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Online behavioural tracking in Internet gambling research: Ethical and methodological issues

ABSTRACT:

In contrast to offline gambling, the use of online behavioural tracking presents an opportunity for researchers in the social sciences to examine the actual and real-time behaviour engaged in by gamblers. If gaming companies can use behavioural tracking to learn more about their clientele, there is no reason why researchers could not adopt the same practice in carrying out their research. After examining why the online medium is a good place to conduct research with online gamblers, the paper examines the (i) methodological issues in online gambling research, (ii) behavioural tracking tools in online gambling, (iii) the ethics of online data collection by the gambling industry, (iv) ethical issues in online behavioural tracking research, and (v) implications of online behavioural tracking for problem gambling screening criteria. In the main, the most salient problems that online researchers in the gambling studies field are likely to face concern ethical issues (informed consent, deception, public versus private spaces, lurking). Despite such ethical dilemmas, these are not insurmountable and can be remedied if careful thought and rationale is provided.

INTRODUCTION: METHODOLOGICAL ISSUES IN ONLINE GAMBLING RESEARCH

Online gambling is a psychological and sociological phenomenon that is becoming a focus of interest for an increasing number of researchers in the social sciences. Furthermore, researchers in the gambling studies field are starting to use online methods to gather their data, rather than traditional offline research approaches (Wood & Griffiths, 2007; Griffiths, 2010). Psychological research that can be done on the Internet includes correlational, cross-sectional, experimental, self-report, and/or observational research. A recent methodological review paper by Griffiths (2010) examined seven different online data collection methods that he had personally used for collecting gambling and gaming data including (i) online questionnaires, (ii) online forums, (iii) online participant observation, (iv) online secondary data, (v) online interviews, (vi) online exemplar websites, and (vii) online evaluations (including online 'mystery shopping'). He also argued in the same paper that the Internet can be a very useful medium for eliciting rich and detailed data in sensitive areas such as problem gambling.

There are a number of reasons why the online medium is a good place to conduct research with online gamblers. This is because the internet: (i) is usually accessible to these gamblers, and they are usually proficient in using it (Wood & Griffiths, 2007); (ii) allows for studies to be administered to potentially large scale samples quickly and efficiently (Buchanan, 2000, 2007; Wood, Griffiths & Eatough, 2004); (iii) can

facilitate automated data inputting allowing large scale samples to be administered at a fraction of the cost and time of 'pen and paper' equivalents (Buchanan, 2007); (iv) has a disinhibiting effect on users and reduces social desirability, leading to increased levels of honesty (and therefore higher validity in the case of self-report) (Joinson, Paine, Buchanan & Reips, 2008); (v) has a potentially global pool of participants, therefore researchers are able to study extreme and uncommon behaviours as well as make cross-cultural comparisons (Buchanan, 2000); (vi) provides access to "socially unskilled" individuals who may not have taken part in the research if it was offline (Wood, et al, 2004; Wood & Griffiths, 2007); (vii) can aid participant recruitment through advertising on various bulletin boards and websites (Wysocki, 1998); and (viii) can aid researchers because they do not have to be in the same geographical location as either the participants or fellow research colleagues (e.g., Whitty, 2004a; Wood, et al, 2004).

However, online research into online gambling is not without potential problems. Some of the main disadvantages of online methodologies (such as self-selecting samples, issues concerning reliability and validity) are also encountered in more conventional offline research methodologies, although online methodologies may give rise to different types of problems when compared to traditional offline research (e.g., lack of researcher control, lack of knowledge about participant behaviour, hardware/software variability).

There are clearly specific issues online researchers need to be aware of with regards to online self-report methods. In the early days of online research, there was the concern that results from online studies might not be valid (e.g., Buchanan & Smith, 1999; Davies, 1999). More recently, Buchanan (2007) highlighted that validity was still a concern because researchers cannot be totally sure that online and offline scales are equivalent. Buchanan also highlighted the issue of sampling bias (i.e., the samples recruited online often look very different to those recruited offline.) However, even when the participants are similar there can still be differences in results. For instance, Joinson (1999) demonstrated in a study examining social desirability that participants who completed an online survey scored lower than those who completed an offline version. Buchanan (2007) argues the differences in online versus offline results may be due to others factors such as (e.g., offline research often has the researcher present which could effect how someone chooses to answer a questionnaire). However, there is clear evidence that even when controlling for such factors an online survey can still produce different results compared to an offline one. This phenomenon has been referred to as the 'Internet mediation' effect (Buchanan, 2007). For example, Buchanan and colleagues found that the International Personality Item Pool proved to have a latent structure very different to that expected when administered online (Buchanan, Johnson, & Goldberg, 2005).

