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THE DEFINITION, DIMENSIONALIZATION, AND ASSESSMENT OF GAMBLING PARTICIPATION

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SUMMARY

In gambling research it is common to assess peoples' self-reported participation in gambling and to then compare extent of gambling involvement to things such as problem gambling status, gambling availability, and attitudes toward gambling. However, there has been no universal definition of what constitutes 'gambling', no standard way of measuring participation in it, and a lack of research investigating the most reliable and valid way of collecting self-report of participation. There are two significant problems deriving from this state of affairs. First, it makes comparisons between studies and jurisdictions very difficult. Second, it calls into question research results that posit a link between gambling participation and the aforementioned variables. The purpose of the present study was to rectify this situation by developing a reliable, valid, and well-agreed upon measure of self-reported gambling participation.

The first part of this investigation was creating a standard definition of gambling so as to identify what activities should and should not be included in a Gambling Participation Instrument. This definition needed to be consistent with legal definitions of gambling, as well as public perception of the term, and contain the core elements of the various academic definitions that have been proposed. It also needed to unambiguously include all activities that are publicly, academically, and legally considered to be gambling in Western countries, and unambiguously exclude all activities that are publicly, academically and legally not considered to be gambling. A definition meeting all of these criteria was as follows: "*Staking money or something of material value on an event having an uncertain outcome in the hope of winning additional money and/or material goods*".

The second part of this investigation was identifying the various dimensions of gambling participation that should be captured in an assessment instrument. One of the primary dimensions is type of gambling, with individual types being grouped into lottery-style games, wagering-style games, or continuous versions of lottery or wagering games. Another dimension is the nature of the gambling provider with regards to whether it is a commercial provider; a private individual; or a charity, community, or nonprofit group. A third dimension concerns means of access, with direct face-to-face access and remote access being the two main subtypes. The final three dimensions of gambling participation are frequency of participation, gambling expenditure, and time spent gambling. In a review of conventional approaches to assessing gambling participation, there was found to be considerable variability in how gambling participation is assessed as well as the terminology used. There has also been a tendency to ask about a lengthy list of 12-20 items that represent a mixture of gambling types, gambling provider, and gambling access (e.g., "lotteries, poker, social gambling, internet gambling, etc."). In addition to being fairly inefficient, this approach produces imprecise rates of participation due to overlap in the categories and incomplete coverage of the dimensions.

The third part of the present investigation was the construction of draft versions of the *Gambling Participation Instrument* (GPI). Several principles guided this process. One was the need to use what research has identified as optimal methodology for collecting reliable and valid retrospective self-report. Another was the need to comprehensively capture the above-identified dimensions of gambling participation, but in a manner that was not completely divergent from conventional ways of assessing it. A third consideration was the need to have an instrument that was efficient as well as generic, flexible, and modular. This is important so that the instrument could be used for different age groups, cultures, and countries; as well as in population prevalence studies, clinical studies, and experimental studies. The final principle was the need to assess gambling participation with a one year time frame so as to align gambling participation with problem gambling assessments, which conventionally use a one year frame.

The final part of this investigation was an empirical evaluation of the aspects of the GPI that were uncertain. More specifically this involved a) comparing the reliability and validity of a 'Graduated-Frequency' approach for assessing gambling frequency, time, and expenditure against the traditional 'Quantity-Frequency' approach; b) determining the optimal *reporting* time frame (i.e., per occasion, past month, past 3 months, past 6 months); and c) examining the value and utility of assessing time spent gambling. A total of 815 Canadian online panelists agreed to keep weekly diaries of their gambling behaviour for 6 months. At the end of 6 months 587 of them had completed 18 or more diaries, making them eligible for the Retrospective Questionnaire. Participants were randomly administered the Quantity-Frequency + Total Amount Retrospective Questionnaire (QF/TA) or the Graduated-Frequency Retrospective Questionnaire (GF). Participants who received the QF/TA questionnaire were asked about their gambling frequency, time spent, and money spent in four different ways and participants receiving the GF questionnaire were asked about their gambling participation in two different ways. A total of 575 completed the QF/TA and GF Questionnaires, with 563 of these individuals completing a re-administration of the same questionnaire two weeks later to establish the test-retest reliabilities of the six different questionnaire formats.

The validity of past 6 month retrospective report of **participation or non-participation** for individual types of gambling was excellent and the test-retest reliability was very good. However, there was also a very high rate of infrequent participants forgetting about their past involvement as recorded in their diaries, particularly for lottery and raffle tickets. The validity of retrospective reports of how the person **accessed gambling** (in person, remotely via phone or online, or both in-person and remote access) was also excellent with the test-retest reliability being good. However, there was some tendency for some people to report having just in-person access, or just online access, but diaries indicating both remote and in-person access. The validity of retrospective reports of **frequency of gambling** tended to be good to excellent, with reliability being fair to excellent, and the strongest reliability and validity coefficients and the best absolute match with diary amounts occurring for the QF and TA formats. Both the reliability and validity of retrospective report of **time spent gambling** was fair to good with the two QF formats having the highest coefficients as well as the closest match with diary amounts. The utility of capturing time spent gambling was modest, in that in most (but not all) situations it was highly correlated with frequency of gambling and frequency of gambling had slightly higher reliability and validity coefficients. The reliability and validity of **net gambling expenditure** tended to be poor to fair, but the validity of **gambling expenditure losses** (i.e., excluding people reporting net wins) was good, with the strongest coefficients and best absolute match with diary totals being for the QF Past 3 Months format. Despite the theoretical superiority of the **GF approach, the QF approach** (asking about participation in a typical month in the past 3 or 6 months) was found to have consistently higher validity and reliability coefficients and produce a better match with diary amounts. Finally, **shorter reporting time frames** (per occasion, past month, typical month in past 3 months) were not found to offer superior reliability or validity when extrapolated back to estimate the past 6 months of behaviour.

In light of the above findings, it would appear that a Quantity-Frequency approach using a time frame of the past 6 months offers the best combination of reliability and validity and is the format that would be optimal for the GPI. This conclusion aligns remarkably well to the reviews of this issue for the assessment of alcohol consumption, where a Quantity-Frequency approach and a one year time period are currently identified as best practice. The finalized *Gambling Participation Instrument* is a comprehensive, flexible, reliable and valid instrument assessing gambling participation in all of the primary dimensions of gambling: type, means of access, gambling provider, frequency, time, and expenditure. The test-retest reliability coefficients are fair to excellent, ranging from .46 to .84, and the validity coefficients are good to excellent, ranging from .60 to .91.

INTRODUCTION

Self-reported participation in gambling is commonly assessed in the context of population prevalence surveys, clinical treatment settings, and research studies. It is also included as part of several problem gambling assessment instruments (Stinchfield, Govoni, & Frisch, 2007). The person's observed level of gambling involvement is then often assessed with respect to its relationship to problem gambling status, as well as proximity to gambling venues, attitudes toward gambling, gambling fallacies, and many other things.

However, despite the frequency of this practice, there is:

1. No universally accepted definition of what constitutes gambling;
2. No standard way of measuring self-reported gambling participation across research studies and across jurisdictions; and
3. Very little research investigating the most reliable and valid way of assessing gambling participation, especially relative to the amount of research that has been devoted to assessing problem gambling (Rodgers, Caldwell & Butterworth, 2009).

There are two significant problems deriving from this state of affairs. The first problem is that it produces a range of different ways of measuring gambling participation, which makes comparisons between studies and jurisdictions very difficult. Second, it calls into question research results that posit a link between gambling participation and the aforementioned variables (e.g., existing low risk guidelines for gambling which are based on self-reported gambling involvement; see Currie et al., 2008, 2012). Moreover, current participation measures are based on certain underlying assumptions that give good reason to question their reliability and validity; namely, that respondents interpret the questions being asked of them in the same way as the researchers intended, and that respondents are willing and able to divulge accurate information about stigmatized behaviour such as gambling. Cognitive distortions, faulty memories and repression of losses combine to lead to response errors, and survey design issues may further impede accurate reporting of past behaviour.

Thus, it is clear that there is a need to develop a reliable, valid, and standardized measure of gambling participation so as to rectify these problems. This was the motivation behind the [Canadian Consortium for Gambling Research \(CCGR\)](#) commissioning the present study and the overarching purpose of the research presented here.

DEFINITION OF GAMBLING

The first requirement in designing a gambling participation instrument is to identify what 'gambling' is with some precision, as this informs which specific activities need to be included in the assessment instrument and which should not be.

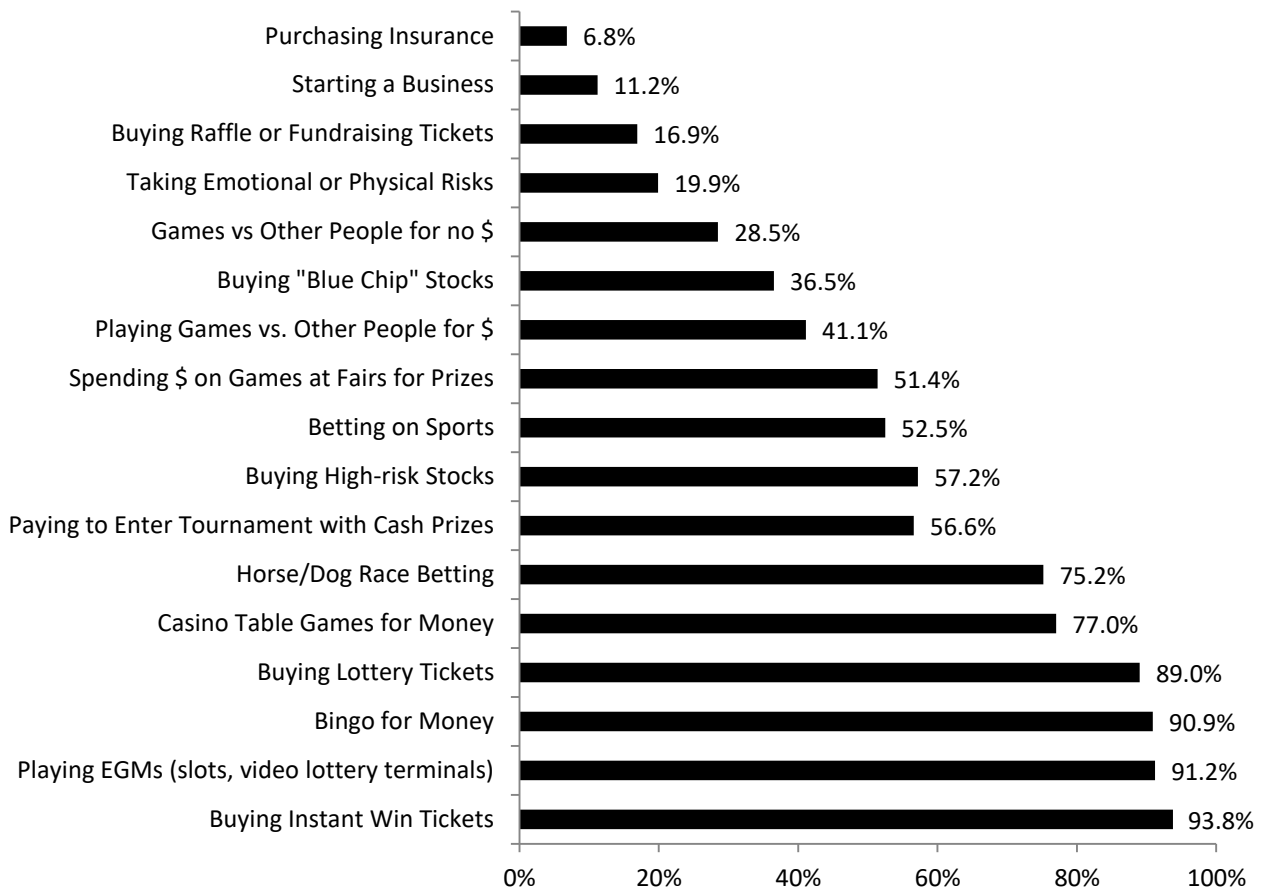
Partaking in gambling is a more ambiguous concept than partaking of alcohol or tobacco. This is due to the fact that the meaning, function, and provision of gambling have differed depending on the culture and time period. In pre-industrialized and non-Western societies gambling was typically engaged in to divine the future; to facilitate trade, socialization, and competition with other groups; and/or to promote the gathering and favor of supernatural forces that were believed to influence harvests, rain, warfare, sickness, and other events (Binde, 2005, 2007; Culin, 1907; McMillen, 1996; Salter, 1974, 1980; Williams, Stevens & Nixon, 2011; Young et al., 2007). In contrast, gambling in Western society has historically been an activity engaged in between individuals for the purposes of recreation and/or winning money. Most recently, the provision of gambling in modern industrialized societies has become a commercial enterprise whereby dedicated gambling venues and companies provide gambling opportunities in a manner that ensures a consistent advantage and profit for the commercial provider (Schwartz, 2006).

Public Perception

There appears to be considerable ambiguity about what constitutes gambling, even in modern Western society. As evidence of this, in two separate studies, the first author provided a comprehensive list of 17 gambling-like activities and asked North American adults to indicate whether they considered each activity to be gambling or not. The first study involved a telephone survey of a random sample of 2,088 Canadian adults in 2006/2007. The second study was an online survey of 10,755 North Americans (89% from United States) in 2007. Details of these studies are reported in Williams, Stevens & Nixon (2011) and Wood & Williams (2012). Results from the aggregated sample are presented in Figure 1, which shows the percentage of people who identify each activity as a type of gambling.

As this figure shows, gambling exists on a continuum for most people and what meets the definition for one person may not meet the definition for another. That being said, there tends to be a high level of agreement that most of the modern classic forms of gambling meet the definition (i.e., lotteries, instant win tickets, electronic gambling machines [EGMs], bingo, casino table games, horse/dog race betting). There is less certainty about sports betting (52.5%), and only 16.9% of North American adults consider raffle or fundraising tickets to be a form of gambling. There is also a high level of agreement that insurance, starting a business, playing games with friends or family, and taking emotional/physical risks do not constitute gambling. The areas of greatest uncertainty concern stock market activity, paying to enter a tournament for cash prizes, games at fairs, and playing games against other people for money.

Figure 1. Percentage of North American Adults indicating whether they consider the Activity to be 'Gambling' ($N = 12,843$) (from Williams, Stevens & Nixon, 2011)



Academic Definitions of Gambling

A two-stage search strategy was used to identify the published literature on the definition of gambling and/or that attempted to delineate gambling from related constructs. The literature search started with the use of the keyword "gambling" in various combinations with the words "definition", "versus", "gaming", "speculation", "investment", "insurance", "tournaments", and "risk-taking" in the following electronic databases, restricting the search to articles published in English:

- ABI/INFORM Global
- Academic Search Complete
- Business Source Complete
- EconLit
- MEDLINE
- PsycINFO
- Science Direct

As a significant proportion of the scholarly literature on gambling is not published in academic journals, this same literature search was conducted in gambling-specific electronic databases:

- Alberta Gambling Research Institute Research Respository
- Australian Gaming Council's eLibrary
- E-Library – Responsible Gambling Council (Ontario)
- Gambling Research Database (GambLIB)
- Gambling Research Exchange Ontario Knowledge Repository
- Problem Gambling Library (New Zealand)
- Responsible Gambling Infohub

The second part of the search strategy involved checking the reference lists of all relevant articles to identify other potentially relevant articles.

The literature revealed dozens of different definitions of gambling proposed over the years, too many to actually cite. However, the following list will provide a starting point for the interested reader: Allen, 1952; Borna & Lowry, 1987; Brenner, 1996; Brenner & Brenner, 1990; Clark, 1987; Cohen, 1970; Devereux, 1979; Hazen, 2005; Holliday & Fuller, 1975; Jacoby, 1950; Lynch, 2011; Martinez, 1977; McMillen, 1996; National Research Council, 1999; O'Malley, 2003; Productivity Commission, 2010; Stout, 1996. For illustrative purposes, a few of these definitions are listed below:

The Australian Productivity Commission (2010) defines gambling as: "... an entertainment based on staking money on uncertain events driven by chance, with the potential to win more than staked, but with the ultimate certainty that gamblers as a group will lose over time. The fact that gamblers inevitably lose overall and that gambling is intended to be a recreational activity, distinguishes these outlays from investment activities, where chance also plays a prominent role".

The U.S. National Research Council (1999) defines gambling as: "...wagering money or other belongings on chance activities or events with random or uncertain outcomes".

Coming from an economic perspective, Borna & Lowry (1987) define gambling as "...reallocation of wealth, on the basis of deliberate risk, involving gain to one party and loss to another, usually without the introduction of productive work on either side".

In general, similar to what was found with public perception, there is no universally accepted academic definition of gambling. However there is consistency in the fact that the majority of these academic definitions contain three core elements: a monetary or material wager on an event; the purpose of the wager is to win additional money or material goods by correctly predicting the outcome of the event; and the future outcome of the event is uncertain. These academic definitions are less consistent in terms of whether the event is purely random and chance based; whether there is always a negative mathematical expectation for the gambler; and whether the activity lacks economic utility.

Feedback from International Gambling Experts

An additional step to understand current research/academic conceptions of gambling entailed soliciting feedback from international experts in gambling. The responding group of 15 people were from 10 countries (Australia, Britain, Canada, Germany, Hong Kong, Iceland, New Zealand, South Africa, Sweden,

United States), with 14 of the experts being academic researchers and the 15th being a gambling regulator. The participating experts were provided with background information about the project, as well as a very early draft of our definition of gambling and our *Gambling Participation Instrument*. Each expert was offered an honorarium of \$200 CDN to provide commentary on the project, our draft definition, and the draft instrument. All responses were received by the end of July 2013.

In general, there was strong endorsement for the project and good consensus about the core elements of gambling contained in our draft definition. However, there was some disagreement about a few of the specific words used and some of the supplementary description we provided to contextualize the definition. In terms of which specific activities constituted gambling, the experts were all in agreement that the following activities should be included: lotteries, instant lotteries, private betting between individuals, bingo, electronic gambling machines, casino table games, sports betting, and horse race betting. However, a small minority did not believe that charity raffles and lotteries should be included, and there was divided opinion about the inclusion of speculative stocks. This latter issue mirrors the general academic literature where there is considerable debate concerning whether speculative financial market activity should be included or excluded as a gambling activity (e.g., Arthur, 2000; Borna & Lowry, 1987; Stout, 1996).

This feedback, together with the review of the academic and legal literature was used to revise and sharpen the final definition of gambling provided later in this section. Feedback from these experts on other aspects of the draft *Gambling Participation Instrument* is described later in this report.

Legal Definitions of Gambling

The literature search described above also identified many legal articles relevant to this topic. Indeed, over the past 100 years, legislators and the courts have devoted considerable time and effort to clarifying what legally constitutes and does not constitute gambling because of the historical illegality of many forms of gambling and the need for formal regulation and taxation of legalized forms. In most Western countries, the definition of gambling was developed in the late 1800s and refined in the early part of the 20th century. It is contained in legislation and common law rulings concerning the activities of ‘betting’ and ‘gaming’ (Cabot, 1999; Rose, 1986). In contrast to the diversity of academic definitions, there is actually considerable uniformity in the legal definition of betting and gaming between different countries.

Betting (also known as ‘wagering’) is generally legally defined as *staking money or something of material value on the outcome of an uncertain event against someone who maintains a different opinion about the outcome* (Blakey, 1984; Cabot, 1999; Lipton, Lazarus, & Weber, 2005; Rose, 1986; Verbiest & Keuleers, 2003).

Gaming is typically defined as *an activity containing three elements: stake¹, prize, and chance* (Blakey, 1984; Cabot, 1999; Rose, 1986; Verbiest & Keuleers, 2003). (Note that ‘gaming’ is the original archaic term used to describe what we currently understand as ‘gambling’ (Clark, 1987). As a consequence of this historical meaning, gambling legislation in most countries conflates the term gaming with gambling).

Despite the cross-jurisdictional uniformity in these legal definitions, the lack of detail, especially in the definition of gaming, has created some ambiguity about the purpose of the stake, the nature of the prize,

¹ Also known as ‘consideration’ in legal contexts.

the relationship between the outcome and the prize, and the nature of ‘chance’. This has spawned a large body of judicial court decisions (‘common law’) in each country to provide further clarity. These more detailed common law clarifications tend to be more country specific. For example, in the United States, most states additionally stipulate that the gaming activity needs to be *predominated* by chance (Cabot, 1999; Liebman, 2009), whereas in Canada, it is deemed to be gaming if it involves *any element* of chance, as the Canadian Criminal Codes prohibits ‘mixed games of chance and skill’, without specifying the proportion of chance involved (Lipton et al., 2005).

