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GAMBLING EDUCATION

Current practice and future directions

A **theory** and **evidence** scope

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1. Introduction

Gambling is a significant issue facing young people today. The latest research on young people and gambling in the UK by the Gambling Commission (2019) found that 11% of 11-16 year olds had spent their own money on gambling within the past week. It found that 1.7% of 11-16 year olds met the definition of 'problem gambler' and 2.7% fell into the 'at-risk' category¹. Young people are regularly exposed to gambling adverts and sponsorships, for example, the same study found that 40% of 11-16 year olds saw gambling adverts on TV more than once a week, with 7% reporting that adverts or sponsorships prompted them to gamble and a further 10% being unsure. Online games (played by 93% of 10-16 year olds; Parent Zone, 2019) now appear tightly interconnected with gambling as many have gambling activities within them (for example, the ability for avatars to play slot machines), or feature gambling mechanisms built into the game's structure, such as loot boxes (Floros, 2018; Parent Zone, 2019; King, Gainsbury, Delfabbro, Hing, Abarbanel, 2015). The same can be said for viewing national and international sports such as football where betting on the game often co-occurs and normalises gambling behaviour (Djohari et al., 2019; Nyemcsok et al., 2018; Hing, Vitartas, Lamont, 2014). Whilst in various forms and social settings gambling may be a positive experience, as this paper will unpack, the harms it can cause are significant and diverse, including some that are complex and obscured.

As with other products that have a high risk of harm, such as alcohol or tobacco, a public health approach is warranted, in which contributors to gambling harms across various domains are mapped and systematically addressed (van Schalkwyk et al., 2019²; Sapthiang, Van Gordon, Shonin & Griffiths, 2019). Education of children and young people is an established component of a public health approach, and indeed recent statutory guidance for educators in England highlights gambling as a topic which needs to be covered in secondary education³. Helpfully, a systematic review of evaluations of school-based gambling problem prevention programmes has recently been published (Keen et al., 2017) alongside other reviews (St Pierre, Temcheff, Derevensky & Gupta, 2015; Oh et al., 2017) – these identify both educational content with encouraging outcomes, as well as the limitations of this evidence base.

Most evaluated education programmes have focussed on both increasing knowledge of gambling and its negative consequences, and reducing relevant cognitive errors (for example they have sought to challenge superstitions and illusions of control and invulnerability, and develop understanding of odds, house edge and randomness). Some have also taught skills such as adaptive coping, problem-solving and decision-making. Whilst many evaluations have had encouraging results, it is not yet known which programmes are most effective, which components are necessary or sufficient, or whether in fact any cause harm. It is also unknown whether other approaches might have comparable or greater impact. Indeed, several authors have underscored the need for more theory-driven programmes and highlighted the potential for novel interventions based on emerging evidence and understandings (for example, Broussard & Wulfert, 2019a; Keen et al., 2017; St-Pierre et al., 2015; Floros, 2018). There are several research areas – such as gambling psychology, adolescent psychology, gambling industry practice, and wider education effectiveness – that would appear to have broad relevance to preventative gambling education⁴ and that might usefully inform both current teaching and future programme development. The aim of this paper is to take this 'wide-lens' approach – identifying both evidenced and promising approaches for preventative gambling education as indicated by a range of theories and research findings. This is with the hope of informing further programme development and research, as well as current teaching practice and guidance. It should be noted that this is not an exhaustive review of all potentially relevant areas of research; the aim is simply to widen the lens, exploring not only those components already thought to be effective but also those that might plausibly be on the basis of research and theory.

¹ Note however that problems with gambling exist on a continuum and other measures have lower thresholds for classifying someone as being a 'problem gambler' (related issues are explored in Section 2). There is also the question of whether, due to stigma, minimisation or misunderstanding, people may under-report difficulties on self-completion measures (Carran, 2018).

² These authors evidence that this approach must be truly independent from industry influence

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/805781/Relationships_Education_Relationships_and_Sex_Education__RSE__and_Health_Education.pdf

⁴ In the interests of brevity, from here onwards this is referred to as 'gambling education' or 'preventative education'. It is specified if prevention of another issue is the aim.

A central question is the ‘why’ – why should various topics be included in gambling education or, as a start, be explored as inclusions? A key aim is to introduce theories and ideas that might enrich and improve gambling education – this is a timely endeavour given that reviews have identified this education as ripe for further development and there is increasing recognition of its necessity.

Of course, what is ‘effective’ or ‘promising’ fundamentally depends on what it is we want to achieve. What does preventative gambling education hope to support young people with? What is its ambition? What *should* be its ambition, and what is ethical? Furthermore, what outcomes should it seek to *avoid*? Answers to these questions are themselves informed by an understanding of what gambling harms actually comprise. Therefore, the following two sections explore these questions as a necessary precursor to the subsequent discussion of educational content.

2. Gambling harms and ethical aims for education

Much of the theory and research on gambling distinguishes between at least two forms of gambling: ‘problem gambling’ and what is either termed ‘non-problem gambling’ or ‘responsible gambling’. At times a third, middle, category of ‘at-risk gambling’ may be demarcated. A person is defined as a problem gambler if they report a certain number of distressing or dysfunctional gambling behaviours or experiences. As an example, a young person is classified as a problem gambler if they endorse⁵ at least four of nine items of the DSM-IV-MR-J problem gambling screen, and deemed at-risk if they endorse two or three. The nine items cover areas of: preoccupation, tolerance, withdrawal, loss of control, escape, chasing, lying, illegal acts and risked relationships (see for example, Gambling Commission, 2019). Whilst this approach of classifying people into problem, non-problem, and possibly at-risk gamblers has certain uses (for example perhaps discriminating who is in need of treatment), it is insufficient and misleading if used as the approach to understand gambling harms – as noted, this being an essential prerequisite for planning preventative education.

Firstly, individuals are on a continuum in the extent to which they experience gambling harms, and categorical approaches can miss harms on the milder end of the spectrum. As an example, the DSM-IV-MR-J screening tool would classify a young person who reports sometimes spending much more than they had planned to on gambling, and often taking money from their family to spend on gambling, as a ‘non-problem’ gambler (not even at-risk). Importantly, these lower levels of harm may be experienced by more people, accumulating to a greater cost to communities and societies as a whole than more severe harms experienced by fewer people. This situation is known as ‘the prevention paradox’ and has been found to be generally true of gambling – i.e. the majority of gambling harms are experienced by those not classified as problem gamblers (for example, Browne & Rockloff, 2018).