BEHAVIOURAL TRACKING TOOLS IN ONLINE GAMBLING

Over the past few years, innovative social responsibility tools that track player behaviour with the aim of preventing problem gambling have been developed including *PlayScan* – developed by the Swedish gaming company *Svenska Spel* – and *Observer* – developed by Israeli gaming company *888.com* (Griffiths, Wood, Parke & Parke, 2007; Griffiths, Wood & Parke, 2009). These new tools are providing insights about problematic gambling behaviour that in turn may lead to new avenues for future research in the area. The

companies who have developed these tools claim that they can detect problematic gambling behaviour through analysis of behavioural tracking data (Griffiths, Wood & Parke, 2009). If problem gambling can be detected online via observational tracking data, it suggests that there are identifiable behaviours associated with online problem gambling. Given that almost all of the current validated problem gambling screens diagnose problem gambling based on many of the consequences of problem gambling (e.g., compromising job, education, hobbies and/or relationship because of gambling; committing criminal acts to fund gambling behaviour; lying to family and friends about the extent of gambling, etc.), behavioural tracking data appears to suggest that problem gambling can be identified without the need to assess the negative psychosocial consequences of problem gambling.

Behavioural tracking tools such as *PlayScan* and *Observer* use a combination of behavioural science, psychology, mathematics, and artificial intelligence. These tools claim to detect players at risk of developing gambling problems, and offer the gamblers tools to help change their behaviour. Unlike the conventional purpose of customer databases (i.e., to increase sales), the objective of these new tools is the opposite. They are designed to detect and help those who would benefit from playing less. Such tools have been compared to a safety belt (i.e., something you use without intending to actually make use of). The use of these systems is voluntary, but the gaming operator strongly recommends its customers to use it (Griffiths, Wood & Parke, 2009). These tools use approximately 40 parameters from the player's behaviour from the preceding year that is then matched against a model based on behavioural characteristics for problem players. If it predicts players' behaviour as risky they get an advance warning together with advice on how they can change their patterns in order to avoid future unhealthy and/or risky gambling. As these tools are based on artificial intelligence (i.e., the computer itself learns to find complex patterns in large quantities of data), it can identify behaviours showing tendencies of problem gaming even though empirical research may not yet have discovered them. Some of the implications of these insights are examined later in the paper specifically in relation to screening for problem gambling.

THE ETHICS OF ONLINE DATA COLLECTION BY THE GAMBLING INDUSTRY

It has been reported that one of the potential concerns surrounding Internet gambling is the way that online gambling websites can collect large amounts of data about the gambler and the extent to which this is an invasion of the gambler's privacy (Griffiths & Parke, 2002). For instance, internet gamblers provide tracking data for online gambling companies that can be used to compile customer profiles. Such data can tell online gambling companies exactly how online gamblers are spending their time in any given financial transaction (i.e., which games they are gambling on, for how long, how much money they are spending, etc.). The companies argue that this information can help in the retention of customers, and can also link up with existing customer databases and operating loyalty schemes (Griffiths & Parke, 2002; Griffiths & Wood, 2008a). It has been argued that many online gamblers are unknowingly passing on information about themselves and that this raises serious questions about the gradual erosion of online gamblers' privacy (Griffiths, 2003; Griffiths & Parke, 2002; Griffiths, Wood, Parke & Parke, 2006).