Proposed Definition of Gambling

Any well-accepted definition of gambling needs to have 5 essential features:

1. Strong consistency with the public perception of the term.
2. Strong consistency with the core elements of the academic definitions that have been proposed and feedback from international gambling experts.
3. Strong consistency with the legal definitions.
4. Wording that unambiguously includes all the types of gambling that are publicly, academically, and legally considered gambling in Western society: lotteries, instant lotteries, bingo, keno, electronic gambling machines, casino table games, sports betting, horse and dog race betting, and private wagers between individuals.
5. Wording that unambiguously excludes all activities that are publicly, academically, and legally not considered to be gambling in Western society: game play, risk-taking, insurance, sweepstakes, tournaments, auctions, and investing.

Based on these considerations as well as a thorough review of the literature, the following definition of gambling is proposed: ***“Staking money or something of material value on an event having an uncertain outcome in the hope of winning additional money and/or material goods.”***

The core elements of this definition are as follows:

1. *The person is staking money or something of material value.* Something has material value if there are people willing to pay money for it.
2. *The purpose of making the stake is to win additional money and/or material goods (i.e., the ‘prize’).* It is important to recognize that winning additional money or material goods does not have to be the only motivation for gambling, as there are situations where the person is also engaging in the activity to support charity efforts/events, to socialize with friends, or because engagement in the activity also provides excitement or psychological escape. Thus, raffle tickets meet this definition of gambling, and will be included in the *Gambling Participation Instrument*. This approach is consistent with legal understandings of what raffles are, although admittedly somewhat inconsistent with public perception.
3. *The prize consists of additional money or material goods.*
4. *The stake is lost or the prize is won depending on the outcome of an event that will occur.* Although most gambling events will occur in a relatively short period of time, the time frame is not a defining feature of gambling, as there are many wagers that take many months to be determined (e.g., betting on the eventual winner of a sports league at the end of the season or placing bets on who might win the next election).

5. *The outcome of the event is 'uncertain'*. There is widespread agreement that staking money on an event with a *certain* outcome does not constitute gambling. Rather, there has to be some uncertainty about the outcome. 'Uncertainty' is a generic term that encompasses a range of outcomes including the chance-based random outcomes of many traditional gambling games (e.g., lotteries, instant lotteries, bingo, keno, electronic gambling machines, roulette), the complex skill-influenced outcomes of skill-based games (e.g., golf, pool), and the mix of chance and skill that determine the outcomes of other types of gambling (e.g., sports betting, poker).

There are three elements that are *not* included in this definition of gambling, but have been suggested as definitional elements by some people:

Chance. Chance or randomness is sometimes identified as one of the historical distinguishing features of gambling (e.g., Reith, 2002). Furthermore, many writers over the years have advocated that a gambling outcome has to be *primarily* chance-based, or cannot be determined *primarily* by skill, or that the outcome cannot be influenced by the person's actions. However, this chance/skill ratio is not a useful distinction. For one, although many traditional types of gambling are purely chance-based (e.g., lotteries, instant lotteries, bingo, slot machines, roulette), most other gambling activities involve a mixture of skill and chance that is very difficult to differentiate or assign proportions to (as evidenced by the ongoing debates about this issue in U.S. courts). Second, some very traditional types of gambling (e.g., sports betting, poker) are highly skill-based (e.g., Leonard & Williams, 2015; Leonard, Staples & Williams, 2015). Finally, we also do not believe that being unable to influence the outcome of the event is an essential feature of gambling, as there are many skill-based activities that can be bet on (e.g., poker, golf) where having greater skill will directly influence the outcome in the player's favour.

Negative Mathematical Expectation. Some definitions have indicated that gambling is characterized by a negative mathematical expectation over time (e.g., Productivity Commission, 2010). However, this only applies to modern commercial forms of gambling where the stake is made against the commercial provider (Hannum & Cabot, 2005). Sports betting, card counting in blackjack, and all person-to-person games (e.g., poker, mahjong) are types of gambling where a long-term positive expected return occurs for a small number of more knowledgeable and skilled gamblers (Hayano, 1984; Silberstang, 1988).

Economic Utility. Some economists have argued that economic utility is what differentiates gambling from investing and stock market speculation (e.g., Borna & Lowry, 1987; Hazen, 2005; Holliday & Fuller, 1975). The economic value of traditional financial markets is fairly clear (i.e., purchasing government bonds or stocks in a company provides funds to support government or industry endeavours). In contrast, gambling has been characterized as largely a sterile transfer of wealth from one sector of the economy to another (Borna & Lowry, 1987; Williams, Rehm, & Stevens, 2011). While there is some truth to this distinction, it is too broad a generalization, as there are some situations where gambling does have economic value² and some situations where the economic value of certain financial markets and instruments is negligible or negative (as will be discussed later in this report). The next section of this report also makes it clear that the existing definition of gambling allows it to be differentiated from financial investing without the need to reference economic utility.

² An example is when the patron base is from outside the jurisdiction, resulting in an influx of new wealth (Williams, Rehm, & Stevens, 2011). It is also true that adding a new and interesting service/good to the economy (e.g., gambling) can have economic value by at least temporarily spurring increased overall monetary circulation within the economy and increasing gross domestic product (GDP) (Walker, 2007; Walker & Jackson, 1998, 2007).

Related Constructs That Are Not Gambling

Game Playing. Game play has many of the same features of gambling in terms of having rules, a definitive outcome, and there being clear winners and losers. Examples include playing chance or skill-based board games, video games, athletic contests, arcade games and other activities that are played for their own sake. What primarily differentiates game play from gambling is that no money or material goods are being staked (see also King et al., 2015, who describe other differentiating features). As mentioned earlier, ‘gaming’ is the original archaic term used to describe what we currently understand as ‘gambling’ (Clark, 1987) which is why it is conflated with gambling in legislation and common law. Nonetheless, gaming clearly has a different meaning today and should not be used to refer to gambling.

Divination. Using randomizing agents such as astragali, dice, or other physical devices to foretell the future or determine the will of supernatural forces does not constitute gambling as nothing is staked and nothing is won.

Risk-Taking. Skydiving, running for office, and asking someone for a date are all things with uncertain outcomes and potential prizes. However, both what is being staked and the prize are nonmonetary and nonmaterial in nature.

Insurance. Insurance involves paying money to transfer risk to another party. When insurance was initially developed, it was often seen as a form of gambling (Rose, 2014; Zelizer, 1983). This was partly due to the fact that, in addition to traditional forms of insurance, some insurance brokers would offer insurance that a particular number would not be drawn in the lottery (these ‘insurance policies’ might cost one shilling and pay out £10 if the number did get drawn)³ and/or insurance on the likelihood of foreign events (e.g., which city would be the target of military action or fall to a siege) (Schwartz, 2006). For the most part, these types of activities *would* meet the definition of gambling. It was because of this conceptual overlap that [insurable interest](#) was subsequently introduced as a prerequisite for purchasing insurance (i.e., you are now only able to insure people or things that have direct relevance to your own personal well-being). This requirement is now common to all modern insurance policies. Consequently, what currently differentiates modern insurance from gambling is the fact that a) the person purchasing the insurance does not wish to ‘win’, b) the commercial insurer always ‘wins’ the insurance premium (i.e., there is no uncertainty), and c) the event may never actually occur.⁴

Sweepstakes. A sweepstake is defined as a lottery with monetary and/or material prizes but no entry fee (or stake). Historically, sweepstakes referred to a type of lottery where all participants put up a ‘stake’ and the winner ‘swept’ or won all the stakes. Beginning in the 1950s, the term began to be used in situations where purchase of a company’s product would automatically enter the person into a lottery draw organized by that company (companies used this strategy to encourage product purchase).⁵ However, because most jurisdictions subsequently deemed this activity to be gambling (as a stake, prize, and chance were involved), all modern sweepstakes that ostensibly require purchase of a product or an

³ This is where the term ‘policy game’ (illegal lottery) derives from.

⁴ Within the Islamic community, there is a belief that insurance still constitutes gambling, partly because the insurance company is hoping to win (Archer, Karim, & Nienhaus, 2011). This has led to the development of *Takaful*, or Islamic insurance, whereby losses are covered by the pooled contributions of other people also seeking to protect against loss rather than from a commercial insurer.

⁵ The popular ‘Irish Sweepstakes’, active from 1939 – 1987, was actually a lottery rather than a sweepstake.

entry fee are obliged to allow free entry unless they actually have a license to hold a lottery or raffle. This free entry provision is often not well promoted, sometimes being contained in the fine print on the product, and sometimes requiring the person to write to the company to receive refund of their purchase or entry fee. (Note: for similar reasons ‘**casting lots**’ to divide up material goods is also not gambling, as nothing is staked even though something can be won).

Auctions. Someone may proffer money on a product that he/she is uncertain to obtain, but the person does not lose their money if they are unsuccessful in purchasing the product.

Tournaments. Although entry fees may be charged to cover administrative costs of running a tournament, there is no monetary or material prize for the winner. Situations where the entry fees are distributed to the winners are more ambiguous. However, in these cases it is usually argued that the entry fee is not a bet or a stake, but rather the requisite fee for participating in the tournament.

Investment. There are various definitions of investing in the field of finance, but the following one tends to be fairly common: “purchasing or allocating money into an asset with the expectation of long term capital appreciation or profits deriving from that asset” (e.g., Bogle, 2012; Investment, n.d.). Conceptually, investing differs from gambling because of its longer term perspective, lower risk, and positive expected returns (Arthur, Williams, & Delfabbro, 2016). However, as mentioned earlier, some forms of gambling have longer term horizons (e.g., betting on which sports team will eventually win the championship); entail low risk (e.g., betting on the heavy favourite in a horse race); and have positive expected returns due to having greater skill at the game (e.g., professional poker players, card counters at blackjack, professional sports bettors) (Hayano, 1984; Silberstang, 1988). Investment is more clearly distinguished from gambling due to the fact that it involves creation or purchase of an asset; the asset is never explicitly staked; financial gains or losses are exclusively due to capital appreciation or depreciation of the asset; and there is usually no specific point in time at which there is an outcome or event associated with the asset (Arthur, Williams, & Delfabbro, 2016).⁶

That being said, within the financial sector there is a continuum between investment-like products/activities (e.g., long-term holding of bonds or mutual funds) and more [speculative](#) gambling-like products and activities that tend to be shorter term, higher risk, with higher and lower gains and losses, and with a *primary focus on making a monetary profit from price movement without regard for the fundamental value of the asset*. Examples of the latter are a) [day trading](#) where stocks are bought and sold in the same day with the express purpose of making an immediate profit; b) ‘penny stocks’ (sometimes known as ‘lottery stocks’) of companies with few or no assets, and with a high risk of going out of business but also a small chance of increasing to many multiples of their current value if their venture is successful; and c) [shorting](#) a stock, which involves borrowing the stock, immediately selling it, and then hoping the value of the stock declines in the future so the person can repurchase the stock at this lower price, return it to the lender, and make a profit. There are also speculative elements to the entire [derivatives](#) market, where people enter into off-exchange contracts relating to the performance of a stock, commodity, or index on the actual exchange and where the asset may in fact never actually be purchased. The purchase of [options](#) to buy or sell a commodity or stock at a specified price before a

⁶ The role of chance versus skill is also often identified as something distinguishing gambling from investment. However, this is also not a strong differentiator, as several forms of gambling are highly influenced by skill, and although most investors use skill and knowledge to select their investments, their actual performance over time usually does not exceed the market average, which could be equally well achieved by choosing a random selection of stocks representative of the general market (Andersson, 2004; Bhootra, Drezner, Schwarz & Stohs, 2015; Chan, Gup, & Pan, 2003; Dickens & Shelor, 2003; Malkiel, 2003; Verheyden, De Moor, & Van den Bossche, 2015).

specified date is one example. [Futures contracts](#) and [forward contracts](#) are another type of derivative where the buyer agrees to purchase an asset (and the seller agrees to sell the asset) at a specific future point in time for a price that is currently determined.

Whether speculation constitutes “*staking money or material goods on an event having an uncertain outcome in the hope of winning additional money and/or material goods*” is potentially arguable both ways, and is somewhat dependent on the specific type of activity or financial instrument involved and how it is used (Arthur, Williams, & Delfabbro, 2016). Although most speculative activities involve purchase of an asset ⁷ (or a contract related to an asset) rather than staking money or material goods, it is clear that the asset, once purchased, is being used as a material stake in the hope of a favourable future valuation so that that the stake can be sold and additional monies accrued (if it has not already been sold as in shorting and futures contracts). The second potential difference is that there is sometimes no definitive point at which an outcome occurs in speculation, which is required for something to constitute a gamble or wager. This is not a particularly strong argument, however, as options have expiry dates, futures contracts have to be fulfilled by a certain date, and day traders and high frequency traders generally sell the asset on the same day the purchase is made. Short selling is the only type of speculation where there is often no definitive date in which the shares have to be repurchased and returned. However, short sales are virtually always ‘covered’ at some point, as the borrower is often paying interest on a margin account and/or dividend costs for the sold shares.

In sum, while investment is conceptually distinct from gambling, there is conceptual overlap between gambling and certain types of speculation. There also appears to be a strong empirical relationship between speculation and gambling, with the large majority of speculators being heavily involved in traditional forms of gambling (Arthur & Delfabbro, 2016; Arthur, Delfabbro & Williams, 2015). For both of these reasons, speculative financial market activities are included as an optional question in the *Gambling Participation Instrument*. (Note that simply wagering on the direction of a financial index (composite stock index, currency value, commodity value) with an agency external to the actual exchange is unambiguously a type of gambling. This is briefly discussed in the next section of this report).

⁷Some forms of speculation do not involve purchase of an asset. One example is an options contract that gives someone the ability to purchase or sell an asset but does not oblige them to. Futures contracts related to weather events also do not involve purchase of an asset. Although buying futures contracts involves the future acquisition of an asset, futures contracts are often resold for a profit or loss before physical delivery of the asset actually occurs. Finally, it can also be argued that ownership of penny stock of a company with few or no assets does not really qualify as purchase of an asset.

DIMENSIONS OF GAMBLING PARTICIPATION

The purpose of the present section is to create a taxonomy of gambling participation so as to more clearly identify the dimensions that should be captured in a *Gambling Participation Instrument*. This taxonomy is intended to be both cross cultural and cross historical.

Types and Subtypes of Gambling

It is a common perception that gambling comes in many different forms. While this is true, it is also true that from a theoretical perspective, all types of gambling can be roughly grouped into two main families: lottery-style games and wagering-style games.

Lottery-Style Games

Lottery-style games are those where a participant has chosen or been assigned a particular set of numbers or symbols which are then compared to the winning numbers or symbols that have been randomly chosen or predetermined from a large set of possibilities. Lottery-style games are known as 'long odds' games, where the person pays a small fee for a small chance to win a large prize. Also characteristic of lottery-style games is the fact that no skill or knowledge influences a person's likelihood of winning and all of the games have a negative mathematical expectation for the player. Within this lottery grouping, individual types and subtypes of lottery-style games can be identified:

Traditional Lotteries

The above described characteristics typify the 'traditional lottery'. Traditional lotteries have existed for thousands of years. Historically, people would purchase tickets that were sequentially numbered up to the maximum number of tickets sold and the winning number would be manually drawn from a container with corresponding numbers. Although there are still some lotteries that use this format, beginning in the late 1970s this began to be replaced with a bingo-inspired procedure whereby 6 to 8 balls are randomly chosen from a vessel containing between 37 and 59 sequentially numbered balls. A few other selection formats also currently exist (e.g., winning numbers selected by random number generators; winning numbers determined from soccer scores in a combination of matches).

Currently, the major subtyping of traditional lotteries concerns their geography (i.e., whether they are transnational, national, or regional) and their frequency (i.e., whether draws are held daily, biweekly, weekly, monthly, or yearly).

Raffles

Raffles are also a very old type of gambling. The traditional distinction between a lottery and a raffle is that raffle prizes consisted of merchandise rather than cash, the prize value was lower than a lottery, and raffle providers were charity/community/nonprofit groups. Although this is still a common understanding of the differences, this distinction has been blurred with government or commercial lotteries offering merchandise as prizes, and charity/community/nonprofit groups offering 'raffles' with cash prizes (e.g.,

50-50 draws) and/or what are described as lotteries but with the prize consisting of merchandise (e.g., dream home lotteries).

Instant Lotteries

This is defined as a lottery where the results can be immediately revealed. Instant lotteries were first introduced in the form of [punchboards](#) in the 1700s, where a person would puncture a hole covering a wooden board with many holes to extract an object or paper to ascertain whether it was the winning object, number, or symbol. In the late 1800s, this began to be replaced with the purchase of paper tickets, where a small number of these tickets contained winning symbols that could be revealed by pulling or scratching off coverings concealing the symbols. Depending on the jurisdiction and specific format these are currently described as scratchcards, break open tickets, Nevada tickets, or pull-tabs. In the last 20 years, virtual electronic forms of instant lotteries have become available from online gambling websites. These are often known as 'instant games'.

Bingo

This game is known as Housie in some countries (e.g., New Zealand). Although the modern version of this game dates from the 1920s in the United States, earlier variants were played in Europe in the 1500s. In modern bingo, players match the numbers of randomly drawn balls (numbered 1 to 75 or 1 to 90 depending on the country) against numbers on cards that have been arranged in a 3 rows x 9 column grid or a 5 row x 5 column grid, depending on the jurisdiction. The player wins if they have a completely matched row, column, or diagonal before any other player for 5 x 5 cards, or if they have the numbers in the four corners of the card matched, or the numbers matched for one, two, or three rows for 3 x 9 cards.

Linked bingo or 'satellite bingo' is a subtype whereby multiple bingo halls participate in a joint bingo event with a larger prize.

Continuous Lotteries

All of the above described lottery-style games involve a single event, with some period of time occurring before an additional opportunity to play is available. However, there are variants of these games where a lottery draw can occur every few seconds or minutes. The percentage payback to the player for continuous lotteries tends to be higher (although still negative). The maximum prize also tends to be much smaller compared to non-continuous lotteries. Within this grouping of continuous lotteries, individual types and subtypes can be identified:

Keno

This game is also known as rapido in some countries (e.g., France). Keno is a very old game, with the traditional versions being non-continuous in nature. Currently, in most jurisdictions keno tends to be offered electronically with draws occurring on a fixed schedule several times a day (every few minutes in many jurisdictions). Players typically choose up to 20 numbers (maximum of 10 or 12 numbers in some countries) ranging in value from 1 to 80. Usually 20 winning numbers are then randomly drawn via a random number generator. Prizes are awarded depending on how many correct numbers have been chosen by the player.

Wheel Games

Spinning wheels have been used for gambling since ancient times. **Roulette** is one popular variant of a wheel gambling game, first developed in Europe in the 1700s. Roulette consists of a horizontal wheel divided into an equal number of segments, with the perimeter of each segment alternating red and black and each segment displaying a unique number from 1 to 36. There is also either one or two segments displaying zeros that are coloured green. The wheel is spun and a ball within the wheel is sent in the opposite direction of the spin. Within a minute the ball falls into one of the segments to designate the winning number and colour. Players can bet on the winning number, its colour, whether it is an odd or even number, or the number range the winning number falls within.

Big Wheel, also known as Big Six, Wheel of Fortune, and Money Wheel, is another relatively popular wheel game, first prevalent in the late 1880s in saloons, gambling establishments, and carnivals. It consists of a vertical wheel divided into an equal number of segments with each segment displaying a particular number, symbol, or colour, with the same number/symbol/colour appearing in multiple locations on the wheel.⁸ The player places a bet on which number/symbol/colour the pointer at the top of the wheel will indicate. The wheel is spun and within a minute friction slows the wheel until it stops and the winning number/symbol/colour is indicated.

Electronic Gambling Machines (EGMs) providing Virtual Lotteries

Depending on the country these are also known as slot machines, video lottery terminals, video gaming machines, poker machines or 'pokies'⁹, fruit machines, fixed odds betting terminals, electronic keno machines, bingo machines, roulette machines, etc. 'Video lottery' is the most accurate description of most of these devices, as the large majority essentially provide electromechanical versions of a lottery-style game. These devices were first developed in the 1890s in the United States with the earliest versions being a) upright cabinet-style machines housing a small Big Wheel style wheel, and b) desktop-style five reel poker machines with each reel containing a deck of cards. After inserting coin(s) into the slot(s), the player would pull a lever that mechanically caused the wheel or reels to spin. Later versions of these devices used three circular reels with each reel depicting a series of symbols (usually limited to five or six different ones). After inserting a single coin into a single slot, all three wheels were spun with a lever and within a minute each wheel would stop. To win, the symbols in the display window would all have to match and/or contain certain symbols. Thus, this represents a somewhat different variation of the lottery where the winning combination of symbols is *already predetermined*, but the statistical likelihood of randomly drawing any of these pre-determined combinations is very low.