A further issue is that many definitions and measures of gambling harms do not cover the full range (Rogers et al., 2019). Costs to a person’s family and friends are important: they can experience distress, relational conflict and breakdown, anxiety, distrust, stigma, missed experiences, or neglect, as well as substantial financial loss (Orford et al., 2017, Darbyshire et al., 2001; Kourgiantakis et al., 2013). Further, there is a general lack of attention to the missed opportunities that may be experienced by both individuals and their friends and family – in other words, more attention paid to ‘bad things happening’ than ‘good things not happening’ (Browne et al., 2016)⁶. On a societal level, gambling appears to increase inequality (Livingstone et al., 2018); evidence of this link includes that gambling opportunities disproportionately cluster in deprived areas; and both unemployed individuals and those in more deprived areas gamble more frequently than their counterparts (see Rogers et al., 2019). In turn, inequality reduces wellbeing and increases a multitude of physical and mental health problems (Wilkinson & Pickett, 2019) particularly in those least well-off, in a vicious cycle.

⁵ To a greater or lesser extent depending on the specific item.

⁶ Note that a complex and nuanced approach needs to be taken to identifying and interpreting opportunity costs, given that undertaking any activity means something else not done. To conclude that lost opportunities are problematic, they need to be demonstrably tied to people’s wellbeing.

A last often overlooked gambling harm is that to autonomy, defined as one's behaviour being experienced as chosen, volitional and reflectively self-endorsed. Research flowing from self-determination theory (SDT; discussed further below) has evidenced the central importance of autonomy to human wellbeing, quality of life, and flourishing (Ryan & Deci, 2017). When autonomy is threatened, individuals' vitality and mental health tend to suffer. In various gambling games and contexts, the rules, odds and overall set-up are clear to those gambling. In these situations, gamblers are likely to experience a greater degree of autonomy (i.e. feeling and indeed being more 'in control') than in gambling beset by what has been termed 'dark nudges' (Newall, 2019). Discussed in more detail below, these are features specifically introduced into games to exploit human biases and increase spending, whilst this intention is kept hidden. A recent study (Revealing Reality, 2019) found that, of its 25 participants selected to represent common UK gambler profiles, all had experienced times when gambling made them feel bad and typically these moments involved feelings of lost control.

Related to this discussion of wider gambling harms are questions about the usefulness and ethics of the very terms 'problem gambling', 'non-problem gambling' and 'responsible gambling'. Is gambling behaviour classified as 'non-problem' necessarily non-problematic or without harm? Or to put it another way, is 'non-problem gambling' as non-problematic as not gambling at all – as the term implies? And does the term 'responsible gambling' imply that those who are experiencing gambling-related harms are irresponsible? This relates to wider concerns that the gambling industry supports this construction of gambling (into broadly 'problem' and 'responsible' forms) to minimise wider harms and to pathologize and subtly blame those who are suffering (van Schalkwyk et al., 2019). In simple terms, if individuals are seen as the problem, there is likely less drive to regulate what in fact are problematic industry practices. Negative stereotypes of 'problem gamblers' in turn compound distress and appear to make it harder for people to identify difficulties and seek help for them (for example, Horch & Hodgins, 2015).

This wide-lens approach to gambling harms, and a critical perspective on how they are narrated, are useful in delineating the rightful aims of gambling education. They suggest that the aim of simply preventing 'problem gambling' is too narrow – and that communicating the narrative of 'problem gambling' versus 'responsible

gambling' in the classroom carries risk. Arguably, a more ethical aim is for students to be equipped with the knowledge and skills they need to act in gambling situations with autonomy, and in line with their intrinsic interests and theirs and others' best interests – both in the short- and long-term. The long-term is important given that *young adults* engage in more risk-taking and are likely to be more at risk of gambling difficulties than adolescents (Romer et al., 2017; Carran, 2018). In other words, adolescents are at an important developmental stage where intervention efforts may prevent progression into harmful stages of gambling.

Many measures of problem gambling capture well issues that follow from compromised autonomy (for example, spending more money than planned, preoccupation, telling lies and stealing). When used in a dimensional fashion, reflective of the continuum nature of gambling harms, they can play a useful role in clarifying and evaluating gambling education objectives. There is also scope for creating new measures and items probing additional strands of autonomy and motivation. Additionally, as various evaluators have done (Keen et al., 2017), such measures may be helpfully complemented by simple measures of gambling frequency. Whilst abstinence from gambling may not be the fundamental aim of gambling education, gambling frequency can serve as a rough or proxy measure of harm, given that: a) it is unclear that any level of gambling carries no risk of harm; b) frequency of gambling is a strong predictor of gambling problems (Dixon et al., 2016; Chiu & Storm, 2010), and c) early onset of gambling reliably predicts gambling problem severity and may be a causal factor (Sharman et al., 2019). As the next section explores, it is also essential that evaluation (as well as resource development) is informed by thinking around potential harmful intervention outcomes and seeks to avoid these.

3. 'First do no harm'

Avoiding harm is thought to be an ethical imperative superior even to doing good. Bonell et al (2015) argue that theories of how interventions can harm (what they term 'dark logic' models) should be routinely developed because, put simply, we are in a better position to avoid inadvertent negative consequences if we strive to make ourselves aware of them (understanding then informing both resource development and evaluation). The

literature on the psychology of gambling, together with that on effective personal, social, health and economic (PSHE) education, indicate a variety of ways in which gambling education could unintentionally increase rather than reduce problems. In particular:

- In describing the nature of gambling or in bringing the issue 'to life', information could be provided which effectively shows students how to gamble (see [PSHE Association & Gamble Aware teacher handbook](#), 2019, pg. 20, for an example) or which glamourises it, increasing gambling competence and motivation respectively.
- Examples which highlight gambling wins could pique interest in it, directly leading students to engage with it. Especially with adolescents, as they have a heightened propensity for sensation-seeking, and are more sensitive to reward and less averse to risk than younger or older age groups (for a review see Romer et al., 2017).
- If extreme examples of problem gambling are focussed on, this could affirm negative stereotypes, which in turn can a) increase stigma, reducing the likelihood of help-seeking in those who are struggling; b) compound any denial and minimisation that those with difficulties are engaging in.
- Extreme examples of gambling difficulties may also communicate powerlessness, reducing self-efficacy in individuals who see themselves as addicted. (see next section for more on the issues around over-emphasising harm or focussing on those that are severe).
- Emphasising a distinction between 'problem' and 'responsible' (or non-problem) gambling may normalise and legitimise most gambling. Going further, conveying the idea of responsible gambling could in fact be seen as a form of promotion.
- Simply through talking about gambling as if it is normal and acceptable, this may convey approving social norms, which could then increase engagement in it.
- If on balance, education increases the salience of gambling in students' minds without developing adaptive knowledge and skills, this salience by itself could increase gambling simply by raising its mental profile as a recreational option.