Using sophisticated software, gaming companies can tailor its service to the gambler's known interests. However, there is a very fine line between providing what the online gambler wants and exploitation (Griffiths & Parke, 2002). On joining online gambling sites, gamblers supply lots of information including name, address, date of birth, gender, etc. Arguably, the online gaming companies know more about the gamblers' playing behaviour than the gamblers themselves. Furthermore, they can send the gamblers offers and redemption vouchers, complimentary accounts, etc. The gaming industry claims that all of these things are introduced to enhance customer experience. However, it has been argued that the more unscrupulous operators will be able to entice known problem gamblers back onto their premises with tailored freebies such as the inducement of "free" bets in the case of Internet gambling (Griffiths & Parke, 2002). The introduction of Internet gambling has come at a price, and that price is arguably an invasion of the gambler's privacy.

However, it has also been argued that the data collected by online gambling companies could be used in a different way. More specifically, experts in problem gambling have been recommending to gaming companies that they should start using their large behavioural tracking data sets to help identify problem gamblers rather than "exploit" them, and share these data with academic researchers (e.g., Griffiths & Parke, 2002; Griffiths, 2003; Smeaton & Griffiths, 2004; Griffiths, Parke, Wood & Parke, 2006; Griffiths, Wood, Parke & Parke, 2007; Wood & Griffiths, 2008b). If gaming companies can use behavioural tracking to learn more about their clientele, there is no reason why social science researchers could not adopt the same practice in carrying out their research.

To date, one team of researchers affiliated to Harvard University have been given access to a large behavioural tracking data set by the Austrian online gaming company *bwin*. This has led to many recent papers examining the actual behaviour of online gamblers based on behavioural tracking data (e.g., Broda, LaPlante, Nelson, LaBrie, Bosworth & Shaffer, 2008; LaBrie, Kaplan, LaPlante, Nelson & Shaffer, 2008; LaBrie, LaPlante, Nelson, Schumann & Shaffer, 2007; LaPlante, Kleschinsky, LaBrie, Nelson & Shaffer, 2009; Xuan & Shaffer, 2009). The biggest hurdle to overcome in this situation is the potential conflict of interest – particularly by those who carry out research with, or is directly funded by, the gambling industry. Almost all of the 'big names' in the gambling studies field have (at some point) carried out research funded by the gambling industry and this often calls into question their academic 'independence' (Griffiths, 2009a; 2009b). This appears to be an increasing economic reality particularly in countries like the UK that live by the governmental philosophy of 'polluter pays'. Another major problem that arises from being funded (directly or indirectly) by the gambling industry is that the industry tends to have a large say in what should be researched in the first place (Griffiths, 2009a). It is the first author's view that far too much research is done on individual risk factors such as research into biological and/or genetic predispositions, personality factors, and cognitive determinants. While this is clearly important research, it sends out the message that problem gambling is solely located within the individual rather than being the result of an interaction between the vulnerable individual, the gambling products, and the gambling environment (Griffiths, 2009a).

There are, of course, many other advantages of the use of observational tracking data for research purposes. The data provide a record of events and can be revisited after the event itself has finished.

Furthermore, several members of a research team can be used to gain different perspectives, to compare notes on (say) excessive play, and/or to gauge inter-observer reliability (Griffiths, 2010). Additionally, the problem of finding suitable online gambling participants and whether or not they want to be included in a study is instantly overcome as the method provides an immediate data set if access is granted by the gaming company. They do not even have to travel to participate in the study. However, the participants are unaware that they are even participating in a study and this raises issues around informed consent (explored in more detail later in this paper).

Using online behavioural tracking methods also allows a study to be both international and multicultural in scope. Furthermore, the speed and efficiency of this type of online research means that the study can obtain much larger and possibly more diverse samples than would otherwise be possible to attain. For instance, the *bwin* data set had 47,000 online gamblers. Finally, in some methodologies that involve gathering data from online gamblers (e.g., online survey), the researcher cannot always be sure that people are who they say they are, or that people are answering truthfully (although researchers have found that individuals are often more likely to open up online compared with face-to-face; Joinson, et al., 2008). The use of behavioural tracking data helps overcome these problems and the data have more validity.

ETHICAL ISSUES IN ONLINE BEHAVIOURAL TRACKING RESEARCH

Researchers have questioned the ethics of carrying out online research over the years, much of which has informed research into online gambling behaviours. In this section, some general issues are outlined and how these apply more specifically to online gambling research. Arguably the most important issues regarding the ethics of conducting online research include informed consent, deception, private versus public space, and lurking (e.g., Buchanan & Williams, 2010; Ess & Jones, 2004; and Whitty, 2004b). These are now briefly examined.