Modern versions of these machines look similar to the original three reel machines, but typically employ five reels; a larger range of symbols and/or pictures on each reel; a larger range of 'stops' (sometimes hundreds) per reel; and with the symbols/pictures in the display window being electronically generated

⁸ The term 'Big Six' comes from the fact that a common variant had six different symbols appearing with different frequencies around the wheel, with the payout proportional to how often the winning symbol was displayed.

⁹ Playing cards were the images used on the reels of all machines first legally introduced in Australia in 1956 (i.e., Clubman and Clubmaster manufactured by Aristocrat), which is presumably where the term 'Poker machine' derives from (a winning combination of three reels displaying the same playing card is also analogous to three of a kind in poker), and why all modern variants of EGMs are still known in Australia as 'poker machines' or 'pokies'. This is in addition to the fact that some of the very first mechanical reel-based machines in the 1890s used actual playing cards and/or playing card symbols and awarded prizes based on poker hands.

via a random number generator. A larger number of possible paylines in addition to the traditional singular horizontal one is also typical.

Stand-alone automated electronic machines offering the lottery-style games of bingo, roulette, and keno were developed in the 1990s and are now commonly provided in casinos and other commercial establishments. Similarly, beginning in the 1960s electronic versions of poker, blackjack, and other *wagering-style* games (described in the next section) were developed. This represents an important subtyping of EGMs: i.e., whether it is providing a lottery-style or wagering-style game. Another subtyping important in some countries concerns whether the EGM only allows small maximum bets and small maximum prizes or permits large maximum bets and large maximum prizes. Another subtyping concerns whether it is a stand-alone machine or a linked-machine connected to other EGMs that collectively can offer a larger potential jackpot.

Wagering-Style Games

Wagering-style games are the second family of gambling games. They involve betting on the specific outcome of a specific event against another individual or agency who is betting that a different outcome will occur. There are several features of wagering that distinguish this family of games from lottery-style games. This includes the fact there are often only two parties involved, wagers are commonly made against both commercial providers as well as privately against other individuals, the event is usually associated with human-related activities, and the range of possible outcomes is usually very limited. Wagering is a 'short odds' game, where a winning bet will often only gain the person an amount similar in size to the person's stake (although there are situations where the person can win a sum that is many multiples of his/her original stake). Of particular importance, unlike lottery-style games, greater knowledge and/or skill *will* often improve a person's likelihood of betting on the correct outcome. Furthermore, people with the most knowledge and/or skill can often achieve a positive expected return on their wagers. Within this wagering grouping of games, individual types and subtypes can be identified:

Sports Betting

Sports are generally defined as competitive human activities involving a degree of physical athleticism or dexterity. It includes situations where the person personally participates in the activity, as well as situations where the use of equipment (e.g., bicycles, skis), motorized devices (e.g., cars, motorcycles, boats) or animals (e.g., horse racing, camel racing) are involved. Although many sports require high levels of both athleticism and dexterity, some sports require a more limited range of physical skill (e.g., golf, bowling, pool, darts).

The most common subtype of sports betting involves betting on the outcome of sporting contests between professional athletes. Historically, this included activities such as wrestling, boxing, foot races, horse races, gladiator duels, and various culturally-specific ball games. Currently, the prevalence of sports betting closely parallels the relative worldwide popularity of different professional sports in the following order: football/soccer, basketball, baseball, American football, cricket, tennis, golf, rugby, horse racing, boxing, mixed martial arts, and ice hockey.

E-sports betting is the newest addition to this list. E-sports betting involves betting on the outcome of video game competitions between professional 'cyberathletes'. These competitions involve virtual versions of traditional sports, as well as several different virtual fighting and virtual shooting games. Currently, the most popular type of e-sports betting is on multi-player online battle arena (MOBA) games.

Although not involving the same degree of general athleticism as most professional sports, success at e-sports does require excellent manual dexterity and reaction time.¹⁰ In addition to cash wagering, it is common to wager ‘virtual goods’ (sometimes known as [skins](#)) that have utility in certain video games and which can be exchanged for cash (Grove, 2016). Of final note, video-game gambling consoles have recently been introduced into certain U.S. casinos. Unlike traditional electronic gambling machines, greater skill at the video game does influence pay-out rates.¹¹

E-sports betting is not to be confused with [virtual sports](#) betting, which involves betting on the outcome of computer generated sporting events (e.g., football/soccer, horse racing, dog racing), with the outcome determined randomly within the odds parameters provided. Virtual sports betting is most commonly provided online by existing online sports betting sites. No knowledge or skill is involved and the outcome is determined in a much shorter period of time. Thus, in most respects, virtual sports betting is actually more of a lottery-style than wagering-style game.

Traditional sports betting involves betting on the specific outcome of a specific event against another individual or commercial provider, with there being one winner and one loser. However, several other variants now exist:

- a) Betting on the outcomes of several different matches (sometimes known as a sports pool¹² or a sports lottery).
- b) Betting whether a team or individual will beat a certain score (‘beating the spread’) or the total score of both teams/individuals.
- c) Betting on a specific score, with the size of the person’s win or loss being tied to how accurate the prediction is (‘spread betting’).
- d) [Fantasy Sport](#) betting where participants select players from any team within a sports league to create a ‘fantasy team’ that competes against other fantasy teams. The winner is the person with the collection of players that have collectively amassed the most individual points in their different games. The results of fantasy sports betting can be determined on a daily basis (Daily Fantasy Sports), or longer intervals, including over an entire season.

Betting on Other Games

In addition to sports, there are many other non-physical games of skill and/or chance that become forms of gambling when the outcome is wagered on. Most of these games are played in non-commercial settings between non-professionals. However certain specific types of card, dice, and tile games are common in land-based casinos and card rooms. In addition, some betting games can be found on commercial online gambling ‘game’ or ‘skill game’ websites.

Games can be roughly subtyped into the following categories: a) card games such as poker, blackjack, baccarat, war, bridge, rummy, euchre, cribbage, and [hanafuda](#); b) dice games such as craps, sic bo (tai sai), Yahtzee, poker dice, and chuck-a-luck; c) tile games such as dominoes, [mahjong](#), and [pai gow](#); d)

¹⁰ Video game competitions where success is primarily dependent on strategy, logic, and chance are listed within the ‘Betting on Other Games’ category.

¹¹ These video-game consoles are listed as a subtype of electronic gambling machine in the GPI.

¹² ‘Sports pool’ is also a term used to describe a [betting pool](#) whereby the collective bets of a group of individuals is divided between the specific individuals who made the correct selection.

board games such as backgammon, chess, go, checkers, Monopoly, Scrabble, Clue, and mancala; e) video games; f) guessing games, such as traditional indigenous guessing games (e.g., [hand game](#), Williams, Stevens, & Nixon, 2011), as well as modern games such as Charades and Pictionary; and g) role-playing games. Games that are often found in casinos will be listed in the GPI under ‘casino table games’ whereas games that are not typically found in casinos will be listed under ‘other types of gambling’.

Betting on Animal Contests

Betting on the outcome of animal contests is also an ancient form of gambling still popular in certain parts of the world. This can involve racing (e.g., dog racing) or fights. Fighting is typically between two roosters ([cockfight](#)), but can also involve dogs, [insects](#), and other animals, and sometimes cross-species contests.

Betting on Other Events

There is almost an endless list of other events that people can and do wager on. The main additional commercial subtypes available on online gambling sites concern political events (e.g., elections), televised entertainment events (e.g., reality show winners, academy awards), and financial indices betting.

Financial indices betting is when a person places a bet on the direction of a financial index (e.g., stock exchange composite index, currency value, commodity value) or the specific future value of a stock or index (‘spread betting’), with an agency external to the financial exchange. Websites offering this type of betting are sometimes known as [binary option](#) sites, foreign exchange (Forex) sites, and spread betting sites. Financial indices betting is actually a very old type of gambling popular in the late 1800s and early 1900s known as ‘bucketeering’ with the venues offering this activity being known as bucket shops (Fabian, 1999; Woodlock, 1908). When this activity was eventually made illegal, it was put into the gambling section of most legal codes. Also consistent with its gambling affiliation is the fact that the reintroduction of financial indices betting was initially made by well-established online *gambling providers* in 2007 such as Bet365, Ladbrokes, Paddy Power, and William Hill (Williams, Wood & Parke, 2012). Many countries (but not Australia, Cyprus, Malta, or the Netherlands) have also deemed this activity to be gambling, and therefore do not subject the profits to taxation (the United States does tax gambling profits), unlike capital gains on financial markets which are subject to taxation (Brady & Ramyar, 2013).

Continuous Wagering

Most of the above activities contain a singular important event (i.e., the ultimate winner or loser), and this is usually the focus of the wager. However, some of these games contain a series of intermediate events that potentially can be wagered on, allowing ‘continuous wagering’ every few seconds or minutes. Within this grouping of continuous wagering, individual types and subtypes can be identified:

In-Play Sports Betting

This is where the person makes bets on intermediate events during the actual course of a live professional sporting event. This can be which team or player will score first, which team or player will get the next point, who will win the next inning or quarter, how many runs will be scored in the next time period, which team or player will get the next penalty, etc. In-play sports betting is most typically done with an online commercial provider, but bets can also be made between individuals.

Continuous Card, Dice, and Tile Game Betting

Although almost any game can involve bets during the course of the game, this is most commonly done with certain card, dice, and tile games that have a natural series of outcomes throughout the gaming session. Currently, the most common card games with this feature are blackjack, baccarat, poker, war, and [hanafuda](#). Currently, the most common dice games with this feature are craps, sic bo, and chuck-a-luck. The most common tile games where ongoing betting occurs are [mahjong](#) and [pai gow](#). Almost all these games can be found in commercial gambling establishments, but all of them can and are played privately as well. Similar to other types of wagering, for most of these games more skillful play will confer greater returns to the player, although these returns will still usually be negative when playing against a commercial provider.

Electronic Gambling Machines (EGMs) Providing Continuous Card, Dice, and Tile Games

As mentioned earlier, mechanical poker machines were first developed in the United States in the 1890s in the form of five reel slot machines with each reel containing a deck of cards. Slightly later three reel versions also used playing cards, with pairs and three of a kind being awarded prizes. Modern electronic poker machines display virtual cards, use random number generators and are more interactive.

Electronic blackjack machines first appeared in the 1960s and are now commonly available in casinos. In the last 30 years, stand-alone electronic versions of almost all the other common casino-provided card, dice, and tile games have become available.

Provider

There are three primary categories of gambling provider:

Commercial Gambling Providers

These are commercial establishments whose primary or secondary business is the provision of gambling. The names given to these primary establishments/organizations are casinos, card rooms, mahjong rooms, bingo halls, race tracks, sports books, lottery retailer, gaming arcades, and online gambling websites (including betting exchanges). The goal of these commercial establishments is to be profitable. Hence, they offer types of gambling that are naturally mathematically favourable to the 'house', and/or provide odds that make the offering mathematically favourable to the provider, and/or extract a commission for offering between-player games (e.g., poker) or wagers (e.g., betting exchanges).

In many countries, gambling is also provided in adult-restricted commercial venues such as pubs/lounges and clubs. Some countries also permit certain forms of gambling in other commercial establishments such as restaurants, retail shops, airport lounges, cruise ships, etc.

Thus, one subtyping of commercial gambling provider concerns whether it is a dedicated gambling provider (e.g., casino) or a commercial establishment that offers gambling as a secondary business (further subtyping can involve the specific type of commercial venue).

Another important subtyping concerns whether the commercial provider is providing the service from within the jurisdiction or from outside the jurisdiction. Related to this is whether the provider is a legal or illegal provider and/or whether the type of gambling they provide is legally permitted or not within the jurisdiction where it is offered.

Charity, Community, and Nonprofit groups

Historically, whenever gambling was legally permitted it was often justified on the grounds that the revenue went to good causes. Charity was one of these causes. Technically, 'charity groups' refers to groups whose purpose is to give money, goods, or services to the less fortunate and/or those in need. In more recent times this category of provider has often been expanded to include a wide range of community organizations and nonprofit groups. Traditionally, charity organizations tended to provide raffles, certain types of instant lotteries, and bingo. While there is still a strong association with these types, these groups also sometimes now provide other types of gambling. All of these groups still aspire to make a profit similar to commercial providers and also tend to provide types of gambling mathematically favourable to the provider. Nonetheless, many jurisdictions make a clear distinction between commercial providers and charity/community groups because of how the latter groups use the revenue generated by gambling.

Private Individuals and/or Residences

Historically, gambling was predominantly conducted privately between individuals, with its commercial provision being a more recent phenomenon. In Western countries private gambling now tends to be less common than commercial gambling, but private gambling is still very common in non-Western countries. Most types of private gambling involve sports betting or games between individuals, but almost all types of gambling can be engaged in privately. The expected return to the player will usually be much higher in private gambling compared to when it is offered by a commercial provider.

An important subtype concerns whether the private provider is a legally permitted provider or is providing gambling illegally.

Means of Access

There are two distinct ways in which a person accesses gambling:

Direct Face-to-Face Access

This is the historical way of accessing gambling and is still overwhelmingly the most common way today.

Remote Access

The earliest form of remote access involved messengers personally communicating a bet to a land-based operator. Communicating bets via telephone landlines began in the early 1900s. The advent of gambling and communicating bets via the internet began in 1995 (Williams, Wood, & Parke, 2012). Currently,

gambling via the internet is overwhelmingly the most common type of remote gambling, with computers, tablets, smartphones, gaming consoles, and interactive television (iTV) being the devices used to access the internet. (Note: all of these devices use platforms that allow communication with the internet, with this connection being made through telephone lines, coaxial cable, fiber optic cable, or radio or microwaves emitted by the device).

Frequency of Participation

Frequency of participation is one of the core dimensions of gambling participation. This is most commonly measured as number of days participating in a specified period of time (week, month, year). In addition to assessing total number of days for any type of gambling it is even more important to also assess frequency for each individual type of gambling, since there are important differences between someone who is a daily gambler but only purchases lottery tickets compared to a person who plays casino table games on a daily basis.

Expenditure

Gambling expenditure is also a core dimension of gambling participation. It also has the strongest theoretical relationship to problem gambling as many of the negative impacts of excessive gambling are due to financial problems. Expenditure is most commonly measured as net expenditure (wins minus losses) in a specified period of time (day, week, month, year). Net expenditure for each type of gambling as well as net expenditure for all types of gambling are both useful indices. Collecting information on outlay (amount wagered), amount won, and amount lost can also sometimes be done, especially for non-continuous types of gambling (e.g., lotteries) where the outlay (ticket purchase) occurs long before the outcome is known. As will be discussed later in this report (Areas of Uncertainty section), there are some important methodological complexities involved in assessing this core dimension of gambling participation.

Time Spent

Time spent gambling is another important dimension of gambling participation. Despite this, as will be discussed in the next section, while most jurisdictional surveys have collected information on frequency and expenditure, it has been uncommon to also collect information on time spent gambling. Part of this may be due to the fact that time spent gambling is expected to be significantly correlated to frequency and expenditure and thus may be somewhat redundant. It is also true that if you have reliably captured gambling expenditure and frequency, for many types of gambling it should be possible to infer time spent gambling. However, this is not necessarily true for types such as sports betting where there may be a considerable research time that may not directly translate into a reliable projection of net win/loss. Thus, there may be a theoretical justification for capturing time spent gambling, at least for certain types of gambling. One difficulty in capturing this dimension is determining what should be included (e.g., should time spent watching sporting events be included; should time travelling to a gambling venue be included).

Conventional Dimensionalization and Assessment of Gambling Participation

There is value in understanding how gambling participation has historically been assessed so that the current instrument is not fundamentally divergent. More specifically: Which types of gambling have been asked about? What time frame has been used to assess this involvement? What dimensions of gambling involvement have usually been assessed?

Rather than conducting an exhaustive search of the academic literature on this topic, which tends to be primarily North American in origin, these questions were addressed in two ways to provide a more international perspective. The first approach was to examine all of the international population prevalence studies of gambling that have been conducted between 1975 and 2012 and documented in Williams, Volberg & Stevens (2012). More specifically, we reviewed the *last* population prevalence study conducted in each jurisdiction up to 2012 (Appendix B). The second approach was to examine the various ways in which jurisdictional gambling *revenue* in different countries has been categorized and reported.

Population Prevalence Surveys

The following is a list of common patterns observed from the 25 international population prevalence studies of gambling detailed in Appendix B (from Williams, Volberg & Stevens, 2012):

Variability between Jurisdictions along with Significant Gaps in Coverage

As expected, the terminology used in these surveys is usually very jurisdictionally specific (e.g., bingo versus housie [New Zealand]; keno versus rapido [France]; sports pools versus sports lotteries [Canada]; scratchcards versus instant lotteries; slot machines versus video lottery terminals [Canada] versus pokies [Australia and New Zealand] versus fixed odds betting terminals and fruit machines [United Kingdom]; versus pachislo [Japan]. To some extent, the terminology needs to be jurisdiction-specific to ensure that survey respondents understand the question. However, there are also several instances where the terms used have been overly restrictive (i.e., slot machine as opposed to the more encompassing 'electronic gambling machine'; football pools versus a more generic descriptor such as 'sports pools'; skill games between individuals versus just 'games between individuals'). There have also been several instances where the terms used have been too general and needed to be more specific (i.e., 'betting', 'card games', 'dice games').

There is considerable variability in how gambling participation is assessed between countries, reaffirming the initial tenet of this research endeavor, which is that there needs to be better standardization. Most jurisdictional surveys are reasonably consistent in capturing the most common traditional types of gambling (i.e., lotteries, instant lotteries, horse racing, sports betting, electronic gambling machines, casino table games, and bingo). However, raffles, keno, and wagering on non-sporting events are traditional subtypes that are not commonly assessed and there is usually poor coverage of the newer subtypes such as fantasy sports, e-sports, virtual sports, financial indices betting, and betting on television and political events. There is also considerable variability and gaps in how gambling provider and means of access are assessed, with these gaps being particularly true in the assessment of online gambling and illegal gambling.

Lack of Logical Organization Leading to Imprecise Participation Estimates

Virtually all of these surveys suffer from lack of logical organization. More specifically, most jurisdictions ask about a lengthy list of 12-20 items that represent a mixture of gambling types, gambling provider, and gambling access. A typical example would be asking about participation in: *“lotteries, instant lotteries, social gambling, casinos, EGMs, poker, table games, bingo, sports betting with foreign bookmaker, sports betting with a legal gambling provider, horse racing, and internet gambling”*.

One problem with this approach is that it creates overlapping categories potentially resulting in double or triple counting. For example, a poker player may endorse social gambling or poker or both; an online EGM player may endorse casino, EGM, internet gambling, or all three activities; a horse race bettor may endorse horse racing and sports betting or just horse racing; a person playing an automated electronic table game at a casino may endorse table game, EGM, casino, or all three; a friendly wager between individuals on a sporting event might be reported as sports betting or social gambling or both. This issue of conceptual overlap is even more problematic in surveys that have asked about participation using overly general terms such as ‘betting’, ‘casino games’, ‘card games’, ‘dice games’, etc.

Another problem with this approach is that it results in incomplete coverage. In the above example, subtypes of gambling are assessed for sports betting (i.e., horse racing as a subtype of sports betting) with no assessment of the subtypes of lottery, EGMs, social gambling, or table games engaged in. Similarly, the nature, location and legality of the gambling provider are only assessed for a single type of gambling (sports). Finally, there is no determination of which specific activities are engaged in online (online purchase of lottery tickets is significantly different from online casino play). This incomplete coverage is partly due to between-jurisdiction differences in the prevalence and availability of different types, subtypes, providers, and means of access as well as the relative importance placed on different dimensions. Nonetheless, it still results in an incomplete picture and a profile that is difficult to compare to other jurisdictions and other time periods.

A few jurisdictions have provided more comprehensive coverage by asking about a much longer list of types x subtype x provider x access (e.g., Great Britain). However, these surveys tend to be very inefficient, as most questions in this 20 item list are endorsed by less than 5% of the population. In a similar vein, most surveys still routinely assess bingo and horse racing because of their historical popularity, however, although it is doubtful whether this is an efficient use of questionnaire time considering that participation rates in these activities in most jurisdictions has been exceedingly low for many years.

Frequency of Participation

Frequency of participation in individual types of gambling is usually assessed. This is done either by asking about number of times engaged in within a certain time period or by asking about estimated average frequency of participation within a certain time period. The latter is more common, with response options typically being provided for frequency of engagement over the past 12 months (ranging from daily to only a few times in past year).

Expenditure

Expenditure on individual types of gambling is usually assessed. This is done either by asking about outlay, wins and losses, or just asking about 'spending'. The latter is the most common approach, although it is not common to explain exactly what 'spending' actually means (i.e., net win/loss). The time frame for assessing spending has either been the last time the person engaged in the activity or in a certain time period. The latter is the most common approach, with past month or typical month being most common time frames. Sometimes participants are asked to provide an open-ended estimate and sometimes they are provided with response options. The former is more common.