- In relation to targetted interventions specifically (in which there is only or increased attention to those at elevated risk) there are particular risks – at one end stigma, and at the other, normalisation and peer-training (notwithstanding that such approaches can have benefits, reducing specific contributors to vulnerability).

Note that a number of these hypothetical inadvertent consequences might not be immediate, but come about some time following the education (for example, in the formation of gambling difficulties in young adulthood). Also, a number will only be relevant to subsets of young people, including those already at greater risk of difficulties by virtue of familial, community or peer influences.

Going further, even interventions which appear to have no impact (or a small positive one) may be harmful if they reduce the opportunity for those that are more effective (on the same or different issues) (Bonell et al., 2015). And lastly, moving from the content to the policy surrounding education, education may be detrimental if it is seen as even a partial alternative to regulation, if this regulation would be a more effective means of reducing harm. On a more fundamental and ethical level, education should not be used to build young people's resilience against something which in fact they could more simply be protected from. Whilst there are rightful debates about young people's rights to participation and protection and the tension between the two, it is widely agreed they should be protected from unhealthy commodity industries' (UCIs) nudges and overtures. It would appear societal hypocrisy to teach young people truths about gambling in education, and yet simultaneously leave them unprotected from persistent industry attempts to obscure, undermine or challenge these truths (Derevensky et al., 2010). And it is possible that at high levels of exposure and 'nudging', preventative education could have less impact. Furthermore, research would suggest that some young people are vulnerable to gambling problems by virtue of adverse childhood experiences and related neuropsychological proclivities such as impulsivity (Lane et al., 2016; Lovallo, 2013) – these contributors may be less amenable to educational efforts than others; in either case, approaches which create barriers to high-harm products would seem warranted (Romer, 2010).

This understanding of potential inadvertent consequences (a rough 'dark logic' model; Bonell et al., 2015) has several broad implications. Firstly, most of these risks, when taken account of, should be possible for teachers and resource developers to side-step. As explored below, there is much that can be taught in educational programmes without gambling being glamourised, normalised, legitimised, or promoted, and without young people being instructed, stigmatised or disempowered. In everyday practice, educators can check for and avoid those examples, anecdotes and activities that appear to have these risks attached. Secondly, evaluations should be designed so that they are sensitive to this range of negative outcomes as well as the various hoped-for positives. It is an advantage to the field that control groups have been routinely employed in gambling education research trials (Keen et al., 2017) as this design can detect a fuller range of outcomes than simpler pre-post approaches. Qualitative, longer-term follow-up, and more comprehensive measures would further increase the ability of studies to capture diverse impacts. Finally, policy-makers should be mindful of the ethical framework in which gambling education should sit. Robust regulation of the gambling industry would appear an important sister of preventative education, without which education may lose both effectiveness and validity.

4. Promising inclusions in gambling education

The preceding discussions on gambling harms, and the aims and risks of preventative education together inform this main section of the paper, which reflects on various possible strands in this education. As noted, both components included in existing, evaluated resources are discussed, as well as those that might merit inclusion on the basis of wider theory or research.

1. Increasing understanding of the nature and harms of gambling

Most if not all evaluated educational programmes have included content on both the nature of gambling (what it is and how it works) and its risks and harms (for example, the potential for financial loss and loss of control) (Keen et al., 2017). Typically this teaching also covers signs and symptoms of problem gambling and where to go for help.

There are various good reasons to teach young people about the nature of gambling. Most simply, it would seem a necessary prerequisite for later teaching that challenges gambling cognitive distortions and the like (see next section); indeed, simply in and of itself it may call a number of these into question. For example, the concepts of *odds* and *house edge* implicitly challenge illusions of control, invulnerability and profitability. Furthermore, some forms of gambling may be less readily identified as such than others (for example, the national lottery versus sports betting), and by highlighting that they are indeed examples of gambling, students may be more critically aware of them, bringing to bear on their thinking and decisions an understanding of gambling's risks. Recent evolutions in gambling are making it harder to spot all its forms, potentially making this component of gambling education increasingly important. An example of this evolution is the introduction of loot boxes into online gaming (Zendle & Cairns, 2018). People gaming can 'pay' (in monetary or non-monetary ways) to open them and they randomly provide in-game rewards, yet they are not clearly labelled as gambling, and are readily available in games classified as suitable for children aged seven years and above (Parent Zone, 2019). Loot boxes are highly profitable to the 'gaming' industry yet appear to detract from its pleasures, increasing the risk of financial loss, frustration and low mood (Parent Zone, 2019). Loot box purchasing is highly associated with problem gambling (for example see Li et al., 2019; Zendle et al., 2019). Another example of the 'blur' that has been introduced around what constitutes gambling is the increasing use of the terms 'game', 'gaming' and 'play' by the gambling industry (and state actors in the case of the UK National Lottery) as replacements for gambling terms (Sharman, personal communication). All of this indicates that teaching on the nature of gambling should draw students' attention to forms that appear less recognised, including those that are recent additions and are prevalent, and it should highlight the ways in which language is used to disguise gambling (discussed further below).

Turning to education on risks and harms, the rationale for its inclusion in gambling education would seem to be that this information may deter young people from gambling (in particular frequently or with large amounts of money), given the natural human tendency to avoid negative feelings, experiences and life events.

Indeed, research has found that a significant factor in adolescents' reduced drug use is their increased understanding of drug risks (for example, Bachman et al., 1998). Interestingly, studies indicate that adolescents are particularly risk-seeking, compared to those older or younger, in situations of ambiguity where the risk is unclear – they are often not more so when risks are clearly known (for a review see Romer, 2017). Therefore, providing clear information about odds and risks (both within gambling games, and regarding gambling as a whole) may move gambling from an ambiguous risk activity to a known risk activity, thereby reducing adolescent engagement with it. In short, information about risks and harms is important for informed decision-making and this may be particularly the case for adolescents.