Informed consent

Although informed consent can easily be obtained online for online surveys, there is much debate over whether it is required when people use postings on public online forums (Sveningsson, 2004). Withdrawal of consent is not as simple, given that if a participant does not complete a survey it is difficult to determine the motivation. For instance, did the participant exit deliberately or was their online connection terminated? (Buchanan & Williams, 2010; Whitty, 2004). Confidentiality is also a major concern given that many online surveys are hosted on insecure sites (Reips, 2002). Cultural issues have also been a concern for researchers (Ess & Jones, 2004). Online surveys give researchers the opportunity to collect larger samples, but at what cost? The collection of data from ethically diverse samples may sometimes make research findings more difficult to interpret.

Given the ethical dilemmas researchers are faced with (e.g., lurking, deception), the better alternative is to set up a reasonable system for participants to give informed consent. Informed consent requires researchers to be honest and open about the aims of their research and how they are going to utilise the data

they collect. Sixsmith and Murray (2001) have stressed that collecting data without informed consent can be potentially damaging to the research process, especially when these unknowing participants discover their data have been used without their consent or knowledge. As far as the authors are aware, none of the participants in papers using the bwin data (outlined above) were provided with informed consent.

In offline research individuals often sign a form to give their consent, however, this is not always possible in online research. One way around was described by Gaunt (2002). He was interested in the types of friendships established in online chat rooms. He recruited participants by entering into the chat rooms and asking whether adults would be interested in conducting an online interview about their online friendships. If participants were interested, Gaunt directed the participant to a website that contained information about his research. The website informed the participants about the purpose of the study, the procedure that would be employed, and the ethics involved, as well as contact details of the research team members and the university's ethics committee. Participants were informed that if they continued by returning to the private chat room where the researcher was waiting, that this would be taken as being indicative of their informed consent to participate in the research (Gaunt, 2002). Again, as far as the authors are aware, none of these procedures were used for any of the participants whose data were used in the bwin online gambling tracking studies.

In some instances, web spaces are moderated. Here, it is appropriate to contact the moderators of the site prior to contacting the participants. This is analogous to contacting an organization prior to targeting individuals within that organisation. Wysocki (1998) examined participants' use of sexually explicit computer bulletin boards. Rather than employ covert methods, Wysocki was honest with potential participants about her identity as a researcher. She originally approached the systems operators (who were enthusiastic about her research) and told them that she was a sociologist who was interested in using a particular bulletin board (The Pleasure Pit) to collect data. To recruit participants for an online survey, a detailed posting was placed on the bulletin board about the research project and an online survey was used. To ensure confidentiality, Wysocki collected the respondents' answers and then separated the participant's name from the survey and assigned a number to each questionnaire. Although not perfect, this procedure provides a better alternative to collecting data without participant content. Online gambling researchers should use similar methods to collect their data particularly those employing the use of self-report.

Research of this nature, as with many projects examining sensitive issues (including problem gambling) have the potential to cause distress for a participant – even when there is no malice intended from the researcher. Safeguards need to be put into place to ensure the participant has a professional to turn to if for some reason the data collection process causes some psychological distress. This is of particular relevance to anyone carrying out research into online problem gambling. Some European countries require written consent for research participation (Mann & Stewart, 2000). Mann and Stewart suggest that if written consent is required then the participant could download a form and sign it offline and then return it by fax or postal mail.

Deception

The issue of deception has been noted as a serious ethical concern for online researchers. Whitty (2004) examined this issue with regards to online relationships and contended that posing as another person in the category group under investigation (e.g., an online dater) rather than a researcher was unacceptable, especially given there are other more ethical ways to collect data. This practice of letting participants know that a researcher is present in the online environment has been adopted by gambling researchers (particularly cyber-ethnographers) and outlined elsewhere (see Griffiths, 2010). However, in online behavioural tracking, this is not really an issue as the data are almost always amassed without the need for researcher intervention.