Time

Time spent on gambling is not usually assessed. When it is, it is the amount of time spent per gambling session that is usually asked.

Time Frame

The person's gambling activities over the past 12 months is what is most commonly used to assess participation.

Jurisdictional Review

The second approach to understanding gambling participation involved examining the various ways in which jurisdictional gambling revenue has been categorized and reported. In the alcohol field, alcohol sales within a jurisdiction have been shown to be the best way of validating self-report of alcohol use (Robinson et al., 2013; World Health Organization, 2000). Similarly, it is to be expected that jurisdictional gambling revenue will be the best way of validating self-reported gambling expenditure. This will be facilitated if the *Gambling Participation Instrument* uses gambling type categories that are similar to the ways in which gambling revenue is categorized and reported.

Our initial intent was to collect this data in a systematic way for each country, similar to the way it was done for the population surveys. However, it soon became apparent that many countries collected and reported gambling revenue on a state or provincial basis, rather than on a federal basis. This presented a much more daunting task, especially considering that these revenue reports were difficult to locate for many jurisdictions and many were not in English. While we did not complete a comprehensive census, enough of these reports were surveyed to come to the following conclusions:

1. Both type-specific and aggregate gambling revenue are commonly reported.
2. There is considerable variability between countries in terms of how detailed the revenue data is within a type of gambling (e.g., some countries report revenue for each type of lottery while others do not; some countries report revenue for different types of electronic gambling machines while others do not).
3. Fiscal year is the most common time frame used to report revenue amounts, with quarterly fiscal amounts also sometimes reported.

Dimensionalization Feedback from International Gambling Experts

As mentioned earlier, one of the earliest elements of the present investigation was soliciting feedback from 15 international gambling experts on the project, our definition of gambling, and the dimensionalization of gambling used in a very early draft of the *Gambling Participation Instrument*. Most experts agreed with the dimensionalization of gambling contained in the draft GPI and that it did a good job of achieving the difficult balance between brevity, coverage, and cross-jurisdictional utility. That being said, there were many different suggestions for improvement, most of which were incorporated into a revised GPI. The following identifies some of the remaining issues, concerns, and themes that were not fully addressed:

- One individual indicated that an additional dimensionalization of gambling participation could be: types of gambling that involve skill versus types based on chance. (We believe we have already captured this with our grouping of game types into lottery-style games which are usually purely chance based and wagering-style games which sometimes involve an element of skill).
- There was divided opinion about the utility of capturing time as a dimension of gambling, but some consensus that this may be an important dimension in a clinical setting. (In the interests of comprehensiveness, time was included in the GPI as an additional dimension that could potentially be omitted by users of the instrument. The actual empirical utility of assessing time (to inform this decision) was evaluated in the present study and is described later in this report).
- A couple of experts indicated that raffles should not be included as type of gambling. (The present authors believe that raffles technically meet the definition of gambling and should be included).
- Three experts believed poker should receive more prominence by being asked as a separate question and two experts believed keno should be given additional prominence by being asked as a separate question. (The purpose of the GPI is to be generic across jurisdictions and time periods, which means not giving special treatment to subtypes that are currently popular in certain jurisdictions. The GPI allows subtypes to be made more prominent by having them listed as specific examples of the type of gambling being asked about. Furthermore, the GPI does specifically ask about participation or nonparticipation in poker, keno and all subtypes of gambling).
- Several experts were concerned about the wording of the draft gambling expenditure questions and recommended either different wording (e.g., reporting wins and then losses separately) or at least empirical testing different question variants. (As discussed in the next section, there is existing research on the best way of assessing self-reported gambling expenditure which guided our draft expenditure questions. Furthermore, some empirical testing was done in the present study to compare the relative reliability and validity of different question variants).

CONSTRUCTION AND EVALUATION OF THE GAMBLING PARTICIPATION INSTRUMENT (GPI)

Since gambling participation is usually assessed via self-report, one of the guiding principles of this project was to design the GPI in a way that optimizes the reliability and validity of that self-reported information. This section provides an overview of what is known about the reliability¹³ and validity¹⁴ of retrospective self-report followed by a discussion of specific principles to optimize self-report deriving from this review.

A Review of the Reliability and Validity of Retrospective Self-Report

Retrospective self-report is a commonly used method for obtaining information about a variety of human behaviours. The benefit of retrospective self-report is that the information can be quickly obtained and it has strong face validity (Gorin & Stone, 2001). The downside of retrospective self-report is that *valid* self-report requires that a) the information be attended to in the first place; b) it is accurately recalled, and c) the person is not deliberately distorting or selectively reporting the information. Many factors are known to compromise memory storage (Baddeley, 2013; Cahill & McGaugh, 1996; Kensinger, 2004; Paller & Wagner, 2002); accurate recall (Baddeley, 2013; Del Boca & Darkes, 2003; Eisenhower et al., 1991; Gorin & Stone, 2001; Greene, 2014; Parkin, 2013; Schwarz, 2007; Stone et al., 2000); and honest self-disclosure (Del Boca & Darkes, 2003; Nederhof, 1985; Tourangeau & Yan, 2007).

Indeed, because of the many potential problems with retrospective self-report, many researchers have preferentially used *prospective* data collection with participants receiving regular or randomized alerts to record their current behaviour via electronic diaries, telephone calls, or physiological sensors. This approach, known 'ecological momentary assessment' (EMA), has been shown to produce more reliable and valid data compared to retrospective self-report (e.g., Gorin & Stone, 2001; Shiffman, Stone & Hufford, 2008; Steptoe & Wardle, 2011).

When time permits, it is clear that prospective EMA is the optimal way to ensure reliable and valid self-reports of behaviour. However, in many situations there is insufficient time available for such an approach, and the question remains about how reliable and valid retrospective self-report is, and whether there are procedures that can help optimize its reliability and validity.

Although there is a paucity of research on the optimal way of assessing self-reported gambling participation, this is not the case in related fields. For example, research on how to best measure self-reported alcohol consumption dates back at least 85 years (Pearl, 1926), with this issue receiving serious research attention beginning in the 1960s (e.g., Carroll, 1995; Del Boca & Darkes, 2003; Midanik, 1988; Rehm, 1998). Comprehensive reviews have been undertaken for self-reported **alcohol consumption** (Bloomfield, Hope & Kraus, 2013; Dawson, 2003; Del Boca & Darkes, 2003; Del Boca & Noll, 2000; Ekholm et al., 2008; Gmel et al., 2006; Gruenewald & Johnson, 2006; Midanik, 1988; Rehm, 1998), **tobacco use** (Brigham et al., 2008; Gorber et al., 2009; Patrick et al., 1994; Rebagliato, 2002) and **illicit drug use** (Darke,

¹³ Reliability refers to the consistency of results obtained when using a particular technique or instrument. Something has high reliability when the same result is repeatedly obtained.

¹⁴ Validity refers to whether the technique or instrument is measuring what it is supposed to be measuring. Validity is fairly synonymous with 'accuracy'.

1998; Hammersley, 1994; Langenbucher & Merrill, 2001; Richter & Johnson, 2001). These three specific areas will be reviewed, as they have the greatest potential relevance to self-reported gambling behaviour.

Alcohol Use Self-Report

Self-report has been found to provide reasonably accurate estimates of alcohol consumption under several different conditions, including optimal conditions structured to minimize bias (Del Boca & Darkes, 2003; Del Boca & Noll, 2000; Grant et al., 2003), clinical or research settings when subjects were alcohol-free and given assurances of confidentiality (Rehm, 1998), and in alcoholics (Langenbucher & Merrill, 2001). Gruenewald & Johnson (2006) found that data on alcohol use derived from general population telephone surveys¹⁵ were also generally reliable but reliability estimates differed across measures and between studies. They noted that reliability was also a function of the stability of drinking patterns.¹⁶ Higher self-reports of alcohol consumption tend to be reported in less stigmatized contexts (Rehm, 1998) though reports of drinking tend not to differ based on guarantees of anonymity versus confidentiality (Del Boca & Darkes, 2003). Age, gender, and race/ethnicity have also been associated with response bias (Del Boca & Darkes, 2003; Stockwell et al., 2014). Some researchers have noted inflated reports of substance use when respondents seek treatment (Midanik, 1982 as cited in Del Boca & Noll, 2000) while others suggest that treatment participants may underreport consumption during evaluations following treatment.

The method most often used to examine the validity of self-reported alcohol consumption in population surveys has been to compare these estimates relative to volume of alcohol sales for the same region (Livingston & Callinan, 2015; Midanik, 1988; Pernanen, 1974; Rehm, 1998; Robinson et al., 2013; Stockwell et al., 2004, 2014; World Health Organization, 2000).¹⁷ A consistent finding from these comparisons has been that while self-reported alcohol consumption surveys sometimes come close to actual amount of alcohol sold in a jurisdiction, survey totals are usually significantly lower than actual sales.

Although some people have suggested this is because heavy drinkers may be less likely to participate in these surveys (Rehm, 1998), recent research indicates that low-risk drinkers under-report to a greater degree than high-risk drinkers (Stockwell et al., 2014). A more plausible explanation concerns the lack of specificity in how the questions have been asked in that people have usually been asked about the number of 'standard drinks' regardless of the beverage (e.g., Carruthers & Binns, 1992; Dawson, 2003). A consistent finding has been that asking more specific questions about alcohol consumption reliably results in higher total volumes of alcohol consumption (Bloomfield et al., 2013; Gmel et al., 2006; Rehm, 1998). One way in which this has been shown is by asking about consumption *for each type of alcoholic beverage* (Dawson, 1998, 2003; Ekholm et al., 2008; Gmel et al., 2006; Russell, Welte & Barnes, 1991; Stockwell et al., 2014). Another way in which this has been done is to ask about different time periods during the

¹⁵ Telephone interviews pose several problems that constrain valid self-report of alcohol consumption. Most important, they do not provide respondents with visual aids, such as flashcards containing response categories or representations of different glass sizes and fill levels (Dawson, 2003).

¹⁶ People with significant variation in their drinking patterns may produce valid but ostensibly inconsistent self-reports (Gruenewald & Johnson, 2006).

¹⁷ Biochemical markers have also been sometimes used to independently assess excessive alcohol consumption (Ekholm et al., 2008).

week or for different drinking occasions or contexts. It is now generally recognized that asking these types of specific questions for alcohol consumption is a “best practice” (Dawson & Room, 2000). Another question variant that has been explored is the “Quantity-Frequency (QF)” approach versus the “Graduated-Frequency (GF)” approach (Bloomfield et al., 2013; Rehm, 1998). Quantity-Frequency questions ask people to estimate *their typical or average use* over a certain time period. In contrast, the Graduated-Frequency approach asks about the maximum number of drinks consumed in one day in the time period of interest. The person is then asked about how often in that time period they consumed different ranges of drinks, starting with the range that includes the reported maximum, and then asking about consumption in progressively lower ranges. Although QF questions are more efficient in terms of fewer questions being asked, the GF approach is theoretically superior as it better captures the variability of drinking behaviour, better identifies excessively high levels of drinking, and usually produces totals that are closer to actual alcohol sales (Rehm, 1998; Stockwell et al., 2004; World Health Organization, 2000). However, it is also the case that the GF approach often produces alcohol consumption totals that are *too high* relative to actual sales (Bloomfield et al., 2013; Gmel et al., 2006; Graham et al., 2004; Poikolainen, Podkletnova & Alho, 2002). The greater complexity of the GF approach is another issue in that it also frequently leads to incorrect administration (Gmel et al., 2006).

A final issue concerns the time span in which the behaviour is assessed. Research in both alcohol and non-alcohol fields has found that more reliable and valid retrospective estimates of behavior are obtained when using *shorter and more recent time frames* such as the previous day, last time engaged in the behaviour, or past week (e.g., Ekholm, 2004; Scott-Sheldon, Kalichman & Carey, 2010; Stockwell et al., 2004, 2008, 2014; Stone et al., 2000; WHO ASSIST Working Group, 2002). The ‘Yesterday Method’ is a version of this where people are asked detailed questions about alcohol consumption on the previous day (Stockwell et al., 2008). The main limitation of using shorter and more recent time periods is that this approach does not adequately capture the drinking patterns of occasional drinkers (Bloomfield et al., 2013). (In a similar vein, although the Yesterday Method might be satisfactory for heavy and/or problem gamblers, it would be limited for nonproblem gamblers and types of gambling not regularly engaged in).

Tobacco Use Self-Report

The literature on the test-retest reliability of self-reported tobacco use also indicates that reliability is acceptable, and sometimes strong, for measures of tobacco use across time intervals of varying lengths (Brigham et al., 2008; Grant et al., 2003). Reliability of recall for specific smoking behaviours (i.e., number of cigarettes smoked per day) has also been shown to be high for intervals of up to 15 years (Brigham et al., 2008).

The validity of self-reported smoking is often questioned because of the widespread belief that smokers are inclined to underestimate the amount smoked or to deny smoking at all (Gorber et al., 2009; Means et al., 1994; Patrick et al., 1994). Despite these concerns, the validity of self-reported smoking is consistently associated with independent biochemical verification (Rebagliato, 2002). A meta-analysis of published studies by Patrick et al. (1994) comparing self-reported smoking status with results of biochemical validation found self-report to have high levels of both sensitivity and specificity (sensitivity = 87%, specificity = 89%). Nonetheless, both measures of accuracy were quite variable between studies (Patrick et al., 1994) and there may be subgroups where validity is lower (Rebagliato, 2002). A more recent review by Gorber and colleagues (2009) examined the relationship between self-reported smoking and smoking confirmed by measurement of cotinine in biological fluids. Overall, their data showed evidence that self-reported smoking somewhat underestimated smoking as established by cotinine.

Self-reporting of smoking is known to be unreliable if the person is under pressure because of social or medical disapproval (Rebagliato, 2002). For example, among populations in which smoking is seen as particularly undesirable, such as in pregnant women or individuals who have smoking-related diseases, the discrepancy between measured and reported smoking rates can be high (Gorber et al., 2009). Psychiatric comorbidity and education are additional variables that have an influence on reliability and validity (Brigham et al., 2008). Rebagliato (2002) found that smoking patterns are changing in populations, from a more clearly defined habit to an increasing number of occasional smokers. However, in their review of smoking self-report studies, Gorber and colleagues (2009) found no trend of increasing or decreasing bias in the accuracy of reported estimates over time. One of the most important unmeasured study characteristics is the specific wording of questions on smoking status. Very few studies report this critical information, despite considerable evidence from survey research that responses are heavily influenced by how a question is phrased and the order in which questions are asked (Patrick et al., 1994).

Illicit Drug Use Self-Report

Self-report of less socially acceptable behaviour such as illicit drug use tends to be particularly vulnerable to distortion (Darke, 1998; Hammersley, 1994). Another factor potentially influencing reliability and validity of self-report is that certain types of illicit or non-medical drug use (benzodiazepines, cannabis, hallucinogens) tend to impair memory (Hammersley, 1994).

That being said, the data indicate that drug users give reasonably reliable and valid answers to questions about drug use, although some under-reporting does occur¹⁸ (Darke, 1998; Langenbucher & Merrill, 2001; Richter & Johnson, 2001; Williams & Nowatzki, 2005). Situations that tend to compromise the validity of self-reported drug use are when respondents are very ill or socially marginalized (Langenbucher & Merrill, 2001) and/or have a strong incentive to hide their consumption (Darke, 1998).

Principles Guiding Optimal Self-Report

The purpose of this section is to highlight the principles that research has identified as essential in optimizing the validity of self-report.

Ensure Confidentiality and Anonymity

As alluded to in the above discussion, the accuracy of self-report measures of 'sensitive' behaviour (of which gambling might be), is more uncertain than behaviour that is not sensitive (Groves et al., 2009; Richter & Johnson, 2001; Tourangeau & Yan, 2007; van der Heijden, van Gils, Bouts & Hox, 2000). Hence, assurances of the confidentiality of responses should precede any survey and should be reiterated as often as necessary to assuage any fears (Langenbucher & Merrill, 2001). In addition, in the context of population surveys or research studies, participants also need to be reassured that all personally identifying information will be removed once the data is collected.

¹⁸ Even after a 10 year interlude, Darke (1998) found self-reports were remarkably consistent with initial estimates. Caution is warranted however as the review was primarily on identified drug users, rather than on drug use among the general population.

The validity of answers to sensitive questions is also known to be significantly enhanced when the survey is self-administered, rather than collected as part of a person-to-person interview (Dawson, 2003; Langenbucher & Merrill, 2001; Tourangeau & Smith, 1996; Tourangeau & Yan, 2007; van der Heijden et al., 2000). Self-administered survey administration not only provides privacy and a sense of anonymity, but is a format that allows sufficient time for the person to think about and answer each question. One positive consequence of the serious decline in telephone response rates is that population surveys will increasingly use self-administered formats in the form of online and mail-in surveys, which will likely improve the validity of survey responses.

If an interview is required, there is evidence that face-to-face interviews may be better than telephone interviews. Although telephone interviews may seem more anonymous, they actually tend to produce less valid responding compared to face-to-face surveys, possibly because face-to-face interaction may foster better rapport (de Leeuw & van der Zouwen, 1988; Holbrook, Green & Krosnick, 2003; Huhtanen, Mustonen & Mäkelä, 2016; Tourangeau & Yan, 2007). In an empirical investigation of the impact of different survey administration methods for assessing gambling involvement, Williams & Volberg (2009, 2010) found that the rates of problem gambling were 1.44 times higher in face-to-face surveys compared to identically administered telephone surveys (after weighting to correct for the age x gender distributions in the population). The same study also found that self-reported past year prevalence of gambling involvement as well as frequency of gambling participation was significantly higher in face-to-face versus telephone administration of the questionnaire, although the magnitude of the differences was not large (~5% to 8% higher). More dramatic differences occurred for gambling expenditure. Although average reported loss was equivalent between the groups, the average reported win was 41% higher in the *face-to-face* format, resulting in a net win/loss that was actually positive in the face-to-face group, illustrating that face-to-face interviewing is not always the best approach.

A final consideration related to sensitivity concerns question ordering. If we assume that gambling participation may be a sensitive topic, then a) gambling frequency and time spent gambling should precede questions about gambling expenditure, and b) the most socially acceptable (and most commonly engaged in) type of gambling should be asked first (typically lotteries), with the least common and/or socially acceptable forms asked later. The only constraint is the additional need to also group similar game types together (i.e., having instant lotteries following regular lotteries; having casino table games following electronic gambling machines).

Emphasize the Importance of Accuracy and Allow Sufficient Time for Recall

Improvements to memory recall in self-report surveys occur when explicit instructions are given to respondents indicating that particular questions are important, accuracy is important, and that they should "take all the time they need" to answer the questions (Conrad, Brown & Cashman, 1998; Del Boca & Darkes, 2003; Eisenhower et al., 1991; Hammersley, 1994). Respondents may also be encouraged to think back to the time of the event (Eisenhower et al., 1991) or think aloud (Means et al., 1994). It has been suggested that this technique works best for non-routine events (Eisenhower et al., 1991; Means et al., 1994; Schwarz, 2007) although it has also been shown to be effective for high frequency behaviors (Conrad et al., 1998; Means et al., 1994).

Ask Specific Questions and Provide Memory Aids

The use of contextual cues is known to facilitate retrieving autobiographical events (Belli, 1998 as cited in Del Boca & Noll, 2000; Eisenhower et al., 1991; Hammersley, 1994). One way of facilitating contextual memory is by asking specific questions about specific forms of the product in specific time periods, as opposed to global questions about 'usual' or 'typical' behavior (Del Boca & Darkes, 2003; Hammersley, 1994).

Another way of doing this is by providing memory aids. This could involve providing calendars and/or identifying important dates (e.g., holidays) as reference point anchors. One operationalization of this is the Time-Line Follow-Back (TLFB) procedure where participants are provided with a daily calendar and asked to estimate their participation retrospectively on a day-by-day basis over a specified time frame (that can potentially extend up to 12 months from the interview date). Several studies have shown that TLFB procedures consistently produce greater estimates of alcohol consumption compared to other approaches (Fitzgerald & Mulford, 1987; Kuhlhorn & Leifman, 1993; Lemmens et al. 1992; O'Hare et al. 1991; Redman et al. 1987; Shiffman, 2009; Sobell & Sobell, 1992; Stockwell et al., 2004; Werch 1989).

Alternatively, depending on the behaviour being assessed, these memory aids may consist of photographs, maps, or other stimuli. If a person has previously reported on the activity, then it can be helpful to present the results of previous responses and allow the person to expound upon them (Brigham et al., 2008; Del Boca & Noll, 2000; Eisenhower et al., 1991).

Endeavour to ask about Shorter and More Recent Time Periods

Shorter (e.g., daily, weekly) and more recent (e.g., yesterday, past week) time periods tend to be recalled more easily and more accurately (Boca & Darkes, 2003; Eisenhower et al., 1991; Hammersley, 1994; Langenbucher & Merrill, 2001).

