice can substitute the need for gambling-related sensation seeking and/or desiring states of elation (Shonin et al., 2013).

Research has shown that mindfulness can be an effective preventative and treatment strategy for problem gambling (Griffiths et al., 2016; Shonin et al., 2014) as well as other forms of behavioural addiction in adults (Van Gordon et al., 2016, 2017). Research also demonstrates that mindfulness is an accessible and effective means of addressing various behavioural and addiction problems in adolescents and children (Shonin et al., 2012). However, although recent studies indicate that mindfulness can be administered as an internet-mediated health promotion intervention (Jayawardene et al., 2017), there is a need for further research specifically investigating the effectiveness of mindfulness as a preventative measure for adolescent problem gambling. Furthermore, there is ongoing debate concerning the credibility of mindfulness

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teachers, which relates to concerns over their ability to impart an experiential understanding of this ancient contemplative technique (Shonin, Van Gordon, & Griffiths, 2015).

Final thoughts

While awareness of problems caused by gambling during adolescence has been steadily increasing, public health responses to this issue have been slow to develop versus other key health concerns in young people. Consequently, research indicates that despite some largely crude government-implemented restrictive and health promotion measures, many minors participate in illegal gambling that places them at a greater risk for problematic gambling behaviour compared to adults (Donati et al., 2018; Griffiths, 2011). Along with a number of established and emerging psychological theories, research likewise indicates that problem gambling in youth is an expression of underlying problematic behaviours and beliefs.

Evidence-based community-level preventative interventions – that seek to target these contributory maladaptive cognitive and behavioural processes – appear to be a promising solution. Such interventions should be implemented in addition to improving awareness in employees working in a wide range of gambling venues of underage gambling as well as problematic gambling behavioural patterns more generally (Griffiths, 2003; Ladouceur et al., 2017; Rintoul, Deblaquiere, & Thomas, 2017). Thus, more research into preventative community-level youth-based problem gambling approaches – including mindfulness – is warranted, particularly because it appears that such interventions can be delivered with minimal burden on costs and resources.

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