Theory and research indicate that how and what risks are taught is however essential to the effectiveness and ethics of this education. Sometimes teaching and campaigns whilst highlighting harms imply high prevalence or approval of the behaviour in question and this can increase interest (Romer, 2010, and see below). If severe harms are emphasised, teaching may be dismissed as irrelevant – young people seeing no resemblance between themselves and the small minority of people dealing with the catastrophic impacts of problem gambling (Shannon et al., 2017). A complementary point made by Keen et al. (2019) is that this approach is also focussed on issues temporally distant from most young people (very 'downstream' of where they are), in contrast to education looking at the early factors in the formation of gambling difficulties which may be more relatable (see next section). Furthermore, over-emphasising harms may be (rightly) judged as untruthful, sparking distrust and disengagement, and if this is done with a variety of issues (drugs, gangs, gambling, sex etc.) young people may be left with a maladaptive sense of fatalism (Donati et al., 2019) and/or apathetic or defensive stances towards PSHE (McGeeney & Hanson, 2017). Additionally, young people place more weight on perceived benefits than perceived risks in many risk situations (Parsons et al., 1997), given their heightened sensation-seeking (for example, Harden & Tucker-Drob, 2011) suggesting this as an important parallel focus: education could focus on reducing perceived benefits rather than primarily emphasising costs. And, when risks are discussed, it is

important that they are those that are most relevant to adolescents rather than to adults – young people are more likely to view as significant those that are short-versus long-term (Moore et al., 1997).

On a related note, research by St Pierre, Derevensky, Temcheff and Gupta (2015) suggests that if adolescents anticipate the negative emotions that might follow gambling, such as regret and guilt, they gamble less frequently and problematically. This research accords with the wider literature on the adaptive function of negative anticipated emotions (NAEs) and suggests that they should be included in gambling education as one set of highlighted risks⁷. Education could also help young people develop their skills in identifying negative feelings that might follow various choices, with the aim of advancing their adaptive and informed decision-making, about a range of behaviours including but not limited to gambling – such training would likely interweave with that on coping skills and mindfulness (explored below).

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Evaluations of preventative education programmes have consistently found that young people can readily acquire knowledge about the nature and costs of gambling (Keen et al., 2017; St-Pierre et al., 2015). Some studies have found that this knowledge appears to translate to reductions in gambling or problem gambling (Walther et al., 2013; Canale et al., 2016), however others have tested for, but not found these behavioural changes (for example, Gaboury & Ladouceur, 1993). For many young people, this educational component is likely to be insufficient (even if necessary) in the prevention of gambling harms: known contributors such as low self-efficacy, fatalism, emotion-focussed and avoidant coping, perceptions of peer pressure, and thinking errors (such as superstitions and illusions of invulnerability and control) may constrain its impact and require their own focus. The following sections explore such educational components, starting with teaching that challenges cognitive errors in part through mathematical reasoning.

⁷ This could be done in a nuanced fashion which also acknowledges positive anticipated emotions (for example, excitement whilst winning) whilst highlighting that these will occur far less given house edge etc.

2. Correcting fallacies and teaching relevant mathematical concepts

Keen et al. (2017) in the conclusion of their systematic review of school-based gambling education programmes state that *'few programs emphasised learning complex mathematical concepts such as randomness and expected value... nevertheless such important concepts are crucial to understanding the unprofitability and unpredictability of commercial gambling products'* (p.321). Teaching of these concepts seeks to challenge and correct both general cognitive biases (termed 'mindware problems' by Toplak et al., 2007) and the gambling-specific thinking errors which follow them and which appear to play a significant role in problem gambling (Taylor et al., 2014; Cosenza & Nigro, 2015; Donati et al., 2018; Keen et al., 2019).

Two critical 'mindware' problems are 'the gambler's fallacy' and superstitious thinking (Donati et al., 2018). The former is the mistaken belief that because something happened more frequently than expected in a given period, it will happen less frequently in the future; it represents a misunderstanding of randomness (i.e. the independence of turns) and the law of large numbers, and can be derived from a natural desire for balance. As an example, a person is suffering from the gambler's fallacy if because the roulette wheel has landed on black six times in a row, they think that next time it is more likely to land on red. Turning to superstitions, there can be various forms including 'behavioural superstitions' in which individuals believe that certain habits increase the chance of winning (for example, always choosing the same numbers) and 'talismanic superstitions' in which they place belief in so called 'lucky charms'. They are all united in creating a false sense of control. In the first of two important studies by Donati et al (2018), these two mindware issues were found to be significantly associated with gambling frequency and problem gambling in adolescents, this relationship mediated by gambling specific distortions (such as illusions of control). In the second study, they found that four hours of interactive and experiential teaching on randomness, probability, independence of turns, and the absence of evidence for superstitions reduced both cognitive distortions and gambling frequency in adolescents (compared to controls) including at six months follow-up. An evaluation of the same or similar teaching by Donati et al. (2014) also found reductions in misperceptions, superstitions and gambling in young people receiving the intervention compared to controls.

These are promising findings and are consistent with those of others (such as those by Williams and colleagues discussed below) and they indicate a central role for this teaching in gambling education. Whilst changes in gambling behaviour following the intervention (compared to controls) are modest (Donati et al., 2014, 2018), effectiveness of this component might be increased by addressing further gambling-related cognitive distortions, such as those involved when near misses or losses prompt further gambling; the 'hot hand fallacy' (the sense that because a person is already winning they will continue winning); and the feeling that one **needs** to continue in case of a win next time (along the lines of *'what if my lucky numbers come up next time, the one time I didn't play'*) (Bărboianu, 2019; Carran, 2018; Keen et al., 2019). Drawing on insights from pedagogical research and theory, Keen et al. (2019) argue that this education could be improved in two further fundamental ways. First, mathematical concepts should be taught in a strategic fashion, in which misconceptions are used as a didactic technique: they are first clearly identified, before dissatisfaction with them is then encouraged, followed lastly by the provision of new information which remediates and satisfies. Second, to ensure students' truly grasp what can be counter-intuitive concepts, learning should involve technology-assisted simulations that enable these understandings to be visualised and experienced (discussed further below).

At the same time, it may be that for many young people a focus on correcting fallacious thinking will also be insufficient. Cognitive errors might often be the product of more primary 'root causes' of gambling difficulties and vulnerabilities, akin to a form of wishful thinking: perhaps better described as hopes rather than beliefs. Whilst for some individuals misconceptions might create gambling motivations (for example, illusions of control leading to gambling for profit), for others it may work the other way: they are recruited to 'mentally permit' gambling that is sought after, for example in the hope of relieving stress or providing mental escape (Lindberg et al., 2014). In line with this hypothesis, common gambling fallacies contradict one another, for example, the idea that following a series of one outcome, the other is more likely (the classic gambler's fallacy) and the idea that a win is more likely following a series of wins ('being on a roll') – but both unite to permit or encourage further play. In keeping with this, gamblers can have a rational

understanding of gambling's unprofitability that is temporally lost whilst gambling (Sevigny & Ladouceur, 2003).