Exactly how short and recent this time period should be depends on the particular behaviour in question and the purpose of the study. In many cases the purpose is to capture an adequate time period such that it can be extrapolated back to infer behaviour over a longer time span (e.g., one year). If this is the case, then the sample period has to be long enough to be representative of the person's pattern of behaviour. This will be a function of the inherent variability of the behaviour in question, as well as the variability of the behaviour within the particular individual (Del Boca & Darkes, 2003; Gruenewald & Johnson, 2006). One potential approach is adjusting the time period as a function of respondent. This would entail asking individuals having high frequency and low variability about shorter and more recent time spans, and people with low frequency and/or high variability about longer and more distant time spans.

Avoid Response Options When Possible

The main advantage of providing closed-ended response options is that they facilitate questionnaire administration and data analysis. However, there are two main disadvantages. First, they potentially convey normative data to the participant in that respondents often assume that values in the middle ranges correspond to usual or average behavior and the values at the extremes of the scale correspond to the extremes of the distribution (Schwarz, 2007). The second problem is that response options do not normally capture extreme values (although this can be accommodated to some extent by a branching question that asks for the exact value for people endorsing the highest category). This is less of a concern

when it comes to frequency and time spent gambling, as the highest possible category is often provided as one of the choices, but it is of significant concern when it comes to expenditure. In most jurisdictions, a small percentage of people with extremely high expenditures account for a significant percentage of overall jurisdictional gambling revenue (e.g., Williams & Wood, 2004, 2007). It is important to know what these actual amounts are in order to try and match aggregated self-reported expenditure to actual jurisdictional revenue. Thus, it seems clear that at least for gambling expenditure, an open-ended question needs to be used.

When response options are provided, there are a few basic principles that should be followed. Evidence from the alcohol field (Dawson & Room, 2000) and the tobacco field (Patrick et al., 1994) indicates that more valid responding is obtained when response options are presented from highest value to lowest value, as this makes higher values seem more normative and less embarrassing. For this same reason, the middle response option for sensitive questions should usually represent a value that is somewhat higher than normative. Another basic principle is that response options should make distinctions between levels that have some useful meaning to the researcher or clinician, which usually requires finer distinctions at higher values. For example, there is usually greater utility in distinguishing between once a week and multiple times a week gamblers than there is distinguishing between three times a year versus six times a year gamblers. (It should be noted that the Graduated-Frequency approach avoids some of these problems altogether by asking people about their maximum frequency or maximum consumption and then asking about frequency within this category, followed by frequency within lower categories [Del Boca & Darkes, 2003]).

Embed Population Surveys of Gambling into Larger Health Surveys

Accurate estimates of gambling participation in the population hinge on having a representative group of the population sampled. Obtaining a representative sample is partly related to the response rate achieved in the survey. As response rates go down (as they have in the past 30 years; e.g., Massey & Tourangeau, 2013; Peytchev, 2013; Volberg, 2007; Williams, Volberg & Stevens, 2012), the potential for systematic bias in the obtained sample increases. Having a personal interest in the survey topic is known to be an important determinant of survey participation (Groves, Presser & Dipko, 2004; Groves et al., 2006; Tourangeau & Yan, 2007). In the field of gambling, Williams & Volberg (2009; 2010) documented that describing a survey as a 'gambling survey' to potential participants tends to result in over-recruitment of gamblers and under-recruitment of nongamblers, leading to inflated rates of both gambling and problem gambling.¹⁹

There are two solutions to this problem. The best solution is to administer a gambling survey as a module in a larger health or recreation survey. Gambling questions are known to be less stigmatizing when asked in the context of a general health interview (Babor & Higgins-Biddle, 1998 as cited in Del Boca & Noll, 2000). If that is not possible, then an alternative approach is to describe the topic of the survey in a very general way (e.g., "a survey of certain health and recreational behaviours") without specifying the particular health or recreational behaviour of interest (i.e., gambling).

¹⁹ The rates of problem gambling were approximately 2.3 times higher in 'gambling' surveys compared to identically administered surveys that do not specify the topic (Williams & Volberg, 2009, 2010).

Other Essential Elements Needed for the Gambling Participation Instrument

In addition to adhering to the above principles, there are other important elements needed for the GPI. These elements are described in detail below.

Comprehensive Coverage of the Known Dimensions of Gambling Participation that are Reasonably Aligned with Conventional Groupings

It is self-evident that the *Gambling Participation Instrument* needs to provide comprehensive coverage of the main dimensions of gambling: types and subtypes of gambling, gambling provider, means of access, frequency of participation, time spent, and expenditure. It will also be important when assessing each of these dimensions, that there are no overlapping categories and people are clear about what activities the question includes and what activities it excludes. In addition, there is value to creating composite measures of total number of gambling types engaged in, maximum and/or total frequency of gambling, total expenditure, and total time on all types as aggregate indices of the person's gambling involvement.

At the same time, for the purposes of consistency and adoption, the dimensionalization of gambling participation in the GPI cannot be fundamentally divergent from conventional ways of identifying and grouping these activities. For example, even though electronic gambling machines are actually a form of *provision* and in most cases are best understood as a subtype of continuous lottery, the general public as well as gambling providers universally identify them as a separate *type* of gambling, and this is also how they need to be identified in the *Gambling Participation Instrument*. Another example is that although roulette, big wheel, and keno are subtypes of continuous lottery games, the first two are more conventionally grouped with casino table games and keno is usually listed on its own. Other concessions to conventional groupings include listing virtual sports betting on computer-generated sporting competitions as a subtype of sports betting rather than as a subtype of lottery, listing skill-based video game machines as a subtype of electronic gambling machine, and listing financial indices wagering as a subtype of financial speculation rather than as an additional subtype of wagering.

Individual types of gambling need to be assessed both to provide comprehensive coverage and to be consistent with conventional assessment practices. However, there are other reasons as well: a) a lack of consensus amongst the general public concerning what gambling actually includes and does not include (thus, listing individual types helps avoid this confusion); b) the fact that different types of gambling have different risk profiles (Williams, West, & Simpson, 2012); and c) asking more specific beverage-specific alcohol questions produces more accurate estimates of true alcohol consumption (Dawson, 1998; 2003; Gmel et al., 2006; Rehm, 1998; Russell, Welte, & Barnes, 1991; Stockwell et al., 2014). There is less research on this latter issue with respect to gambling. What is known is that studies that have assessed gambling with a singular question have produced participation rates 30% to 60% lower than studies that have assessed participation in each type of gambling (e.g., Chhabra, Lutz & Gonnerman, 2005; Culleton, 1985; Petry, Stinson & Grant, 2005; Shepherd, 2009; Sommers, 1988). A study by Wood & Williams (2007) that compared questions asking about total spending on "gambling" or "all types of gambling such as..." to questions that asked about spending on each type confirmed that that the latter question format produced significantly higher expenditure amounts that were closer to actual jurisdictional gambling revenue as well as diary records.

Efficiency

The *Gambling Participation Instrument* needs to be as efficient as possible, so it can be administered in a relatively short period of time and so that participants are not asked a long series of questions that do not pertain to them.

Historically, the assessment of gambling participation has been very inefficient, in large part due to the intermingling of questions about type of gambling with subtype, provider, and means of access (described earlier in the *Lack of Logical Organization Leading to Imprecise Participation Estimates* section). The historical approach has been to ask a list 12-20 questions to each participant, with each affirmative answer being followed by supplemental questions about frequency, expenditure, and sometimes time. This is also true of the standardized problem gambling assessment instruments that also contain a section on gambling participation: for example, there are 21 stem questions about gambling participation asked of each participant in the Canadian Problem Gambling Index (Ferris & Wynne, 2001) and 19 in the Canadian Adolescent Gambling Inventory (Tremblay et al., 2010).

This is an inefficient use of time in light of the fact that between 15% - 60% of the adult population (depending on the jurisdiction and time period) do not have *any* past year participation in *any* type of gambling and that engagement in just one to three types is normative for the large majority of people that do gamble (Williams, Volberg, & Stevens, 2012).

It is clear from research described earlier that participants do need to be explicitly asked about involvement in each major type of gambling. However, as will be seen in the finalized *Gambling Participation Instrument*, types of gambling can be logically grouped into just six or seven categories, with all rare forms grouped in an 'other types' question. Similar to conventional approaches, each of these six or seven stem questions can then be followed by a set of follow-up questions concerning subtypes, provider, access, frequency, time, and expenditure. A questionnaire organized in this fashion not only significantly reduces the average completion time for most participants, but also produces more comprehensive and accurate coverage of gambling participation. The time savings will be more modest when assessing heavy involved gamblers, but the improvement in comprehensiveness and accuracy of assessment will nonetheless occur.

Generic and Flexible

The intent of the *Gambling Participation Instrument* is for it to be used in any jurisdiction; in population surveys, clinical settings, and experimental studies; and across different age groups (adolescents and adults). To do this, it needs to be fairly generic. At the same time, the GPI needs to be flexible, such that this generic listing of types of gambling captures all the jurisdictionally-specific types. As will be seen in the finalized GPI, the main way in which this is accomplished is by listing the local forms when giving examples of each type of gambling and using regionally-specific terminology when necessary. This approach also allows the GPI to be periodically updated in different countries without fundamentally changing the overall structure of instrument, as gambling types, gambling provider, and access to gambling continually change. Certain types go out of fashion (e.g., bingo, horse racing) while other types appear (e.g., financial indices betting; fantasy sports league betting, e-sports, virtual sports); new providers (e.g., hospitals) emerge; and new ways of accessing gambling are constantly being devised.

Modular

Finally, modularity can be accomplished by having the GPI organized so that certain dimensions could potentially be omitted to create a shorter instrument. For example, governments may have an interest in the nature of the gambling provider as well as its geographic location and legality, but this dimension may be less important in a clinical context. Similarly, a detailed level of gambling participation in terms of frequency, time, and expenditure are important dimensions in a clinical context, but may be less important to experimental researchers or government.

A One Year Time Frame

It is important to provide a time frame for the person to report whether he/she has engaged in the gambling activity or not, as this has a major influence on obtained participation rates. This reference time frame can vary from past day to lifetime.

As mentioned earlier, research in non-gambling fields shows that much more reliable and valid retrospective estimates of behavior are obtained when using shorter time frames (e.g., Ekholm, 2004; Scott-Sheldon, Kalichman & Carey, 2010; Stockwell et al., 2004, 2008; Stone et al., 2000; WHO ASSIST Working Group, 2002).

However, short time frames often do not provide an adequate sample of time to be representative of the person's overall pattern of participation, especially for occasional and/or binge patterns (Nower & Blaszczynski, 2003). This may be especially true for gambling, which may have a lower average frequency and greater individual variability than tobacco or alcohol consumption. A second disadvantage is that short time frames do not correspond with the much longer time frames (i.e., 6 months; 12 months) that are typically used (and needed) to assess *problems and harm* derived from gambling. More specifically, all of the major instruments for assessing problem gambling in adults use a past year time frame: Diagnostic and Statistical Manual of Mental Disorders – 5 (American Psychiatric Association, 2013); Canadian Problem Gambling Index (Ferris & Wynne, 2001); South Oaks Gambling Screen – Revised (Abbott & Volberg, 1992, 1996), the Problem and Pathological Gambling Measure (Williams & Volberg, 2010, 2014), and the Victorian Gambling Screen (Ben-Tovim et al., 2001). A past year time frame is also used for all of the adolescent problem gambling instruments (Stinchfield, 2010), except for the Canadian Adolescent Gambling Inventory (Tremblay et al., 2010), which uses a past three month time frame. The relationship between patterns of gambling participation and problems deriving from participation is often a very important issue. Hence, *a one year time frame for the GPI would seem optimal*. For similar reasons, this is also the reference period recommended for assessing alcohol use (Bloomfield et al., 2013; Dawson & Room, 2000). Jurisdictional gambling revenue (for the purposes of validating self-reported gambling expenditure) is also most commonly reported in a one year time frame.

A one year time frame does not necessarily require that everyone be asked to retrospectively report on their entire past year behaviour. For people with relatively stable patterns of behaviour it would suffice to have a shorter *reporting time frame* that provides a sufficiently representative sample of recent gambling behaviour that can be extrapolated back so as to provide an estimate of total past year involvement. The optimal reporting time frame is empirically addressed later in this report.

Reliability and Validity

Adequate reliability and validity are essential for all standardized assessment instruments. The specific type of reliability and validity that is necessary depends on the nature of the instrument and its purpose. For the GPI, the type of reliability that is most important is test-retest reliability. GPI questions need to be clear enough and easy enough that consistent results are obtained across repeated administrations that occur in a relatively short period of time (e.g., 1 – 4 weeks). In terms of validity, it is important that there be reasonably high consistency between retrospective report of gambling participation and more objective evidence of this participation as contained in diaries and/or actual behavioural records of gambling activity.

There is no consensus on the needed magnitude of test-retest reliability or validity for an assessment instrument to be considered satisfactory. However, a common reference for test-retest reliability is Cicchetti (1994), who describes a level of <.40 as poor, .40 - .59 as fair, .60 - .74 as good, and .75 and higher as excellent. These descriptors will be used in the present study when characterizing the sufficiency of both reliability and validity coefficients.

Optional Elements

There are several other areas related to participation in gambling that usually merit inclusion in a comprehensive assessment of gambling:

- **Responsible Gambling**
- **Attitude toward gambling**
- **Motivation for gambling**
- **Context for gambling** (alone or with friends; under the influence of drugs/alcohol)
- **Gambling social exposure** (extent of gambling among friends, family, and at workplace)
- **Gambling-related harm**

These sections will all be included as optional elements in our *Gambling Participation Instrument*. However, although all of these supplemental sections have been tested and evaluated in other studies, they were not specifically evaluated in the present study and so can be omitted if desired.

Areas of Uncertainty

Value of a Graduated-Frequency Approach for Gambling

In the Graduated-Frequency (GF) approach, a person is asked about his/her maximum level of participation in the activity in a certain time period and then asked about the frequency of this level of participation and progressively lower levels of participation. GF has theoretical advantages because it a) avoids providing normative information (as happens when providing response options), and b) it captures the variability of the person's participation, something not possible when asking a person about their *average* participation in a certain time period (Quantity-Frequency approach) or asking about their *Total Amount* in a recent time period (i.e., total number of times engaged in the behaviour in the past month).

GF can be employed fairly easily when assessing alcohol and/or tobacco consumption because what historically has been assessed is frequency for *all* types of alcohol or types of tobacco combined. However, this is potentially much more complicated and time consuming when assessing each different type of gambling. This time commitment may be possible within a clinical setting, but is unlikely to be suitable for population surveys. Hence, for the Graduated-Frequency approach to replace the more standard Quantity-Frequency and Total Amount approach it needs to demonstrate superior validity. In a similar manner, while a Time-Line Follow-Back approach will undoubtedly yield more accurate estimates of gambling participation, this technique will usually be limited to clinical settings because of the time involved as well as the need for the interviewer to typically be in the same room as the participant (e.g., Hodgins & Makarchuk, 2003; Stinchfield et al., 2007; Weinstock, Whelan & Meyers, 2004).

The Optimal Reporting Time Frame

As indicated earlier, a *reporting time frame* is needed that will extrapolate frequency, expenditure, and time spent gambling back to the past 12 months. The key is to have a reporting time frame that is as recent and short as possible so as to maximize the reliability and validity of self-report, but also long enough that it is representative of the past 12 months. Because of the generic nature of the GPI, this reporting time frame needs to apply to occasional recreational gamblers, binge gamblers, and problem gamblers.

Logically, this shorter and more recent time period will need to conform to a naturally occurring time period (past week, past two weeks, past month, past two months, past three months). Considering that 'less than once a month' is the most commonly endorsed option for most gamblers in population surveys conducted by the first two authors, this limits the choices to: past month, past two months, and past three months. A Graduated-Frequency approach is then logically limited to assessing the number of months with a certain pattern of gambling behaviour within the past three, six, (or potentially 12 months).²⁰

²⁰ Another approach, not fully explored in the present study, is adjusting the time period as a function of respondent, so that individuals having high frequency and low variability are asked about shorter and more recent time spans, and people with low frequency and/or high variability are asked about longer and more distant time spans.

Best Way of Assessing Gambling Expenditure

This is one area that has received some research attention, partly due to the fact that actual jurisdictional gambling revenue can provide a test of the accuracy of self-reported expenditure.

Many Western countries conduct annual 'Household Expenditure Surveys' that inquire about expenditure on a comprehensive range of consumer products, including gambling. These surveys have consistently obtained significant underestimates of actual gambling expenditure. For example, in Australia, gambling expenditure totals in the 1998–1999 Household Expenditure Survey were only 17% of actual gambling revenue (Access Economics, 2003). In New Zealand in 1998, people reported spending \$103 per person on gambling, compared to \$280 per person in actual revenue (Statistics New Zealand, 1999). In 2001, Canadians reported spending \$267 per *household* in the Survey of Household Spending, compared to an average of \$447 per *person* in actual revenue (Marshall, 2003). Average Alberta household gambling expenditure in the 2008 Survey of Household Spending was \$363 compared to approximately \$2,000 in actual per household revenue (Williams, Belanger & Arthur, 2011).

Jurisdiction-wide prevalence surveys of gambling have obtained expenditure totals that are both above and below actual gambling revenue. In Washington State, Volberg and colleagues (1998) found that reported losses were 2 to 10 times higher than actual revenues, depending on the type of gambling. In a study of Canadian provinces by Williams & Wood (2004), self-reported expenditures were 2.1 times higher than actual provincial gambling revenues in that time period. In contrast, Australian and New Zealand studies have found self-reported expenditures to be between half and three-quarters of actual revenues (Abbott & Volberg, 2000; Productivity Commission, 1999). In a national survey of U.S. adults by the National Opinion Research Center, gamblers reported being *ahead* \$3 billion at the casinos in the past year instead of having lost more than \$20 billion, the actual total revenues reported by the casino industry. Gamblers also reported being ahead \$2 billion at the racetrack and \$4 billion in private gambling. Only when it came to lotteries did they admit to a loss of \$5 billion (Gerstein et al., 1999).

There are several reasons for the lack of correspondence between reported gambling expenditure and actual revenue. One of the primary ones concerns how the question is asked. Many gambling surveys have asked people: 'How much do you *spend* on gambling?' A problem with the word 'spend' is that some people interpret it to mean how much total money they have wagered (outlay) rather than their net win/loss, and other people include their travel and meal costs (Blaszczynski, Dumlao & Lange, 1997). Paradoxically, however, studies using clearer non-biased question wordings have obtained some of the most discrepant results. The National Opinion Research Center study (Gerstein et al., 1999) asked U.S. adults whether they had 'come out ahead or behind on your gambling', with the choices being 'ahead, behind, or broke even'. With this wording, a majority of people actually reported *winning* rather than losing money in the past year. A similar type of wording has been used in most of the Household Expenditure surveys, all of which have obtained significant underestimates of actual spending. For example, Statistics Canada asks people about their 'expenses from [various types of gambling]' and then their 'winnings from [various types of gambling]'.

It would appear that when given the choice to represent themselves as either a 'winner' or 'loser', many people choose to misrepresent themselves as winners or else minimize their actual losses. This was confirmed in research conducted by Wood & Williams (2007). A random sample of 2424 Ontario adult gamblers was asked about past month gambling expenditure in one of 12 different ways. The relative validity of each question format was subsequently established by the correspondence with amounts obtained by subsequent prospective diaries as well as actual Ontario gambling revenue. One of the

important findings was that slight variations in question wording resulted in significant variation in reported expenditure amounts (by a magnitude of five).

The other important finding was that there were some question wordings that had better correspondence to amounts recorded in prospective diaries as well as jurisdictional revenue. As expected, the questions with the most discrepant results with actual revenue were those asking about how much people ‘came out ahead or behind’.²¹ Underestimates also occurred when asking about expenditure on all forms of gambling collectively. In contrast, significant overestimates occurred when asking about spending ‘the last time they purchased/played that activity’ and multiplying this by their frequency of participation. The question wording with the best evidence of validity was actually the traditional question that asked about ‘*spending*’, which asked: “Roughly how much money do you *spend on* [specific gambling activity] in a typical month?” (with the totals from each activity then added together).²² Adding the phrase “What we mean here is how much you are ahead or behind, or your net win or loss” tended to worsen validity to some extent. However, an appropriate balance between clarity and validity is thought to be achieved if this phrase is only mentioned once or twice, rather than routinely for each type of gambling. For self-administered questionnaires, the convention that the present authors have used (including in the empirical study described later in this report) that obtains the same low prevalence of ‘net winners’ and a reasonable match to diary amounts and jurisdictional revenue is to a) tell participants to put a plus sign in front of the number if they had a net win, or b) have a minus sign automatically precede the box where the number is entered and tell participants to remove it if they had a net win.