Private versus public space

Another concern that is more unique to studying online interactions is the perception of the space. Ferri (cited in Mann & Stewart, 2000) asserted that “private interactions do take place in public spaces” (p.46). Although online interactions are often observed by many other people, the person online may not perceive their interactions as public. A public space is much more obvious in face-to-face settings. Whitty (2004) argues that although interactions take place online in public spaces, this does not mean that the intended audience is a social science researcher. In relation to sensitive issues (such as problem gambling), she warns that researchers need to think about how the participant would feel if they were included in their studies without giving any consent. This clearly has overlaps with lurking (see next section).

Sharf (1999) has also noted that “despite widely announced admonitions concerning the potential for public exposure, there exists the paradox that writing to others via e-mail often feels like a private or, in the case of an online group, quasi-private act” (p. 246). There are clearly blurred boundaries between what constitutes public and private spaces online. This is not a clear-cut issue, and that in addressing the issue it would also be counter-productive for social scientists to answer this question in respect to the entire Internet. Instead, social science researchers need to acknowledge that there are different places online. For example, a chat room or an online poker forum might be deemed a more public space than (say) email. This is a crucial ethical concern that should not be dismissed and it would be arrogant for social science researchers to debate this issue amongst themselves, without consulting the individuals who inhabit the particular web spaces. While the present authors can offer no definitive answer, the way forward in our research is to begin questioning the nature of this space. To this end, it is argued that lurking in public newsgroups might be ethically questionable. Miskevich (1996) also questions that if it is acceptable to collect data, what limits should be placed on the type of data collected and how should these data be analysed.

If researchers are to make divisions between private and public spaces online, the demarcations are not always obvious. For instance, is an online self-help support group for gamblers that can be accessed by anyone online a public or private space? The internet can give an individual a sense of privacy and anonymity. If it is concluded that online spaces are public spaces, the anonymity they afford can give the illusion that these are private spaces. Therefore, should researchers ethically take advantage of online users' false sense of privacy and security? Is it ethically justifiable to lurk in these sites and collect data without the

knowledge or consent of the individuals who inhabit these sites? It is probably best to assume that people are not aware of others' presence unless they make themselves explicitly known to them, at which point the situation becomes public, unless those being studied are under the impression that they are in a private correspondence with the researcher (Wood & Griffiths, 2007). In other words, it is the perceptions of the participant that defines the domain as public or private, rather than the physicality of the situation. However, in online behavioural tracking, the participant is passive and unknowing.

Lurking

Some social scientists have opted to play the role of lurker (i.e., being a passive observer in a chat room or discussion group) for the purposes of collecting participant data. For instance, respecting a participant's right to privacy is a basic ethical requirement of any social science study. However, this issue becomes more complicated when studying online gamblers (Wood & Griffiths, 2007). In general, the rule of thumb is that researchers should only observe people in a situation where they would ordinarily expect to be observed, such as a public space. However, in cyberspace these boundaries become blurred as it is often difficult to ascertain what, exactly, is a public domain and, what is a private domain (Wood & Griffiths, 2007). Social researchers need to seriously consider if they have the right to lurk in online settings in order to learn more about the activities they are investigating. Mehta (2001) examined pornography in public newsgroups. While the study provided important information for psychologists, social scientists and criminologists, it also raises some important ethical and legal questions in respect to how social scientists conduct research online. Although it was not discussed, one might wonder if the researcher sought permission to use their institutions' servers to peruse internet sites containing illegal material, and what the legal ramifications are if they did not. In relation to online gambling research, Griffiths (2010) has the ethical concerns for cyber-ethnographers studying online poker players by accessing online poker forums.