3. Developing adaptive coping skills and emotion regulation

A primary reason that people gamble is to cope with stress and strong feelings. Research has delineated this as one of four main motivators behind gambling; the other three being the desire to enhance positive feelings, the desire to enjoy its social elements, and the drive to make money (Stewart & Zack, 2008; Kim et al., 2017)⁸. Gambling as a way of coping is more likely to be problematic and extensive than gambling for social reasons (Stewart & Zack, 2008; Studer et al., 2016). In a longitudinal study, when baseline gambling was controlled for, the coping motive predicted problem gambling six months later in a sample of adults (Grubbs & Rosansky, 2019). Studies have also found that this motivation mediates the relationship between difficult emotional states (such as depression and shame) and gambling frequency and problems (Takamatsu et al., 2016; Schlagintweit et al., 2017). In short, people can develop gambling problems because they are using gambling as a maladaptive means of coping with distress. Gambling-as- coping is one expression of a broader coping stance which is avoidant and emotion-orientated: rather than difficulties being faced and reflected upon, they are avoided and the person's focus is on simply reducing the associated difficult feelings (Calado et al., 2017). Unsurprisingly this form of coping also appears to be a factor in other risky behaviours such as substance misuse and unsafe sex (for example, van der Zwaluw et al., 2011; Gil, 2005; Wicki et al., 2017). An important additional point here is that gambling may also be used as a means of coping with, and alleviating, positive emotional states and this is also associated with gambling problems (Kim et al., 2019).

People may develop avoidant coping practices such as gambling when more adaptive emotion regulation skills have not been developed or seem out of reach, by virtue of past or present life experiences (Calado et al., 2017; McCormick et al., 2012) – emotions, whether negative or positive, may feel uncontrollable, with escape options (such as gambling or alcohol) the only 'solution' (Jauregui & Estevez, 2019). The flipside of all of this is that adaptive problem-focused coping and more

general emotion regulation skills should reduce gambling harms. Indeed, Dixon et al. (2016) found that at low levels of gambling, adaptive coping was associated with fewer gambling problems in adolescents (however when individuals were more heavily involved in gambling, it failed to offer this protection).

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Given the coping motive's seemingly important role in gambling harms, several gambling education programmes have included a component focussed on teaching problem-solving and adaptive coping. Evaluations, however, have so far produced mixed results. In two evaluations of a preventative programme containing teaching and rehearsal of adaptive coping skills, Turner and his colleagues found no significant impact of the programme on problem gambling behaviours or coping skills (although it did improve relevant knowledge, including knowledge about coping) (Turner et al., 2005; 2008). Conversely, in an evaluation of a different programme containing a coping skills strand, Williams et al. (2010) did find evidence of the intervention both decreasing gambling, and improving decision-making, coping and problem-solving. However, it is not known if the skill developments brought about (in total or in part) the gambling changes.

A person's typical approach towards stress and difficulty is developed through many experiences and lived out and practised regularly, given that 'lows' are a normal part of life. And naturally their coping stance(s) affect many areas of life, not just their propensity to gamble and how they gamble. Therefore, it is conceivable that supporting positive changes in young people's coping skills requires substantive experiential education which links these skills to various parts of life (an idea explored in more depth below). It may also require an interweaving component developing self-confidence and self-efficacy (explored below). Whilst this teaching would be more extensive, the hope would be that its impacts were deeper and more wide-ranging.

⁸ Note however that these four motivations can co-occur, and entwine both with one another and fallacious thinking. So for example, a person may want to gamble to relieve stress, because they mistakenly believe gambling is a good way to make money, and believe that money will alleviate their stress (Lee et al., 2007).

A complementary promising direction of inquiry is the inclusion of mindfulness in prevention education. In relation to gambling, Sapthiang, Van Gordon, Shonin & Griffiths (2019) describe mindfulness as *'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'* (p.3). Mindfulness does not neatly fit into the traditional typology of problem-focussed versus emotion-focussed coping⁹. It involves emotional awareness, often as an alternative to either problem-orientated or emotion-motivated actions. In a mindful meditative stance, a person purposefully observes their feelings without judgement, and may discover both a distance from them and increased control over how they then act. In this way it complements other adaptive coping approaches, and is just as relevant to the regulation of positive emotions as it is to negative ones, which is important given the role of sensation-seeking, and positive emotion enhancement and alleviation motives in gambling. Studies indicate that mindfulness holds promise both in the treatment of gambling problems (Griffiths et al., 2016) and in the improvement of children's mental health in schools (Sapthiang, Van Gordon & Shonin, 2019). There is clearly a firm rationale for future studies investigating its effectiveness in both gambling-specific prevention education, and more generic education focussed on teaching 'bedrock skills' that reduce harms and grow autonomy (again, see below).

4. Promoting and raising awareness of positive social norms

People's perceptions of how normal, acceptable, and celebrated a behaviour is typically affect their decisions about engaging in that behaviour – this is an obvious part of being human. Generally speaking, we are more likely to do something if we think it is commonplace, if we think it is largely accepted, or if we think it confers kudos or status (for example, seen as glamorous, cool, or respected) – whether in the society in which we live or by important others in our lives. Research demonstrates the significant impact of these perceived cultural and social norms on various adolescent risk behaviours, including alcohol and drug use, aggression, risky sexual behaviour, and problem gaming (for example, Baumgartner et al., 2011; Fikkers et al., 2016; Haagsma et al., 2013; Mahalik et al., 2015). Whilst all age groups

are influenced by social norms, adolescents appear particularly sensitive to their perceptions of what their peers do (descriptive norms) and what they approve of (injunctive norms).

Turning to research specific to social norms and gambling, Martin et al. (2010) found that perceived acceptance, approval and pressure from friends and family were significantly associated with past year gambling and gambling frequency in college students. Wu and Tang (2012), also using a student sample, found that these perceived norms correlated with problem gambling (and Moore and Ohtsuka (1997) had previously reported similar findings with an adolescent and student sample). Furthermore, Larimer and Neighbors (2003) found that students overestimated their peers' gambling and both this descriptive norm and injunctive norms predicted gambling frequency, expenditure and harms.