While it is clear that an approach that asks about ‘spending’ on individual types of gambling in a ‘typical month’ is a wording that achieves reasonable reliability and validity, it is also true that additional data cleaning is typically needed to improve validity. One issue is that extreme values (statistical outliers) are common when using open-ended questions about gambling expenditure and these outliers have a large impact on correlation coefficients and diary/report ratios. There are several ways of mitigating the impact of these outliers, including winsorization, trimming, grouping expenditure values into categories, and using nonparametric measures of association (e.g., Kendall tau *b*). However, one problem with this approach is that the majority of revenue from most types of gambling comes from a minority of heavy gamblers, many of whom are problem gamblers (Williams & Wood, 2004; 2007). Thus, many of these extreme values will be legitimate.

In addition to extreme values, another issue with expenditure reports is that a significant minority of people will claim to be *net winners*. A small minority of gamblers will legitimately be net winners, especially if they are referring to a short time period (e.g., ‘last time they gambled’) and/or types of gambling where winning is quite possible (e.g., person-to-person). However, many reports of being a net winner are inaccurate, and are reflective of either the person deliberately making a false report to portray themselves as a ‘winner’, or people with distorted recall who truly believe themselves to be winners. Many people in the latter group are problem gamblers, and the report of being a winner has both diagnostic and clinical value. Thus, although ‘wins’ need to be allowed in collecting self-reported

²¹ A recent experimental investigation in Massachusetts involving the first two authors, the Massachusetts Council on Compulsive Gambling, and the Massachusetts Gaming Commission confirmed that even when the **behind** option is bolded and participants are informed that “most of the time people are behind”, the ‘ahead’ option is endorsed to a much greater extent than is statistically possible (result obtained using an online panel of 2,002 people).

²² Thus, even though ‘spend’ implies loss, it appears to be a more palatable characterization of people’s gambling activity.

expenditure, it is also true that the match between retrospective expenditure reports and gambling revenue *usually improves when all winning amounts are removed* (e.g., Wood & Williams, 2007).

The first author has conducted several jurisdiction-wide telephone prevalence studies of gambling and problem gambling using the above-mentioned question wording and utilizing these additional data cleaning procedures (Ontario in 2011; British Columbia (lower mainland) in 2004, 2005, 2006; Alberta in 2008, 2009; Canada in 2007; South Korea in 2011). In most of these studies, the use of these additional data cleaning procedures has resulted in a reasonably good match between reported gambling expenditure and actual jurisdictional revenue.

Another issue with gambling expenditure concerns whether outlay instead of or in addition to net expenditure should be assessed for certain types of gambling. Although net expenditure is the more important figure, it may be more difficult to calculate or remember for non-continuous types of gambling (e.g., lotteries), especially where there is typically a single wager or outlay that does not vary significantly over time, and the outcome of the wager is determined at a much later time than the initial wager. For continuous types of gambling involving a rapid series of wagers (e.g., casino table games, electronic gambling machines, poker), the outcomes occurring very close in time to the wagers, and immediate rewagering of winnings being typical, assessing net expenditure is the most sensible approach. For the purposes of consistency, most studies ask about net expenditure for every type of gambling. However, an unpublished empirical investigation of this issue conducted by the first two authors in conjunction with the Massachusetts Council on Compulsive Gambling and the Massachusetts Gaming Commission has determined that outlay can be used to assess lottery expenditure with net spending wording being used for all other types of gambling without the outlay wording for lotteries having a major impact on the net spending amounts reported for all other types.

Finally, due to the sensitive nature of gambling expenditure, as well as variability in the amounts spent, it seems clear that open-ended questions should be posed, rather than providing response options. Also because of the higher presumed sensitivity of expenditure, questions about expenditure should be asked after frequency and time (having the person first reporting on frequency and time might also help improve the validity of self-reported expenditure).

Value of Assessing Time Spent Gambling

Time spent gambling is not typically asked when assessing someone's participation in gambling, as it is seen as potentially redundant to frequency and expenditure on gambling. However, it is another valid dimension of gambling participation and is included in the gambling participation subsection of both the Canadian Problem Gambling Index (Ferris & Wynne, 2001) and the Canadian Adolescent Gambling Inventory (Tremblay et al., 2010). Time spent gambling is also known to be reliably associated with problem gambling status in adults (e.g., Lin et al., 2010; Rockloff, 2012; Stinchfield et al., 2016; Tremblay et al., 2010) and is the primary basis for one prominent problem gambling screen (Rockloff, 2012).²³ Furthermore, it was found to be more strongly correlated to problem gambling symptomatology for adolescents in the Canadian Adolescent Gambling Inventory (CAGI) than either frequency of gambling or money lost (Wiebe et al., 2008).

²³ The two time-related questions used in this three item screen are: How much time did you spend gambling on a typical day in which you gambled in the past 12 months? How often did you spend more than 2 hours gambling (on a single occasion) in the past 12 months?

Time spent gambling will be included as a dimension in the GPI both for the purposes of comprehensiveness as well as its stronger potential association with adolescent problem gambling. However, the need for a researcher or clinician to routinely utilize this dimension when assessing adults hinges on the answers to a couple of empirical questions. The first question relates to the extent to which time spent gambling is correlated with frequency of gambling and gambling expenditure and therefore redundant. The second question addresses the issue of whether time spent gambling is *more accurately and reliably reported* than frequency or expenditure, and therefore should be used in preference to frequency or expenditure (alternatively, whether it could potentially be used to infer expenditure, assuming that self-reported expenditure is found to be less valid and reliable).

Research Questions

1. **Does a Graduated-Frequency (GF) approach produce more reliable and valid results compared to a Quantity-Frequency (QF) or Total Amount (TA) approach for frequency, time, and money spent gambling?** (The Quantity-Frequency approach will ask about average use over a specified time period; the Graduated-Frequency approach will ask about maximum frequency/time/expenditure and then about participation in different ranges of frequency/time/expenditure; and the Total Amount approach will ask about total frequency/time/expenditure in the past month). If so, what is the relative trade-off in terms of greater time administration of a GF approach? Do the advantages and disadvantages of a GF versus QF versus TA approach vary as a function of whether frequency, time, or expenditure is being assessed?
2. **What is the optimal reporting time frame?** Does a short reporting time frame (i.e., per occasion, past month, past 3 months) provide a more reliable and valid estimate of activity for a 6 month period (i.e., when the shorter period is extrapolated to 6 months) compared to just asking people to report on their past 6 month behaviour? Do the advantages and disadvantages of a shorter reporting time frame vary as a function of whether frequency, time, or expenditure is being assessed?
3. **What is the utility of assessing time spent gambling?** How strongly correlated is self-report of time spent gambling with frequency of gambling and gambling expenditure? Is time spent gambling more reliable and valid compared to frequency and expenditure? Does time spent gambling predict expenditure such that it could potentially be used as a more reliable substitute?
4. **What is the reliability and validity of the finalized Gambling Participation Instrument?** Once the previous research questions have been answered, it will be important to document the estimated reliability and validity of the finalized *Gambling Participation Instrument*.

Evaluation of the Reliability and Validity of GPI Variants

Method

The above research questions were addressed by comparing retrospective self-reports of gambling behaviour against more objective evidence of actual behaviour. In the present study this was done by having several hundred members of a Canadian online panel (Legerweb) keep weekly²⁴ diaries of their gambling behaviour for 6 months and then, without prior warning, asking them to retrospectively report on their gambling, with variations in how the frequency, time, and expenditure questions were asked. Comparisons were then made between the amounts reported in the diaries against the amounts obtained from the various question formats used in the retrospective reports.²⁵

Ethical approval for the study was obtained from [Institutional Review Board Services](#) in Ontario.

Recruitment

An email solicitation to participate was sent to over 2,000 members of the [Legerweb](#) online panel. Leger is the largest Canadian-owned polling company, with offices across Canada (head office in Montreal). Their online panel consists of over 400,000 Canadians demographically stratified by age, gender, education, and region to represent the Canadian adult population. Prior research by the present authors has shown that online panels have a disproportionately high representation of heavy gamblers and problem gamblers, which is why they should not be used to establish population prevalence (Lee et al., 2015; Williams & Volberg, 2012). However, this was an advantage in the present situation, as we wished the sample to be overselected for regular and heavier gamblers. To further ensure this, Leger's email solicitation to prospective online panelists advertised the study as a gambling study. Research by Williams & Volberg (2009, 2010, 2012) has shown that regular gamblers preferentially participate in surveys that are advertised as 'gambling surveys', with nongamblers and infrequent gamblers being more likely to decline.

²⁴ An argument can be made that daily diaries would be even more valid than weekly diaries. However, we opted for weekly diaries as we were concerned about a) drop-outs and compliance with a response burden of 180 diaries rather than 24); b) the monitoring effect that daily accounting of gambling behaviour might have on gambling; and c) a potential enhancement of memory (producing inflated reliability and validity coefficients) that daily recording of gambling might have on retrospective recall.

²⁵ The original online panel company we had arranged this project with was Corsential, based in Ontario, Canada. However, this company went out of business early in the course of the study, requiring us to make arrangements with Leger. Our original research plan also included a second means of evaluation, which was comparing retrospective estimates of gambling behaviour against behaviour recorded either by Player Cards or through online transactions with an online gambling provider. Extensive negotiations were first conducted with Manitoba Lotteries, who eventually declined to participate. This was followed by discussions with the online provider Betfair in the United Kingdom, but after extensive negotiation this effort also did not succeed (partly due to the fact that our contact person left Betfair). Finally, a third potential partner was identified, the online gambling company Unibet (registered in Malta). After several months of planning and negotiation, in 2015 Unibet emailed all their patrons who had been members of Unibet for at least 12 months to click a link to a short 10 minute research survey. The email indicated that the first 1,000 people who completed the survey would be entered into a draw to win one of two iPads. Unfortunately, despite repeated overtures over several weeks, only 34 Unibet customers responded, and only 16 completed the entire survey. Due to these low numbers this data is not included in the present report.

The email solicitation (Appendix C) indicated that the purpose of the study was to record people's gambling behaviour for a 6 month period so as to develop a self-report measure of gambling participation. To be eligible, participants needed to a) participate in some form of gambling at least once a month or more; and b) be available and willing to answer questions about their gambling behaviour every week for the next 6 months. As compensation, for each weekly diary completed, they would receive one dollar or two [Air Miles](#) reward miles, plus two chances for the monthly draw (prizes in the monthly draw consisted of one Apple iPad, 1000 Air Miles, two prizes of \$1000, and one prize of \$100). Participants were also advised they must complete at least 18 out of 24 weekly diaries to be eligible for the 'final survey' which would last 20 minutes and for which they would receive an extra \$10 or 20 Air Miles reward miles plus 20 chances for the monthly draw. Participants who completed 21 or more diaries would receive an additional \$5 or 20 Air Miles plus 20 additional chances for the monthly draw.

A total of 815 people agreed to participate, with 27.8% of these individuals being French-Canadian.

Six Months of Weekly Diaries

These 815 online panelists were sent an email each Monday morning asking them to click a link to a diary to record their past week gambling behaviour (Appendix D). They were given 24 hours to complete this. The diary asked whether they had engaged in eight different types of gambling: lottery or raffle tickets, instant lotteries, slot machines or video lottery terminals, casino table games, sports betting, horse racing or dog racing, bingo, and 'other' forms of gambling. For each type they reported participating in they were asked whether it was direct or remote (phone or online) access, number of days out of seven they participated, number of hours spent (not asked for lottery/raffle tickets or instant lotteries), and net weekly expenditure. Their data was irretrievable to them subsequent to entering it. They were also advised that we did not wish them to alter their natural pattern or frequency of gambling behaviour ("having no past week gambling is perfectly acceptable"). The weekly diary continued for 6 months, from June 9, 2014 to November 9, 2014. Both the diaries and the Retrospective Questionnaires (described below) were available in English and French.

Retrospective Questionnaire at 6 Months

At the end of 23 consecutive weeks 587 of the original 815 participants had completed 18 or more diaries, and were therefore eligible for the final survey. Of this group of 587, 50.5% had completed all weekly diaries, 23.1% had missed one week, 12.4% had missed two weeks, 4.8% had missed three weeks, 4.8% had missed four weeks, and 4.3% had missed five weeks. On the 24th week, these 587 participants were told in an email that instead of asking about their gambling in the past week, we were going to ask about the past 6 months. It was explained that: "The main purpose of this Gambling Study was actually to assess how well people can accurately remember their past behaviour over long time periods. Your weekly diaries will be used as a measure of your actual gambling in the past 6 months. We are now going to ask you to estimate your overall past 6 months of gambling behaviour as compared to what you reported in your weekly diaries. We are also going to ask these questions in different ways to determine if there are certain ways that better correspond to your gambling behaviour. So, please do not try and access any records you may have of your gambling in the past 6 months as the purpose of this study is to evaluate your unaided memory of this behaviour. Please take as much time as needed to complete this questionnaire and try to answer the questions as accurately as you can."

Participants were randomly assigned to receive one of two versions of the self-administered online Retrospective Questionnaire, the **Quantity-Frequency + Total Amount Questionnaire (QF/TA)**²⁶ or the **Graduated-Frequency Questionnaire (GF)** (Appendix E). Both questionnaires had stem questions asking about participation or non-participation in the past 6 months in 7 out of the 8 types of gambling assessed in the diaries.²⁷ If the person reported participating in that type, they were then asked whether access was direct, remote (phone or online), or both. The questionnaires used different question approaches when asking about frequency, time, and expenditure, which are detailed in Table 1 below.

The six gambling frequency response options used in the QF/TA Questionnaire (4+ times/week; 2-3 times/week; 1/week; 2-3 times/month; 1/month; < 1/month) are the response options used by the first two authors in much of their recent prevalence research as well as in many other prevalence surveys around the world. They are also very similar to the response options used in the Canadian Problem Gambling Index (CPGI) (Ferris & Wynne, 2001) and the Canadian Adolescent Gambling Inventory (CAGI) (Tremblay et al., 2010). However, they diverge slightly. Rather than asking about '<1/month in the past year', the CPGI has two response options of '1-5 times/year' and '6-11 times a year' (we collapsed these categories as we did not consider the distinction to be important). Also, for multiple occasions during the week, both the CPGI and CAGI use response options of '2-6 times a week' and 'daily' (whereas we used '4 or more times a week' and '2-3 times a week', as daily participation in any type of gambling the past 12 months is extremely rare, even for problem gamblers, and is best grouped with a slightly less common frequency).

The final section of both questionnaires assessed problem gambling via a 6 month version of the Problem and Pathological Gambling Measure (Williams & Volberg, 2010, 2014) and the Canadian Problem Gambling Index (Ferris & Wynne, 2001).

A total of 575 out of 587 eligible participants completed the Retrospective Questionnaire (300 in the QF/TA group and 275 in the GF group). As anticipated, the GF Questionnaire took more time to administer. More specifically, the QF/TA questionnaire was completed in an average time of 8.3 minutes (median time of 5.5 minutes), compared to 9.9 minutes for the GF approach (median time of 7.9 minutes). Also as anticipated, the overall sample contained a high prevalence of At Risk (12.8%), Problem (4.6%), and Pathological (3.3%) gamblers as assessed by the Problem and Pathological Gambling Measure. The diaries also confirmed high rates of past 6 month participation for the various types of gambling: 451/575 (78.4%) for lotteries/raffles; 346/575 (60.2%) for instant lotteries; 174/575 (30.3%) for electronic gambling machines; 92/575 (16.0%) for casino table games; 123/575 (21.4%) for sports betting; 40/575 (7.0%) for horse race betting; and 85/575 (14.8%) for bingo.

Test-Re-Test Reliability Two Weeks Later

For the purposes of assessing test-retest reliability of the different question formats, everyone was asked to complete the same version of the Retrospective Questionnaire again two weeks later. (The email solicitation for this re-test is contained at the end of Appendix E). A total of 563/575 (97.9%) completed this retest.

²⁶ Questions about the Total Amount (TA) of days, hours, and money spent gambling in the past four weeks were added as additional questions to the QF Questionnaire.

²⁷ They were not asked about participation in 'other' forms of gambling, as was done in the weekly diaries.

Table 1. Structure of the Quantity-Frequency + Total Amount Questionnaire (QF/TA) and the Graduated-Frequency Questionnaire (GF).

	QF/TA Retrospective Questionnaire	GF Retrospective Questionnaire
Participation	Past 6 month participation or nonparticipation in lotteries/raffles, instant lotteries, EGMs, table games, sports betting, horse race betting, and bingo.	
Access	For each type of gambling participated in, whether the access was direct, remote (phone or online), or both.	
Frequency	<p>For each type of gambling participated in:</p> <p>a. Average estimated frequency of participation in the past <u>3 months</u> (6 response options provided).</p> <p>b. Average estimated frequency of participation in past <u>6 months</u> (6 response options provided)</p> <p><i>Note: Half received the 3 month question first and half received the 6 month question first.</i></p> <p>c. Total number of days participating in the past 4 weeks.</p>	<p>For each type of gambling participated in:</p> <p>a. Estimated maximum number of days in a month they participated in the past <u>3 months</u>. Followed by questions asking how many of the past 3 months the number of days participated was in one of 3 individually tailored ranges, with the highest range including the maximum reported amount; lowest range consisting of no participation; and an intermediate range (see GF Questionnaire in Appendix E for the specific ranges provided).</p> <p>b. Estimated maximum number of days in a month they participated in the past <u>6 months</u>. Followed by questions asking how many of the past 6 months the number of days participated was in one of 3 individually tailored ranges, with the highest range including the maximum reported amount; lowest range consisting of no participation; and an intermediate range (see GF Questionnaire in Appendix E for the specific ranges provided).</p> <p><i>Note: Half received the 3 month question first and half received the 6 month question first.</i></p>
Time	<p>For each type of gambling participated in (except lotteries/raffles and instant lotteries):</p> <p>a. Average estimated hours spent participating in a <u>typical month in the past 3 months</u>.</p> <p>b. Average estimated hours spent participating in a <u>typical month in the past 6 months</u></p> <p><i>Note: Half received the 3 month question first and half received the 6 month question first.</i></p> <p>c. Estimated average number of hours spent on days when they did participate.</p> <p>d. Estimated total number of hours spent participating in the past 4 weeks.</p>	<p>For each type of gambling participated in (except lotteries/raffles and instant lotteries):</p> <p>a. Estimated maximum hours in a month they participated in the past <u>3 months</u>. Followed by 3 questions asking how many of the past 3 months the number of hours they participated was in one of 3 ranges, with highest range consisting of 50% - 100% of maximum reported hours; lowest range consisting of no participation; and an intermediate range consisting of 1% - 49% of maximum reported hours.</p> <p>b. Estimated maximum hours in a month they participated in the past <u>6 months</u>. Followed by 3 questions asking how many of the past 6 months the number of hours participated was in one of 3 ranges, with highest range consisting of 50% - 100% of maximum hours; lowest consisting of no participation; and intermediate range consisting of 1% - 49% of maximum reported hours.</p> <p><i>Note: Half received the 3 month question first and half received the 6 month question first.</i></p>
Expenditure	<p>For each type of gambling participated in:</p> <p>a. Average estimated net expenditure in a <u>typical month in the past 3 months</u>.</p> <p>b. Average estimated net expenditure in a <u>typical month in the past 6 months</u>.</p> <p><i>Note: Half received the 3 month question first and half received the 6 month question first.</i></p> <p>c. Estimated total net expenditure in the past 4 weeks.</p>	<p>For each type of gambling participated in:</p> <p>a. Estimated maximum net expenditure in a month in the past <u>3 months</u>. Followed by questions asking how many of the past 3 months expenditure was in one of 3 ranges, with highest range consisting of 50% - 100% of maximum expenditure; lowest range consisting of no expenditure; and an intermediate range consisting of 1% - 49% of maximum reported expenditure.</p> <p>b. Estimated maximum net expenditure in a month in the past <u>6 months</u>. Followed by questions asking how many of the past 6 months expenditure was in one of 3 ranges, with highest range consisting of 50% - 100% of maximum expenditure; lowest range consisting of no expenditure; and an intermediate range consisting of 1% - 49% of maximum reported net expenditure</p> <p><i>Note: Half received the 3 month question first and half received the 6 month question first.</i></p>
Problem Gambling	Problem and Pathological Gambling Measure (Williams & Volberg, 2010; 2014) and Canadian Problem Gambling Index (Ferris & Wynne, 2001) (6 month)	

Validity

The relative validity of the retrospective reports was established by their correspondence with the aggregate amounts from the weekly diaries. For equivalency of comparison, all amounts reported in the weekly diaries and the QF/TA and GF Questionnaires were multiplied by a factor that projected these amounts to a 6 month period (26 weeks). Participants with fewer completed diaries received a correspondingly higher multiplication factor. (Note: for multiplication purposes the mid-point was used for any response option that provided a range of values).