IMPLICATIONS OF ONLINE BEHAVIOURAL TRACKING FOR PROBLEM GAMBLING SCREENING CRITERIA

Although obvious, it needs to be noted that problem gaming lies on a continuum of behaviour and there are always behaviours that are typically engaged in by problem gamblers that some non-problem gamblers may also engage in. On a diagnostic screening level, the DSM-IV criteria for pathological gambling comprises ten key indicators as to whether someone has a gambling problem (*Diagnostic and Statistical Manual, Fourth Edition*; American Psychiatric Association, 1994; see Table 1). If a person answers positively to at least five of the following items, a diagnosis of pathological gambling would be made whereas endorsement of three or four of the criteria would indicate a diagnosis of problem gambling. As will be argued below, only a few of these behaviours can be reliably spotted online using online behavioural tracking (the most obvious being chasing losses, salience/preoccupation, and tolerance). The following list highlights each of the DSM-IV questions for pathological gambling and the component of pathological gambling that each criterion is assessing. This is followed by an assessment as to what extent each criterion can be identified online.

- *Salience/Preoccupation* (Do you find that you are becoming preoccupied with past gambling successes or find yourself spending increasingly more time planning future gambling?) – An online problem gambler is likely to spend a lot of time gambling online although this behaviour in itself does not necessarily indicate a problem. Anything above four hours daily play over a protracted period could be considered excessive although some forms of online gambling (e.g., online poker) may take up a lot of time and be played relatively inexpensively.
- *Tolerance* (Do you find that you need to increase the amount of money you gamble to achieve the same enjoyment and excitement?) – If experiencing tolerance to gambling, an online problem gambler is likely to have changed their gambling behaviour in one of two ways over time. The first example of tolerance is a gradual increase of daily play in terms of time. For instance, the gambler might start off playing 30-60 minutes a day but over the course of a few months starts to play increasing amounts of time. The second example of tolerance is the act of gambling using gradually bigger stakes over time. An online problem gambler is more likely to experience both of these combined (i.e., gambling for longer and longer periods of time with bigger and bigger amounts of money).
- *Relapse* (Have you recently tried to stop gambling but were unsuccessful?) – Although this is difficult to detect with absolute certainty online, a typical pattern would be a gambler who gambles heavily, day-in day-out, for a period of time and then “disappears” for a period of time (which could be days, weeks, and sometimes even months), only to suddenly re-appear and gamble heavily again.
- *Withdrawal* (Do you become moody or impatient when you are cutting down how much you gamble?) – This is again difficult to detect with absolute certainty online but is most likely to surface with the use of verbally aggressive comments in those games that have chat room facilities (such as online poker).
- *Escape from reality* (Do you ever use gambling a way of ignoring stress in your in life or even pick you up when you feel down?) – This is almost impossible to detect online although those players who play for long hours every day are more likely to experience escape-like feeling.
- *Chasing losses* (Do you ever try to win back the money you lost by increasing the size or frequency of your wagers?) – This is one of the key indicators of problem gambling and can be spotted online more easily than many other problem gambling criteria. Typical chasing patterns will include repeated ‘double or quit’ strategies in an effort to recoup losses. Although many gamblers use this strategy on occasion, the online problem gambler will do it repeatedly. This behaviour, above and beyond any other criteria, is most likely to signal problem gambling.
- *Conceal Involvement* (Do you ever hide how much or how often you gamble from significant others?) – There is no way that an online gambling operator can spot this during online gambling unless such admissions are given to other players in online chat rooms.
- *Unsociable Behaviour* (Have you ever committed fraud or theft to get money to gamble with?) – Again, there is no way that an online gambling operator can spot this during online gambling unless such admissions are given to other players in online chat rooms.
- *Ruin a Relationship/Opportunity* (Has gambling ever ruined a personal relationship or an occupational or educational opportunity?) – As with the previous two criteria, there is no way that an online gambling operator can spot this during online gambling unless such admissions are given to other players in online chat rooms.
- *Bail-out* (Have you ever needed others to relieve a financial problem created by gambling?) – When an online gambler has exhausted all their own funds, they will often ‘beg, borrow and (eventually) steal’ money to continue gambling. A player whose account is constantly ‘topped up’ by people other than themselves may be a problem gambler.

This brief analysis of the extent to which each DSM criterion of problem gambling can be identified online shows that only a few behaviours (chasing losses, salience/preoccupation, and tolerance) can be reliably spotted via online behavioural tracking (see also Table 1). However, the first author has been informed (by various members of the online gambling industry) that problem gambling can be identified online. If this is true, it has implications for current problem gambling screening instruments. The following list contains a

number of behaviours that are engaged in by online problem gamblers. This was devised by the first author and based on conversations with members of online gaming industry.