Through various marketing strategies, including associations with respected and popular sports and organisations, the gambling industry portrays gambling as normal, acceptable and glamorous (see next section). At times it narrates gambling as just another 'game' (Sharman, personal communication). As noted above, a concerning minority of young people (17%) report that gambling adverts have prompted them to gamble or that they feel unsure about whether they have (Gambling Commission, 2019) – it is plausible that this influence (which is likely to be an underestimate given the widely documented third person effect; Youn et al., 2000) is partly due to the normalisation, legitimization and/or glamourisation that advertising achieves. The same study by the Gambling Commission (2019) found that, of those young people who reported spending money on gambling in the past year, 11% reported doing so 'because it's cool'. Ten per cent reported gambling because their parents gamble, six per cent because their siblings do, and six per cent because their friends do and they don't want to feel left out (these figures are again plausibly underestimates given the difficulty humans often have in identifying influences on them, Nisbet & Wilson, 1977). Furthermore, although most young

⁹ Problem-focussed coping involves attempts to solve the issue causing difficult feelings, whereas emotion-focussed coping describes strategies simply targetting the feelings – for example, attempting to reduce them through distraction or escapism. Emotion-focussed coping is somewhat synonymous with avoidant-coping and is generally thought to be less adaptive than problem-focussed approaches.

people in the sample had not gambled, 7% thought that most did and 37% appeared unsure about this.

Whilst there is the need for further research specifically delineating the impact of cultural and social norms on young people's gambling, these findings are suggestive of their influence. At their heart, social norms interventions seek to reduce risky behaviours by reducing unhelpful social norms through the provision of accurate information about what other people actually do and actually approve of. Such an approach clearly only works where people are assuming their peers (or family or society) engage in or approve of the risky behaviour more than they actually do. This appears to be true for gambling, where it seems a proportion of young people think more young people might gamble than they in fact do; Larimer and Neighbors (2003) found that college students overestimated both their peers' gambling and approval of it. Cislighi & Heise (2018) highlight the success of social norms interventions in such situations, though caution that they can instead *do harm* if applied when people actually have accurate perceptions, or when they think others engage in or approve of the behaviour less than they actually do (as might be the case around issues such as domestic violence).

In short, if applied in the right context, social norms interventions hold promise for reducing gambling harms in young people. Surprisingly, although a social norms approach has been recommended as best practice for social marketing campaigns aimed at preventing youth problem gambling (Byrne et al., 2005), it has rarely been taken within gambling education programmes.

What might an effective social norms component of gambling education comprise? Given that young people are particularly attuned to their peers, and that peer norms can be measured and engaged with in school-based education in ways that might not be possible with other norms (such as family & cultural), they are a good starting point. To ensure appropriateness and effectiveness, a peer norms intervention should be informed by educators' baseline assessment of students' own gambling and views, and their perception of the gambling and views of their peers. If measurement (for example via questionnaire) indicates that students perceive their peers as gambling more than they do and/or approving of it more than they do, education

can focus on correcting these perceptions, with the evidence-based aim that this should reduce gambling and its harms.

A second promising strand of a social norms intervention is challenging perceptions of societal acceptance and approval. Teaching about the history of gambling, including its relatively recent legalisation in the UK and wider legislative debates, could highlight to students that societies can and often do disapprove of various gambling practices and seek to regulate them, and this can be used to spark critical reflection about their own views. Furthermore, mismatches between the portrayal of gambling in its marketing and how it is viewed across society could be instructive. Gambling's marketing is of course one of a number of means that the industry use to both draw people into the practice and continue engaging with it. Education on this range of industry strategies is explored next.

5. Developing understanding of and resilience towards industry strategies and 'entrapment'

Strategies utilised by the gambling and 'gaming' industries to draw people into gambling and keep them playing include the following (a number of which have been discussed above):

- Offering financial incentives to gamble, including sign-up bonuses, 'refunds', 'free bets', and refer-a-friend bonuses (Newall et al., 2019; Hing et al., 2017)¹⁰.
- Normalising and legitimizing gambling – for example, through saturating various sports entertainment with gambling references, thus creating a perception that it is an expected part of enjoying spectator sports (one example being the English Premier League: by 2017 half of all teams had gambling shirt sponsors, and a Match of the Day episode contains on average over 250 gambling logo exposures; Newall et al., 2019; Lopez-Gonzalez & Griffiths, 2018).
- Targetting certain groups with advertising and specific messages, including sports fans, people with gambling problems, and arguably adolescents (Newall et al., 2019; Monaghan et al., 2008).

¹⁰ Cited references are examples of papers in which each strategy has been documented or discussed.

- Promoting industry-friendly narratives of gambling.
- In marketing, gambling presented as glamorous and associated with being a winner (Lopez-Gonzalez et al., 2017; Lemarie & Chebat, 2015).
- 'Problem gambling' or 'gambling addictions' narrated as individual dysfunctions or disorders; 'responsible gambling' and a clear qualitative distinction between it and problem forms assumed and promoted (Livingstone et al., 2018; Cassidy, 2014).
- Blurring boundaries between gambling and gaming (for example, as discussed above, gambling described in terms of 'games' and 'playing'), and the use of gaming to draw young people into gambling (for example via loot boxes discussed above)
- Strategic exploiting of known cognitive biases to increase profit, such as incorporating near miss experiences; losses disguised as wins; the use of meaningless 'bells, whistles and associations'; and encouragements to bet on very low probability, highly specific event chains involving at least one individually intuitive event, with the house edge being more than it 'should' be, i.e. if the events were unchained (e.g. 'Thomas Muller to score first and Germany to win 3-1') (Barton et al., 2017; Newall, 2019; Carran, 2018)
- Promotion of complex odds and financial incentives which are prone to being misunderstood by their audiences (Kim et al., 2017; Newall, 2017)
- Whilst it is hard to estimate, given that the gambling industry do not routinely release their data to researchers, companies may use individual player behaviour to target them with approaches exploiting their particular vulnerabilities or biases (Zuboff, 2019)

Most of these strategies fall into one of three categories: marketing, lobbying and within-gambling nudging. The impact of some of these strategies on some individuals may simply be engagement in a gamble which brings enjoyment, and is therefore unproblematic. However, many of these strategies appear to undermine informed decision-making and autonomous action in service of company profit. Research finds an association between engagement with a number of them (such as financial incentives) and gambling frequency, difficulties, or impulsivity. For example, a recent set of studies by Hing

and colleagues (2018a, 2018b; Russell et al., 2018) found that gambling advertising exposure predicted gambling expenditure over time in all groups of gamblers, and that financial incentives and push notifications led to riskier and more impulsive bets, though financial incentives led to these being perceived as lower risk.