Table 2 presents the association between the retrospective report of whether the person had participated or not participated in each type of gambling in the previous 6 months against his or her participation or nonparticipation as established by the weekly diaries. Overall correspondence between the retrospective reports and diaries was found to be excellent, with 89.4% overall accuracy averaged across all types of gambling. However, the data also illustrates a high rate of people reporting they had not participated in a type of gambling when their weekly diaries indicated otherwise ('false negatives'), which is reflected in lower sensitivity (70.9%) relative to the other measures. This is most pronounced for lottery and raffle participation where the *majority* of people who denied participation in the retrospective report (140/251; 55.8%) had diary entries showing participation. The large majority of these cases were found to involve one or two instances of participation. Similarly, the large majority of false negatives for EGMs, casino table games, sports betting, horse race betting, and bingo participation involved a single instance of participation in the diaries.

Table 3 presents the association between the retrospective reports of the nature of the person's access to each type of gambling versus the nature of the access as established by the weekly diaries. Overall correspondence between the retrospective reports and diaries is again excellent with 90.6% accuracy averaged across all types of gambling. However, this is partly attributable to the fact that in-person access was overwhelmingly used for all types of gambling except for casino table games, sports gambling, and bingo. Despite high overall accuracy, there was some evidence of both false positives (e.g., people reporting both remote and in-person access, but diaries only indicating one of these) and an even stronger tendency toward false negatives (e.g., people reporting just in-person access, but diaries indicating remote and in-person access).

Table 4 presents the association between the retrospective estimates of frequency of participation for each type of gambling against what was contained in the weekly diaries among individuals who reported participation in both their diary and their retrospective report.²⁸ The left side of the table displays the results for the QF and TA question formats, and the right side of the table displays the results for the GF format. In addition to these measures of association, the absolute accuracy of the retrospective reports was established by calculating the ratio of days contained in the diaries versus days in the retrospective

²⁸ An argument can be made that the sample should also include people who reported nonparticipation in the diaries, retrospective reports, or both. However, with this approach the magnitude of the correlations would be strongly influenced by participation rates (i.e., types of gambling with low rates of participation will achieve the highest correlation coefficients because of the preponderance of matching zeros in both the diaries and retrospective reports). A stronger case can be made for including people who reported non-participation in *either* the diaries or retrospective reports, but not both. Preliminary investigation of this analytic approach revealed the correlation coefficients to be quite similar to what is presently reported, due to the a) comparatively small number of people who were false positives or false negatives relative to true positives; and b) the previously reported tendency of false negatives to report relatively few instances of actual involvement in the diaries.

reports. The averages at the bottom of the table indicate that all four of the five question formats had good to excellent Pearson r associations with the diaries, with only the GF Past 3 Months group having a fair degree of association. However, there was insufficient variation in the frequency of gambling among the horse race bettors in the TA Past 4 Weeks group for associations to be calculated (i.e., all participants who engaged in horse race betting reported engaging in it one day in the past 4 weeks). When horse race betting is removed from all the calculations, the Pearson r averages consistently favour the QF and TA formats relative to the GF format. The diary/report ratio is also better in the QF and TA formats relative to the GF format. In general, the QF and TA retrospective reports produce estimates of frequency that are somewhat too high relative to the diary amount (resulting in a low ratio) and the GF format produces estimates that are significantly lower than actual (resulting in high ratios).

Table 5 presents the association between the retrospective estimates of time spent gambling for each type of gambling against what was contained in the weekly diaries. (Note that time spent gambling was not assessed for lottery/raffles or instant lotteries). Two of the retrospective estimates of time have coefficients in the good range (QF Past 3 Months & QF Past 6 Months), three are in the fair range (QF Average Time per Occasion, GF Past 3 Months, GF Past 6 Months), and one is in the poor range (TA Past 2 Weeks). The accuracy of the diary/report ratio tends to parallel this pattern, with the closest match being for the QF Past 3 Months and QF Past 6 Months. As has previously been found in research on gambling expenditure (Wood & Williams, 2007), the format that asked about average time *per occasion* and multiplied this by frequency of participation produced aggregate estimates that are much too high relative to diary amounts.

Table 6 presents the association between the retrospective estimates of net gambling expenditure for each type of gambling against what was contained in the weekly diaries. Statistical outliers are common when using open-ended questions about gambling expenditure (as was used in both the diaries and retrospective reports) and these outliers have a large impact on Pearson coefficients and diary/report ratios.²⁹ Hence, in the present table both Pearson correlations are presented as well as non-parametric Kendall tau b coefficients. As expected, the magnitude of these correlations are weaker in the present table compared to what was observed in the tables depicting time and frequency, with none of them being in the 'good' range and some being in the 'poor' range. The strongest Pearson correlations are found with the GF formats (in the fair range), whereas the strongest Kendall tau is found with the QF Past 6 Months format. The diary/report ratios are also much more divergent compared to what was observed with time and frequency. The closest ratios are seen with QF Past 3 Months and QF Past 6 Months. In general, QF approaches tended to result in overestimates relative to diary amounts and GF approaches tended to produce underestimates relative to diary amounts.

As mentioned earlier, further data cleaning is usually needed to improve the validity of gambling expenditure estimates as a percentage of people will claim to be net winners in their retrospective reports. In the present study 14% of participants reported being net winners on all types of gambling combined with 39% of these people being At Risk, Problem, or Pathological Gamblers, and 10/11 of the highest net winning values being from these groups. Thus, Table 7 reports the Pearson correlations and diary/report ratios when excluding all cases where a positive net win/loss was reported. As can be seen, the correlation coefficients are now much higher and more similar to the magnitude obtained with time and frequency, with three being in the good range (QF Past 3 Months; QF Past 6 Months; GF Past 3 Months). The diary/report ratios remain quite divergent however, with the QF Past 3 Months being the closest.

²⁹ Outliers were very rare with frequency and time as there were constraints on the maximum values allowed.

Table 2. Validity of Retrospective Report of **Participation or Non-Participation** in Different Types of Gambling (Retrospective Report compared to Weekly Diaries).

Lottery/Raffle Participation		6 Month Retrospective Report			Sensitivity	69.0%
		No	Yes	Total	Specificity	89.5%
Weekly Diaries	No	111	13	124	Positive Predictive Power	96.0%
	Yes	140	311	451	Negative Predictive Power	44.2%
	Total	251	324	575	Overall Accuracy	73.4%
Instant Lotteries Participation		6 Month Retrospective Report			Sensitivity	71.4%
		No	Yes	Total	Specificity	98.7%
Weekly Diaries	No	226	3	229	Positive Predictive Power	98.8%
	Yes	99	247	346	Negative Predictive Power	69.5%
	Total	325	250	575	Overall Accuracy	82.3%
Electronic Gambling Machine Participation		6 Month Retrospective Report			Sensitivity	71.4%
		No	Yes	Total	Specificity	98.0%
Weekly Diaries	No	393	8	401	Positive Predictive Power	94.0%
	Yes	49	125	174	Negative Predictive Power	88.9%
	Total	442	133	575	Overall Accuracy	90.1%
Casino Table Game Participation		6 Month Retrospective Report			Sensitivity	66.3%
		No	Yes	Total	Specificity	99.8%
Weekly Diaries	No	482	1	483	Positive Predictive Power	98.4%
	Yes	31	61	92	Negative Predictive Power	94.0%
	Total	613	62	575	Overall Accuracy	94.4%
Sports Gambling Participation		6 Month Retrospective Report			Sensitivity	67.5%
		No	Yes	Total	Specificity	98.9%
Weekly Diaries	No	447	5	452	Positive Predictive Power	94.3%
	Yes	40	83	123	Negative Predictive Power	91.8%
	Total	487	86	575	Overall Accuracy	92.2%
Horse Racing Participation		6 Month Retrospective Report			Sensitivity	77.5%
		No	Yes	Total	Specificity	99.3%
Weekly Diaries	No	531	4	535	Positive Predictive Power	88.6%
	Yes	9	31	40	Negative Predictive Power	98.3%
	Total	540	35	575	Overall Accuracy	97.7%
Bingo Participation		6 Month Retrospective Report			Sensitivity	72.9%
		No	Yes	Total	Specificity	99.4%
Weekly Diaries	No	487	3	490	Positive Predictive Power	95.4%
	Yes	23	62	85	Negative Predictive Power	94.5%
	Total	510	65	575	Overall Accuracy	95.5%
Averages Across All Gambling Types					Sensitivity	70.9%
					Specificity	97.6%
					Positive Predictive Power	95.1%
					Negative Predictive Power	83.0%
					Overall Accuracy	89.4%

Sensitivity = number of people who retrospectively report engaging in the activity divided by the number of people who engaged in the activity as evidenced by their weekly diaries.

Specificity = number of people who retrospectively report not engaging in the activity divided by the number of people who did not engage in the activity as evidenced by their weekly diaries.

Table 3. Validity of Retrospective Report of Method of Accessing Gambling (Retrospective Report compared to Weekly Diaries).

Lottery/Raffle Access		6 Month Retrospective Report					
		In Person	Phone/Online	Both	Total	Sensitivity	98.5%
Weekly Diaries	In Person	267	0	2	269	Specificity	60.0%
	Phone/Online	7	10	0	17	Positive Predictive Power	94.4%
	Both	9	2	14	25	Negative Predictive Power	85.7%
	Total	283	12	16	311	Overall Accuracy	93.6%
Instant Lotteries Access		6 Month Retrospective Report					
		In Person	Phone/Online	Both	Total	Sensitivity	100.0%
Weekly Diaries	In Person	233	0	0	233	Specificity	71.4%
	Phone/Online	4	4	0	8	Positive Predictive Power	98.3%
	Both	0	0	6	6	Negative Predictive Power	100.0%
	Total	237	4	6	247	Overall Accuracy	98.4%
Electronic Gambling Machine Access		6 Month Retrospective Report					
		In Person	Phone/Online	Both	Total	Sensitivity	100.0%
Weekly Diaries	In Person	108	0	0	108	Specificity	58.8%
	Phone/Online	0	4	0	4	Positive Predictive Power	93.9%
	Both	6	1	6	13	Negative Predictive Power	100.0%
	Total	114	5	6	125	Overall Accuracy	94.4%
Casino Table Game Access		6 Month Retrospective Report					
		In Person	Phone/Online	Both	Total	Sensitivity	87.5%
Weekly Diaries	In Person	28	0	1	29	Specificity	73.3%
	Phone/Online	3	11	3	17	Positive Predictive Power	77.8%
	Both	0	5	10	15	Negative Predictive Power	84.5%
	Total	31	16	14	61	Overall Accuracy	80.7%
Sports Gambling Access		6 Month Retrospective Report					
		In Person	Phone/Online	Both	Total	Sensitivity	89.2%
Weekly Diaries	In Person	33	0	0	33	Specificity	81.4%
	Phone/Online	2	28	6	36	Positive Predictive Power	80.5%
	Both	4	3	7	14	Negative Predictive Power	89.7%
	Total	39	31	13	83	Overall Accuracy	85.0%
Horse Racing Access		6 Month Retrospective Report					
		In Person	Phone/Online	Both	Total	Sensitivity	100.0%
Weekly Diaries	In Person	31	0	0	31	Specificity	
	Phone/Online	0	0	0	0	Positive Predictive Power	100.0%
	Both	0	0	0	0	Negative Predictive Power	
	Total	31	0	0	31	Overall Accuracy	100.0%
Bingo Access		6 Month Retrospective Report					
		In Person	Phone/Online	Both	Total	Sensitivity	100.0%
Weekly Diaries	In Person	39	0	0	39	Specificity	52.2%
	Phone/Online	3	6	0	9	Positive Predictive Power	78.0%
	Both	4	4	6	14	Negative Predictive Power	100.0%
	Total	46	10	6	62	Overall Accuracy	82.3%
Averages Across All Gambling Types						Sensitivity	96.5%
						Specificity	66.2%
						Positive Predictive Power	89.0%
						Negative Predictive Power	93.3%
						Overall Accuracy	90.6%

Table 4. Validity of Retrospective Report of Gambling Frequency (Retrospective Reports compared to Weekly Diaries).

		Retrospective Report Frequency: QF/TA Format			Retrospective Report Frequency: GF Format	
		Past 3 Months	Past 6 Months	Total Days Past 4 Weeks	Past 3 Months	Past 6 Months
Lottery/Raffle Frequency Weekly Diaries	Pearson <i>r</i>	.841**	.841**	.840**	.538**	.673**
	Diary Total/Report Total	88.1%	88.1%	86.3%	155.2%	127.6%
Instant Lottery Frequency Weekly Diaries	Pearson <i>r</i>	.884**	.753**	.832**	.423**	.420**
	Diary Total/Report Total	100.1%	87.3%	82.4%	319.4%	131.9%
EGM Frequency Weekly Diaries	Pearson <i>r</i>	.748**	.746**	.823**	.628**	.618**
	Diary Total/Report Total	69.1%	69.1%	63.0%	186.5%	190.5%
Table Game Frequency Weekly Diaries	Pearson <i>r</i>	.570**	.570**	.744**	.253	.791**
	Diary Total/Report Total	28.4%	35.5%	18.4%	164.8%	163.6%
Sports Betting Frequency Weekly Diaries	Pearson <i>r</i>	.871**	.871**	.866**	.465**	.730**
	Diary Total/Report Total	93.8%	93.8%	101.4%	140.8%	149.0%
Horse Racing Frequency Weekly Diaries	Pearson <i>r</i>	.245	.293	NA	.991**	.991**
	Diary Total/Report Total	60.2%	60.2%	45.2%	120.5%	118.6%
Bingo Frequency Weekly Diaries	Pearson <i>r</i>	.586**	.586**	.588**	.135	.278
	Diary Total/Report Total	55.9%	55.9%	79.5%	214.6%	196.8%
Average	Pearson <i>r</i>	.68	.67	.78 ³⁰	.49	.64
	Diary Total/Report Total	70.8%	70.0%	68.0%	186.0%	154.0%

** $p < .01$; * $p < .05$ (one tail); NA = not assessed

³⁰ This value does not include horse racing, whereas the other averages do. If horse racing is also excluded from the other calculations then the averages are: .75 for QF Past 3 Months; .73 for QF Past 6 Months; .41 for GF Past 3 Months; and .59 for GF Past 6 Months.

Table 5. Validity of Retrospective Report of Time Gambling (Retrospective Reports compared to Weekly Diaries).

		Retrospective Report Time Spent: QF/TA Format				Retrospective Report Time Spent: GF Format	
		Average Time per Occasion	Typical Month Past 3 Months	Typical Month Past 6 Months	Total Hours Past 4 Weeks	Past 3 Months	Past 6 Months
Lottery/Raffle Time Spent Weekly Diaries	Pearson <i>r</i>	NA	NA	NA	NA	NA	NA
	Diary Total/Report Total	NA	NA	NA	NA	NA	NA
Instant Lottery Time Spent Weekly Diaries	Pearson <i>r</i>	NA	NA	NA	NA	NA	NA
	Diary Total/Report Total	NA	NA	NA	NA	NA	NA
EGM Time Spent Weekly Diaries	Pearson <i>r</i>	.561**	.665**	.810**	.686**	.280*	.465**
	Diary Total/Report Total	18.5%	83.2%	63.3%	179.5%	329.2%	180.0%
Table Game Time Spent Weekly Diaries	Pearson <i>r</i>	.913**	.204	.214	.250	.842**	.829**
	Diary Total/Report Total	10.0%	8.1%	7.5%	94.2%	47.3%	73.1%
Sports Betting Time Spent Weekly Diaries	Pearson <i>r</i>	.937**	.903**	.700**	.260	.625**	.059
	Diary Total/Report Total	11.9%	154.6%	113.6%	105.9%	73.5%	33.5%
Horse Racing Time Spent Weekly Diaries	Pearson <i>r</i>	-.163	.457*	.527*	-.709**	.792**	.700**
	Diary Total/Report Total	21.1%	113.8%	123.0%	200.3%	172.2%	154.4%
Bingo Time Spent Weekly Diaries	Pearson <i>r</i>	.602**	.869**	.949**	.754**	.156	.244
	Diary Total/Report Total	166.2%	153.4%	131.9%	241.3%	112.8%	111.5%
Average	Pearson <i>r</i>	.57	.62	.64	.25	.54	.46
	Diary Total/Report Total	45.5%	102.6%	87.9%	164.2%	147.0%	110.5%

** $p < .01$; * $p < .05$ (one tail); NA = not assessed

Table 6. Validity of Retrospective Report of Net Gambling Expenditure (Retrospective Reports compared to Weekly Diaries).

		Retrospective Report Money Spent: QF/TA Format			Retrospective Report Money Spent: GF Format	
		Typical Month Past 3 Months	Typical Month Past 6 Months	Total Spend Past 4 Weeks	Past 3 Months	Past 6 Months
Lottery/Raffle Money Spent Weekly Diaries	Pearson <i>r</i>	.406**	.112	.719**	.441**	.311**
	Kendall tau <i>b</i>	.444**	.682**	.590**	.423**	.391**
	Diary Total/Report Total	57.2%	33.2%	92.3%	203.9%	183.4%
Instant Lottery Money Spent Weekly Diaries	Pearson <i>r</i>	-.295**	-.014	-.314**	.269**	.442**
	Kendall tau <i>b</i>	.255**	.236**	.177*	.324**	.420**
	Diary Total/Report Total	57.7%	36.5%	116.1%	466.5%	188.8%
EGM Money Spent Weekly Diaries	Pearson <i>r</i>	.616**	.342**	.269*	.659**	.602**
	Kendall tau <i>b</i>	.458**	.390**	.204	.496**	.497**
	Diary Total/Report Total	75.8%	119.5%	20,160%	346.6%	131.1%
Table Game Money Spent Weekly Diaries	Pearson <i>r</i>	.064	.135	.309*	.660**	.551**
	Kendall tau <i>b</i>	-.081	.428**	.014	.535**	.167
	Diary Total/Report Total	106.1%	84.9%	104.8%	336.7%	134.9%
Sports Betting Money Spent Weekly Diaries	Pearson <i>r</i>	-.853**	.934**	-.876**	.655**	.418*
	Kendall tau <i>b</i>	.420**	.744**	-.096	.531**	.228
	Diary Total/Report Total	7.3%	44.8%	-101.6%	1.3%	1.0%
Horse Racing Money Spent Weekly Diaries	Pearson <i>r</i>	.753**	.756**	.833**	.899**	.744**
	Kendall tau <i>b</i>	.228	.444*	.617**	.333	.333
	Diary Total/Report Total	181.5%	16.5%	200.0%	13.7%	11.4%
Bingo Money Spent Weekly Diaries	Pearson <i>r</i>	.577**	.726**	.066	.482**	.646**
	Kendall tau <i>b</i>	.492**	.624**	.482**	.411**	.564**
	Diary Total/Report Total	44.1%	83.6%	43.2%	1494.7%	539.0%
Average	Pearson <i>r</i>	.18	.43	.14	.58	.53
	Kendall tau <i>b</i>	.32	.51	.28	.44	.37
	Diary Total/Report Total	75.7%	59.9%	2915.0%	409.1%	169.9%

***p* < .01; **p* < .05 (one tail)

Table 7. Validity of Retrospective Report of Gambling Expenditure Losses (Retrospective Reports compared to Weekly Diaries).

		Retrospective Report Money Spent: QF/TA Format			Retrospective Report Money Spent: GF Format	
		Typical Month Past 3 Months	Typical Month Past 6 Months	Total Spend Past 4 Weeks	Past 3 Months	Past 6 Months
Lottery/Raffle Money Spent Weekly Diaries	Pearson <i>r</i>	.498**	.242**	.594**	.498**	.423**
	Diary Total/Report Total	46.9%	28.2%	80.1%	203.9%	183.4%
Instant Lottery Money Spent Weekly Diaries	Pearson <i>r</i>	.466**	.517**	.391**	.435**	.271**
	Diary Total/Report Total	41.6%	28.9%	77.9%	466.5%	188.8%
EGM Money Spent Weekly Diaries	Pearson <i>r</i>	.779**	.778**	.810**	.328**	.316**
	Diary Total/Report Total	59.8%	46.3%	136.9%	346.6%	131.1%
Table Game Money Spent Weekly Diaries	Pearson <i>r</i>	.998**	.675**	.742**	.881**	.850**
	Diary Total/Report Total	44.5%	70.2%	99.9%	336.6%	134.9%
Sports Betting Money Spent Weekly Diaries	Pearson <i>r</i>	.922**	.924**	-.036	.600**	.418**
	Diary Total/Report Total	66.3%	33.3%	138.8%	1.3%	1.0%
Horse Racing Money Spent Weekly Diaries	Pearson <i>r</i>	.807**	.469*	.833**	.899**	.744**
	Diary Total/Report Total	93.2%	16.5%	2050.0%	13.7%	11.4%
Bingo Money Spent Weekly Diaries	Pearson <i>r</i>	.549**	.619**	.066	.748**	.629**
	Diary Total/Report Total	43.3%	30.4%	43.2%	1494.7%	539.0%
Average	Pearson <i>r</i>	.72	.60	.49	.63	.52
	Diary Total/Report Total	56.5%	36.2%	375.3%	409.0%	170.0%

***p* < .01; **p* < .05 (one tail)

Utility of Time Spent Gambling

Table 8 addresses the degree to which time spent gambling is correlated with frequency of gambling and net gambling expenditure in the weekly diaries. The results indicate that time spent gambling is very strongly correlated with total days gambling (average Pearson correlation of .84 across all types of gambling), but only has a moderate correlation with net expenditure (average Pearson correlation of -.50 across all types of gambling). (Note that expenditure has a negative value when a net loss is reported). That being said, the association between days spent and hours spent is only .64 for sports betting. Furthermore, time spent gambling was not collected for lotteries/raffles and instant lotteries as it was not seen as an important dimension for those types of gambling. Nonetheless, if it was collected these associations may not be strong as there are many daily lottery players who spend minimal time on these purchases.