Table 1: Summary of problem gambling criteria (DSM-IV) and likelihood of identification of problem gambling behaviour online

<i>DSM-IV Criterion</i>	<i>Likelihood of online identification</i>
Experiencing salience/preoccupation	Very good possibility
Experiencing tolerance	Reasonable possibility
Experiencing relapse	Slight possibility
Experiencing withdrawal symptoms	Unlikely
Escaping from reality	Unlikely
Chasing losses	Definitely
Concealing involvement	Unlikely
Engaging in unsociable behaviour	Unlikely
Ruining a relationship/opportunity	Unlikely
Other people providing a bail-out	Slight possibility

These are additional to those identified above (i.e., chasing losses, spending high amounts of time and money, and increasing the amount of gambling over time). As a general 'rule of thumb', it is assumed that the more of these online behaviours that are detected, the more likely the person is to be a problem gambler.

- *Playing a variety of stakes* – Playing a variety of different stakes (in games like online poker) indicates poor planning and may be a cue or precursor to chasing behaviour.
- *Playing a variety of games* – Evidence from national prevalence surveys (e.g. Wardle et al, 2007) suggests that the more types of gambling engaged in, the more likely the person is to be a problem gambler. Although this factor on its own is unlikely to indicate problem gambling, when combined with other indicators on this list may be indicative of problem gambling.
- *Player 'reload' within gambling session* – Although any gambler can engage in such behaviour, players who deposit more money within session ('reload') are more likely to be problem gamblers. This indicates poor planning and is a cue to chasing behaviour.
- *Frequent payment method changes* – The constant changing of deposit payment methods indicates poor planning and is may be a cue to chasing behaviour. This online behaviour usually indicates shortage of funds and need to extract monies from a variety of sources. Such behaviour can also indicate bank refusal.
- *Verbal aggression* – Aggressive verbal interaction via relay chat is common among problem gamblers although any gambler losing money may cause such behaviour. Such behaviour may be evidence of

gamblers going on 'tilt' (i.e., negative cognitive and emotional reaction to losing) or withdrawal effects if out of money to gamble.

- *Constant complaints to customer services* – Constant complaints to the customer service department is common among problem gamblers although any gambler losing money may cause such behaviour. As with verbal aggression, such behaviour may be evidence of gamblers going on 'tilt' (i.e., negative cognitive and emotional reaction to losing).

Clearly, each of these behaviours needs to be examined in relation to at least three or four other indicative behaviours. Perhaps most importantly, and according to online gambling companies who use socially responsible behavioural tracking tools, it is a significant change in usual online behaviour that is most indicative of a problem gambler. Most statistical modelling of player behaviour predicts future problematic behaviour on the basis of behavioural change over time. The behaviours highlighted in this section suggest that screening instruments in the future may be able to be developed that concentrate on the gambling behaviour itself, rather than the associated negative consequences.

CONCLUSION

This paper has attempted to highlight the basic methodological issues, and (more importantly) ethical issues concerning behavioural tracking as a new methodological tool for social scientists, along with a specific example of how the behavioural tracking technologies may provide important insights into future research into online gambling and problem gambling screening. On the very specific issue of online problem gambling detection, it is suggested that if problem gambling can be identified online without the use of diagnostic gambling screens, then this may have implications for the development of new problem gambling screening instruments in the future. No longer will screening instruments rely on the many consequences of problem gambling, but may be based on the actual behaviours that problem gamblers engage in while gambling rather than the negative psychosocial consequences that arise from the behaviour.

It has also been argued that online methods in all their varieties tend to provide a cost-efficient way of gathering online gambling data that can have many benefits for both researchers and their study participants (Wood & Griffiths, 2007; Griffiths, 2010). Online gamblers' familiarity with internet technology – whether they have problems or not – may facilitate and enhance such studies being undertaken. In the main, the most salient problems that online researchers in the gambling studies field are likely to face concern ethical issues (informed consent, deception, public versus private spaces, lurking). Despite such ethical dilemmas, these are not insurmountable and can be remedied if careful thought and rationale is provided.

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