It is well recognised that certain forms of gambling, and certain gambling game characteristics (or structural qualities) are associated with increased gambling expenditure, frequency and problems (Carran, 2018). The near-miss characteristic serves here as an instructive example. Gambling games can be designed so that some loses are experienced as near-wins. Whilst in actual fact it is just a form of losing, they appear to activate parts of the brain that process reward and reinforcement messages, rather than those that process loss and aversion (Clark et al., 2009). Individuals are left with a sense of a reward being just out of reach, and this both generates high levels of frustration (Dixon et al., 2011) and the sense that one is progressing closer towards winning – both of which in turn spur further play. 'Near misses' are most frequently found in slot machines and their online equivalents, and these are associated with high levels of gambling problems (e.g. Cholz, 2010).

Whilst gambling education routinely includes teaching on the nature and risks of gambling (see above), most does not appear to include within this a specific focus on industry strategies that are designed to increase profit, prolong gambling, and exploit human biases (notwithstanding those biases typically at play in all forms of gambling, such as illusions of control, superstition and misunderstandings of randomness). Extending programmes to include teaching about these strategies (and the biases they exploit) seems important given their potential to increase difficulties, induce frustration and undermine autonomy. Awareness of industry manipulation may increase resilience to it, and more broadly, allows for informed decision-making. Such teaching may prompt young people to reject and 'unhook' from industry strategies by communicating this rejection as a natural part of being independent, autonomous and 'in control' – these are states, indeed aspects of identity, desirable to most people, possibly in particular adolescents. Smoking prevention campaigns aimed at young people have included messages about industry manipulation seemingly to good effect (see for

example, Sly et al. 2002; Farrelly et al., 2002; Farrelly et al., 2009) and such an approach has been highlighted as promising for gambling prevention campaigns (Byrne et al., 2005).

Such teaching could interweave with a social norms approach – for example, Byrne et al (2005) suggest that *‘messages may underline the fact that most people are aware that in order to make profits, the industry must produce games designed to make individuals lose money’* (p. 23).

6. Strengthening intrinsic values and agency

More generally, theory and research suggest that education that supports the development of young people’s intrinsic values and self-esteem, and their agency, holds promise in preventing gambling harms (alongside other issues). Studies indicate that holding a self-concept centred around financial success and holding materialistic values significantly raise the risk of gambling difficulties (Eyzop et al., 2019; Tabri, Wohl, et al., 2017). An interacting risk factor here is a sense of personal relative deprivation, wherein people feel that they have less than they deserve (this can be because they objectively do have less and are struggling with poverty). Gambling may be used as an attempt to obtain money that individuals feel they should have, but without the hard work that they don’t feel they should have to do to obtain it (Callan et al., 2015; Tabri, Shead & Wohl, 2017). Importantly, values, self-esteem and identity built around money and materialism (which infer hierarchies of people) harm people in a broad range of ways, the increased risk of gambling difficulties being only one. Research from the fields of universal values (Schwartz, 2012), inequality (Wilkinson & Pickett, 2019), and self-determination theory (Ryan & Deci, 2017) taken together indicates that extrinsic aspirations (including financial success, but also status, recognition and appearance) are negatively (or at times neutrally) related to wellbeing, self-esteem, relationship quality, development, and pro-social action, and that they reduce the salience of intrinsic values (such as self-acceptance, good relationships and close community) which have opposing effects (see for example, Crompton, 2010; Kasser & Ryan, 2001; Ryan & Deci, 2017, chapter 11). Marketing by the gambling industry (discussed above) is arguably one example of the multitude of corporate attempts to

promote individuals’ extrinsic values. These efforts are often successful (Crompton, 2011) and the problem, in short, is that they are not generally in the best interests of people or the planet. Recently there have been calls¹¹ for education to help young people identify, develop and hold strong to their intrinsic values as a ballast against corporate invitations to place value elsewhere – the aspiration is that this education will have a multitude of positive knock-on effects, including on young people’s self-esteem, wellbeing, as well as their behaviour towards others and the environment¹².

If such education is effective in strengthening students’ intrinsic values and core self-esteem, so that it is not contingent on extrinsic ‘markers’ such as wealth, recognition and looks, it should plausibly reduce drivers of, and therefore prevalence, of gambling difficulties. Whilst this education is broad-based, arguably to be most effective it should at the same time include explicit links to the areas it hopes to impact, including gambling. For example, it could help students identify any ways in which forms of gambling might conflict with their deeply felt values and interests. This education intersects closely with that on industry strategies (discussed above), which in fact could be seen as one of its components. Social norms education is also relevant here, as people tend to wrongly assume that others give less weight to intrinsic values and more weight to extrinsic values than they actually do (Hanel et al., 2018).

Also closely related is teaching aimed at increasing young people’s agency: their sense of being in control and acting autonomously in life. A variety of studies, many differing in their exact focus and terminology, converge in highlighting agency as an important protection against gambling (and other) harms. Within a sample of adolescents, Donati et al. (2019) found that a fatalistic approach towards the present was related to gambling frequency, and that a reduced sense of the future and personal goals was related to gambling problems – findings consistent with studies of adults (for example, Hodgins & Engel, 2002). Fatalism and lack of direction both involve a sense of powerlessness, the individual

¹¹ See for example those by Global Action Plan: www.globalactionplan.org.uk

¹² Note that this approach is not about encouraging students to ‘do the right thing’ instead of following self-interest – following one’s intrinsic values tends to be ‘win-win’.

feeling that they cannot effect change in their life. When people feel like this, they are less inclined to depend on their own efforts and may be more inclined to live by chance and luck, gambling being one such way to do so. The experience of gambling itself may then further increase feelings of uncontrollability. Revealing Reality's (2019) in-depth study of the perceptions and practices of 25 'average' UK gamblers found that much of gambling involved compromised control, with many describing frequent internal conflict between their desire to gamble and their motives not to. They found that gambling seemed to cause most problems when individuals felt out of control. Complementing all of these findings, research flowing from the *Theory of Planned Behaviour* finds that people's (adults' and adolescents') perception that they can control their gambling (including whether they gamble or not) is associated with reduced gambling frequency and problems (St Pierre, Temcheff, Derevensky & Gupta, 2015; St Pierre, Derevensky, Temcheff & Gupta, 2015).

In short, a reduced sense of one's own agency may contribute to gambling, and to gambling problems, and can also be heightened by the experience of gambling itself, potentially in a vicious cycle. Education to reduce gambling harms might therefore do well to include a component aimed at building young people's agency and self-efficacy: their perception that they have control over their actions and in building their present and their future. This might include much of the promising content already discussed, including education on: emotion regulation and adaptive coping (building skills at 'staying in control' when there are internal pulls to gamble); identifying and 'unhooking' from industry strategies (building agency in the face of corporate pressures to gamble); relevant mathematical concepts (reducing false feelings of control and agency, thereby facilitating accurately informed decision-making); developing awareness and action around intrinsic values (broadly building agency); and assertiveness training (helping students resist unwanted peer pressure). Developing young people's agency and their ability to act in line with their intrinsic values interrelate because such values are inherently motivating (Moss, 2016). And again, as young people's feelings of and actual skills in 'being in control' of their actions grow, this may have multiple benefits, including reduced gambling but also reduced drinking, smoking and aggression, and increased civic participation and social activism (Ryan & Deci, 2017).

The experience of gambling itself may further increase feelings of uncontrollability

5. How should schools deliver education which reduces gambling harms?

A wide range of evidenced and promising components of a preventative gambling education programme have been explored here – clearly not all of which could be covered in the limited time that schools are able to devote to gambling specifically. Not only unrealistic, such an approach would be unwarranted and undesirable. A central point has been that many of the attributes, stances and skills that protect against gambling harms protect against various other harms too, and enable young people to act with autonomy in line with their own and others' best interests across a range of situations. Therefore, what seems indicated is instead a tiered approach consisting of:

a) Specific gambling education which includes components that develop students' understanding of:

- The nature and harms of gambling, including forms of gambling within gaming; the risk of negative anticipated emotions, lost opportunities and compromised autonomy; and reduced perceived benefits.
- Relevant cognitive fallacies and mathematical concepts.
- Positive social norms (peer and societal) around gambling prevalence and/or approval.
- Industry strategies and their attempts to undermine autonomy.

Supported by:

b) 'Bedrock' PSHE education which develops students':

- Emotion regulation and adaptive coping skills (including mindfulness and problem solving).
- Awareness of, and ability to act in line with, their intrinsic values.
- Self-efficacy and agency.

And:

c) A whole school approach which:

- Models and narrates the importance of intrinsic values (including personal growth, good relationships, altruism, nature, and community).
- Supports young people in helping one another.
- Supports or facilitates support for young people with difficult issues including gambling.

Of note, the 'bedrock' education is likely to be most effective when it explicitly links to various issues and areas of life including gambling. This overall approach maps well onto a 'spiralling curriculum' in which the same area may be covered at different ages, with reference to different developmentally-appropriate issues at each point – for example, emotion regulation skills taught with links to friendships when children are in primary school, and taught again but this time with reference to drinking, gambling and dating relationships when children are mid- to late-adolescence.

It is also important to consider the delivery of gambling education lessons: what style should be used, who should teach, and how many gambling-specific lessons should there be? Research suggests some initial answers to these questions. A set of studies within the field of Self Determination Theory highlight that education is most effective when it is autonomy-supportive, and, in turn, teachers are most capable of this when their autonomy too is supported (by school leadership and beyond). This style of teaching includes listening to students and giving them opportunities to talk and ask questions; explaining rationales; being responsive to students' questions and views; making space for their independent work; acknowledging signs of effort, improvement and mastery; and offering progress-enabling hints rather than answers. Controlling practices are avoided such as use of words like 'should' and 'have to', monopolizing the lesson, and using demands and directives (see Ryan & Deci, 2017, Ch. 4 for a review of relevant research). Interestingly research indicates that autonomy-supportive practice not only improves learning but also helps students internalise pro-social values, in turn reducing bullying (Roth et al., 2011).

Research points to the importance also of experiential learning in gambling education – this is gaining

understanding of something through 'seeing it in action' versus simply being told about it (experiential learning falls under the broad umbrella of autonomy-supportive teaching). For example, Broussard and Wulfert (2017; 2019b) found that learning about odds through a slot machine simulator reduced gambling frequency and expenditure in a way that learning the same information through a handout did not. Abel et al. (2015) taught odds via a dice-based task – participants were asked to roll two dice until they got two sixes and they were told that winning the lottery was like getting a six nine times in a row. Intriguingly, individuals who needed more than the median number of rolls to obtain two sixes gambled less frequently even at one-year follow-up compared to those who needed fewer.

Few studies have explored who should deliver gambling education and how many gambling specific lessons are sufficient. Ladouceur et al (2003) found that an education programme was more effective at reducing cognitive errors in primary school children when it was delivered by a gambling psychology specialist than when it was delivered by a teacher. They suggested that teachers might need training that challenges any gambling-related erroneous beliefs that they themselves might hold before they go on to deliver gambling education. Some studies (such as Canale et al., 2016) have found solely multimedia programmes to be effective. At the same time, teachers hold knowledge and skills that seem pivotal to many strands of gambling-specific and wider supporting education, such as autonomy-supportive practice and their knowledge of their students (to inform baseline assessment). In some contexts people who have recovered from a gambling problem deliver teaching to children and young people; however this form of gambling education may be more at risk of over-emphasising harms and some of the inadvertent consequences discussed in section three. Whoever delivers gambling education, a minimum prerequisite would seem to be that their teaching follows from relevant theory and research, both that specific to gambling prevention and that relevant to PSHE more generally.

Lastly, in regard to the question of 'how much', Keen et al. (2017) noted on the basis of their review that more comprehensive programmes (involving a number of lessons rather than one) with booster sessions tended to perform better than briefer versions.

6. Summary and conclusion

In sum, there is a wealth of knowledge to inform the design and delivery of gambling teaching and the wider education that supports it. We know of some learning areas (such as the nature and risks of gambling, cognitive errors, mathematical concepts) that reduce gambling harms, and have good reasons to predict the efficacy of others (such as teaching about industry strategies, social norms, self-efficacy, coping skills and values). As gambling harms experienced by adolescents and young adults are increasingly recognised, we can expect more focus on gambling education and its development in schools. Evidence reviewed in this paper suggests that the most promising approach involves: a) depth of ambition (developing young people's abilities to act with autonomy, in theirs and others best interests, versus a focus on 'problem gambling'); b) explicit attention to, and therefore avoidance of, plausibly harmful practices; c) a set of gambling specific lessons together with 'bedrock' PSHE content on emotion regulation and coping skills, self-efficacy, and intrinsic values (as part of a spiralling curriculum); d) autonomy-supportive and experiential methods employed by teachers with good knowledge of

the subject. Research could usefully support the further development of effective and ethical gambling education by comparing approaches with different components in randomised trials – evaluating the same gambling specific programmes undertaken with and without 'bedrock' education and a whole school approach, and exploring young people's views and insights into what works and what would be helpful.

On the basis of this review, our hope is that gambling education can form part of a holistic approach within PSHE and within schools that enables young people to navigate the present and the future with relevant knowledge, grounded confidence, autonomy, and emotional skill, whilst alive to their inner values.

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