Table 8. Pearson Correlations between Hours Spent Gambling with Days Spent Gambling and Net Gambling Expenditure in the Diaries.

	# Lottery/Raffle Days	Lottery/Raffle Money Spent
# Lottery/Raffle Hours	NA	NA
	# Instant Lottery Days	Instant Lottery Money Spent
# Instant Lottery Hours	NA	NA
	# EGM Days	EGM Money Spent
# EGM Hours	.910**	-.632**
	# Table Game Days	Table Game Money Spent
# Table Game Hours	.869**	-.308**
	# Sports Betting Days	Sports Betting Money Spent
# Sports Betting Hours	.639**	-.699**
	# Horse Racing Days	Horse Racing Money Spent
# Horse Racing Hours	.855**	-.313
	# Bingo Days	Bingo Money Spent
# Bingo Hours	.919**	-.526**
	Average Correlation Across All Types of Gambling	
# HOURS	.84	-.50

** $p < .01$; * $p < .05$ (one tail); NA = not assessed

Table 9 addresses the question of whether retrospective report of time spent gambling is a better predictor of diary expenditure than retrospective reports of money spent gambling. The answer appears to be 'no'. Although all the correlations are in the right direction, the magnitude of the correlations is weaker than seen when comparing diary reports of expenditure to retrospective reports of expenditure losses as detailed in Table 7.

Table 9. Pearson Correlations between Diary Expenditure and Retrospective Report of Time Spent on each Type of Gambling.

	Retrospective Report Time Spent: QF/TA Format				Retrospective Report Time Spent: GF Format	
	Average Time per Occasion	Typical Month Past 3 Months	Typical Month Past 6 Months	Total Hours Past 4 Weeks	Past 3 Months	Past 6 Months
Lottery/Raffle Money Spent Weekly Diaries	NA	NA	NA	NA	NA	NA
Instant Lottery Money Spent Weekly Diaries	NA	NA	NA	NA	NA	NA
EGM Money Spent Weekly Diaries	-.331**	-.543**	-.347**	-.408**	.031	-.272*
Table Game Money Spent Weekly Diaries	-.208	-.094	-.094	.236	.447**	.036
Sports Betting Money Spent Weekly Diaries	-.734**	-.573**	-.538**	-.256	.389*	-.006
Horse Racing Money Spent Weekly Diaries	-.118	-.001	.092	-.833**	-.894**	-.833**
Bingo Money Spent Weekly Diaries	-.230	-.734**	-.813**	-.693**	-.213	-.156
Average	-.32	-.39	-.34	-.39	-.05	-.25

** $p < .01$; * $p < .05$ (one tail); NA = not assessed

Reliability

The reliability of the different retrospective question formats was established by their two week test-retest reliability coefficients. A total of 563/575 participants (97.9%) completed the retest. The sample for the present analysis is restricted to everyone who indicated they participated in a certain type of gambling in either their original retrospective questionnaire or the readministered questionnaire two weeks later. (Individuals who reported participation for a type of gambling in one questionnaire but not the other were assigned zeros for days, time, and expenditure in the questionnaire they reported non-participation).

Table 10 illustrates that the test-retest reliability of people's retrospective reports of past 6 month participation or non-participation as measured by kappa are very good, although somewhat lower for lottery/raffle participation. Although not detailed in the present table, the most common error was people reporting they had participated in a type of gambling in the second administration of the questionnaire whereas they denied this in the first administration.

Table 11 illustrates the similarly good test-retest reliability of people's retrospective reports of how they accessed each type of gambling. (Kappa could not be calculated for horse racing due to the lack of variation as all people reported in-person access for both administrations). Although not detailed in the present table, a common error was people reporting they had accessed gambling both directly and remotely in one administration of the questionnaire whereas they only reported one means of access in the other questionnaire.

Table 12 illustrates the test-retest reliability of people's retrospective reports of gambling frequency as assessed by intraclass correlation. Two of the coefficients are in the excellent range (QF Past 6 Months; TA Past 4 weeks), one is in the good range (QF Past 3 Months), and both of the GF formats are in the fair range. The absence of variation within the TA Past 4 Week horse racing format precluded the calculation of coefficients (i.e., all participants reported engaging in the activity one day in the past 4 weeks).

Table 13 illustrates the test-retest reliability of people's retrospective reports of time spent gambling. Although most of the coefficients are adequate, they tend to be slightly lower than frequency, with only two in the good range (QF Past 3 Months and QF Past 6 Months). It is notable that both of the GF formats are in the poor range.

Table 14 illustrates the test-retest reliability of people's retrospective reports of gambling net expenditure. As was found for validity of raw net expenditure, most of these intraclass coefficients are much lower than observed for time or frequency. Four of the five formats were in the poor range, with only QF Past 6 Months being in the fair range. Although the Kendall tau *b* correlations tended to be stronger than the intraclass coefficients, they were still weak.

Evaluating the test-retest reliability of *expenditure losses* for each type of gambling was not evaluated, as although these reliability coefficients would be undoubtedly be stronger, eliminating all net wins for each individual type of gambling in either administration of the questionnaire represents a significant reduction in the sample and is too strong of a constraint on the data. It is also important to know the extent to which people who report net wins for a specific type of gambling still report net wins two weeks later, which is provided with the net expenditure reliability coefficients.

Table 10. Two Week Test-Retest Reliability of Retrospective Reports of Gambling Participation or Non-Participation.

	Kappa
Lottery/Raffle Participation	.579**
Instant Lotteries Participation	.708**
Electronic Gambling Machine Participation	.686**
Casino Table Game Participation	.825**
Sports Gambling Participation	.813**
Horse Racing Participation	.793**
Bingo Participation	.768**
Average	.74

Table 11. Two Week Test-Retest Reliability of Retrospective Reports of Method of Accessing Gambling.

	Kappa
Lottery/Raffle Access	.791**
Instant Lotteries Access	.940**
Electronic Gambling Machine Access	.515**
Casino Table Game Access	.533**
Sports Gambling Access	.681**
Horse Racing Access	NA
Bingo Access	.767**
Average	.70

** $p < .01$; * $p < .05$ (one tail)

Table 12. Two Week Test-Retest Reliability of Retrospective Reports of Gambling Frequency (Intraclass correlation coefficients).

	2 Week Retest: QF/TA Format			2 Week Retest: GF Format	
	Past 3 Months	Past 6 Months	Total Days Past 4 Weeks	Past 3 Months	Past 6 Months
Lottery/Raffle Frequency Retrospective Report	.588**	.634**	.701**	.617**	.609**
Instant Lottery Frequency Retrospective Report	.739**	.664**	.697**	.403**	.212**
EGM Frequency Retrospective Report	.476**	.547**	.716**	.488**	.523**
Table Game Frequency Retrospective Report	.806**	.902**	.960**	.227	.389*
Sports Betting Frequency Retrospective Report	.830**	.854**	.686**	.076	.636**
Horse Racing Frequency Retrospective Report	.811**	.890**	NA	.239	.583**
Bingo Frequency Retrospective Report	.729**	.734**	.942**	.815**	.480**
Average	.71	.75	.78 ³¹	.41	.49

** $p < .01$; * $p < .05$ (one tail); NA = not assessed

³¹ This average does not include horse racing, whereas the other averages do. If horse racing is also excluded from the other calculations then the averages are: .69 for QF Past 3 Months; .73 for QF Past 6 Months; .44 for GF Past 3 Months; and .47 for GF Past 6 Months.

Table 13. Two Week Test-Retest Reliability of Retrospective Reports of Time Gambling (Intraclass correlation coefficients).

	2 Week Retest: QF/TA Format				2 Week Retest: GF Format	
	Average Time per Occasion	Typical Month Past 3 Months	Typical Month Past 6 Months	Total Hours Past 4 Weeks	Past 3 Months	Past 6 Months
Lottery/Raffle Time Spent Retrospective Report	NA	NA	NA	NA	NA	NA
Instant Lottery Time Spent Retrospective Report	NA	NA	NA	NA	NA	NA
EGM Time Spent Retrospective Report	.475**	.740**	.592**	.563**	.154	.589**
Table Game Time Spent Retrospective Report	.233	.988**	.993**	.002	.724**	.321*
Sports Betting Time Spent Retrospective Report	.911**	.602**	.524**	.219	-.047	-.054
Horse Racing Time Spent Retrospective Report	.254	.024	.598**	.690**	.373	.260
Bingo Time Spent Retrospective Report	.144	.941**	.716**	.972**	.562**	.815**
Average	.40	.66	.68	.49	.35	.39

** $p < .01$; * $p < .05$ (one tail); NA = not assessed

Table 14. Two Week Test-Retest Reliability of Retrospective Reports of Net Gambling Expenditure (Intraclass correlation coefficients).

		2 Week Retest: QF/TA Format			2 Week Retest: GF Format	
		Typical Month Past 3 Months	Typical Month Past 6 Months	Total Spend Past 4 Weeks	Past 3 Months	Past 6 Months
Lottery/Raffle Money Spent Retrospective Report	Intraclass Correlation	.598**	.628**	.446**	.634**	.663**
	Kendall tau <i>b</i>	.428**	.465**	.390**	.531**	.439**
Instant Lottery Money Spent Retrospective Report	Intraclass Correlation	.701**	.671**	.559**	.229**	.259**
	Kendall tau <i>b</i>	.443**	.476**	.376**	.474**	.338**
EGM Money Spent Retrospective Report	Intraclass Correlation	.424**	.582**	.514**	.107	.269**
	Kendall tau <i>b</i>	.377**	.425**	.143	.349**	.602**
Table Game Money Spent Retrospective Report	Intraclass Correlation	.534**	.327*	.287	.347*	.291
	Kendall tau <i>b</i>	.568**	.494**	-.039	.308*	.543**
Sports Betting Money Spent Retrospective Report	Intraclass Correlation	-.867**	.189	-.579**	-.027	-.182
	Kendall tau <i>b</i>	.160	.286*	.379**	.409**	.145
Horse Racing Money Spent Retrospective Report	Intraclass Correlation	-.623**	.685**	-1.0**	-.298	-.587**
	Kendall tau <i>b</i>	.213	.048	-1.0**	-.738**	-.738**
Bingo Money Spent Retrospective Report	Intraclass Correlation	-.140	.135	.322*	.468**	.353*
	Kendall tau <i>b</i>	-.115	-.016	.410**	.906**	.330*
Average	Intraclass Correlation	.09	.46	.08	.21	.15
	Kendall tau <i>b</i>	.30	.31	.09	.32	.24

** $p < .01$; * $p < .05$ (one tail)

Conclusions

The following summarizes the findings and conclusions from this empirical investigation.

1. The validity of past 6 month retrospective reports of **participation or non-participation** for individual types of gambling is excellent and the test-retest reliability is very good. However, there is also a very high rate of infrequent participants forgetting about their past involvement as recorded in their diaries, particularly for lottery and raffle tickets. This parallels findings in alcohol research, where occasional drinkers tend to report higher amounts in their diaries relative to their retrospective reports of their involvement (Bloomfield et al., 2013; Redman et al., 1987; Shakeshaft et al., 1999; Webb et al., 1990). Thus, to facilitate higher (and more accurate) reports of participation, it would seem that a question that simply asks about participation or nonparticipation in the past 6 months (as was used in the present study), is less preferable to a question that asks about the person's frequency of involvement in the past 6 months, with 'no participation' being one of the response options. This is the approach that will be used in the finalized GPI.
2. The validity of retrospective reports of how the person **accessed gambling** (in person, remotely via phone or online, or both in-person and remote access) is also excellent with the test-retest reliability being good. However, this high validity is related to the fact that the most commonly engaged in forms of gambling (lottery/raffle, instant lotteries, EGMs) are overwhelmingly accessed by just one means (i.e., in-person). For other types of gambling (casino table games, sports betting, horse race betting, bingo), there was some tendency for some people to report having just in-person access, or just online access, but diaries indicating both remote and in-person access.
3. The validity of retrospective reports of **frequency of gambling** tends to be good to excellent, with the strongest associations and the best absolute match with diary amounts occurring for the two Quantity-Frequency (QF) formats and single Total Amount (TA) format. Test-retest reliability is fair to excellent depending on the retrospective questionnaire, with the QF and TA formats again having stronger coefficients relative to the Graduated Frequency (GF) formats.
4. The validity of retrospective reports of **time spent gambling** tended to be fair to good, and slightly lower than obtained with frequency of gambling. The two QF formats had the strongest validity coefficients as well as the closest match with actual diary amounts. Reliability of time spent gambling tended to parallel validity, with most coefficients being in the fair to good range and the strongest reliability coefficients occurring for the two QF formats. Time spent gambling is very strongly correlated with frequency of gambling in the diaries ($r = .84$ across all types of gambling that were assessed). However, time spent gambling was not collected for lotteries/raffles and instant lotteries where the association may be weaker. Furthermore, the correlation between hours spent sports betting and days spent sports betting was only $r = .64$, indicating that sports betting frequency and expenditure may not sufficiently capture sports betting participation. Finally, as will be described later in this report (and seen in Table 17), aggregate measures of *total time spent gambling on all types combined* was not strongly correlated with total days gambling on all types combined. This weaker association is primarily due to regular lottery players having a high number of total days gambled but a low aggregate time total. Of final note, retrospective reports of time spent gambling do not appear to be a potential substitute for retrospective reports of expenditure, as its association with diary expenditures is not higher than retrospective reports of expenditure. Thus, in sum, although time spent gambling has some redundancy to frequency of gambling, in the interests of comprehensiveness as well evidence that it may have stronger relationship to problem gambling in

adolescents than either frequency or money (Wiebe et al., 2008; Tremblay et al., 2010), it needs to be included as an additional dimension of gambling participation in the finalized GPI.

5. As anticipated, the validity of raw retrospective reports of **net gambling expenditure** tends to be poor to fair. This is one situation where the coefficients are actually stronger for the GF formats relative to both the QF and TA formats. The ratio of diary expenditure to retrospective report expenditure (which speaks to the absolute accuracy of the values) is particularly divergent and in both directions. The validity of **gambling expenditure losses** (i.e., eliminating people reporting net wins) is significantly better, with most of these coefficients being in the good range and the strongest coefficients and the best match with diary amounts being for the QF Past 3 Months format. Unfortunately, the test-retest reliability of net gambling expenditure tends to be poor, with the QF Past 6 Month format being the only one in the fair range. (The test-retest reliability of gambling expenditure *losses* was not evaluated).

6. The **Graduated-Frequency (GF) approach** is theoretically superior to the conventional **Quantity-Frequency (QF) approach** because it can better capture the natural variability of gambling behaviour. Evidence of this theoretical superiority is seen in the present study by virtue of the fact that most participants reported that their gambling frequency, time, and expenditure fell into more than one of the three ranges provided.³² More specifically, 68% of people chose more than one range for frequency, 68% chose more than one range for time, and 74% chose more than one range for expenditure, with these percentages being even higher when reporting on their past 6 months of participation (rather than 3 months). However, the GF approach is more complex to administer, takes more time to complete, and *does not show empirical superiority*. Rather, as described above, and as evident in Table 15, the QF format has consistently higher validity and reliability coefficients for frequency of gambling and time spent gambling. It is only with gambling expenditure that the GF approach has somewhat comparable validity. Moreover, the GF reliability coefficients for expenditure are poor, whereas the reliability coefficient for QF Past 6 Months is satisfactory. Also of note is that the GF amounts consistently and significantly *underestimate* actual diary amounts, whereas the QF approaches tend to overestimate these amounts and to produce a closer overall match. This underestimation for GF formats is opposite to what has been reported in alcohol research, where retrospective GF totals are typically too high (Bloomfield et al., 2013; Gmel et al., 2006; Graham et al., 2004; Poikolainen et al., 2002). This difference may be due to participants in the present study being constrained in how many months they could allocate to each frequency, time, and expenditure range (i.e., it could not exceed 3 or 6 depending on the question), whereas having no constraints on total months reported has been more typical in alcohol research.

7. Previous research has established that **shorter and more recent time periods** tend to be more reliable and valid. This was evaluated in the present study using the **Total Amount (TA) format** asking about total participation in the past 4 weeks. Past 4 Week reports showed some evidence of stronger validity and reliability for gambling frequency. However the Past 4 Week format tended to have much weaker validity and reliability for gambling time and gambling expenditure. Past 4 Week reports may well be more valid and reliable if compared to just the last month of diary entries, but it appears that the last 4 weeks is not sufficiently representative to extrapolate well to the past 6 months of behaviour. Three months may be a more suitable time frame, as QF Past 3 Months had slightly higher

³² As a reminder, people were asked about the maximum number of days, hours, or money they spent on a particular type of gambling in a certain time frame (past 3 or 6 months) and then asked what proportion of these months their days gambling, hours gambling, or money spent gambling fell into each of 3 different ranges (ranging from 0 to the maximum value they identified).

validity coefficients than QF Past 6 Months. Unfortunately, the reliability of QF Past 3 Months is somewhat weaker than QF Past 6 Months and had unsatisfactory reliability for net expenditure. Finally, also relevant to the topic of shorter time frames is the fact that asking about average *time per occasion* produces estimates of time spent gambling that are much too high relative to diary amounts, as well as reliability and validity coefficients are only in the fair range.

8. In light of the above findings, it would appear that a **Quantity-Frequency approach using a time frame of the past 6 months has the best combination of reliability and validity and is the format that should be used for the GPI** (see Table 15 for a summary of the reliability and validity coefficients for each retrospective questionnaire format). This conclusion aligns remarkably well to the reviews of this issue for the assessment of alcohol consumption, where employing beverage-specific questions using a Quantity-Frequency approach and a one year time period are currently identified as best practice (Bloomfield et al., 2013; Gmel et al., 2006). As is often done with alcohol participation, the GPI will add an additional question about binge or episodic gambling to help in better capturing the variability of gambling. In the finalized GPI a 'past 12 months' is used, as it is anticipated that the reliability and validity will be very similar to 'past 6 months' and because there are logistical advantages of using a time frame that does not have to be extrapolated to 12 months and which naturally corresponds to the one year time frame used in the assessment of problem gambling. While it would be perfectly acceptable if users of the GPI preferred to use a 'past 6 month' reporting frame, this would also require a corresponding adjustment to a 6 month time frame for assessing problem gambling.

Table 15. Relative Validity and Reliability of Retrospective Report Formats.

Validity (Correspondence between retrospective report and weekly diaries)		QF/TA Format ³³				GF Format	
		Average Time per Occasion	Typical Month Past 3 Months	Typical Month Past 6 Months	Total Past 4 Weeks	Past 3 Months	Past 6 Months
Gambling Frequency	Pearson <i>r</i>	NA	.68	.67	.78 ³⁴	.49	.64
	Diary Total/Report Total	NA	70.8%	70.0%	68.0%	186.0%	154.0%
Gambling Time	Pearson <i>r</i>	.57	.62	.64	.25	.54	.46
	Diary Total/Report Total	45.5%	102.6%	87.9%	164.2%	147.0%	110.5%
Gambling Expenditure Losses	Pearson <i>r</i>	NA	.72	.60	.49	.63	.52
	Diary Total/Report Total	NA	56.5%	36.2%	375.3%	409.0%	170.0%
Average	Pearson <i>r</i>	.57	.67	.64	.51	.55	.54
	Diary Total/Report Total	45.5%	76.6%	64.7%	202.5%	247.3%	144.8%

Reliability (Two-week test-retest)		QF/TA Format				GF Format	
		Average Time per Occasion	Typical Month Past 3 Months	Typical Month Past 6 Months	Total Past 4 Weeks	Past 3 Months	Past 6 Months
Gambling Frequency Intraclass Correlation		NA	.71	.75	.78 ³⁵	.41	.49
Gambling Time Intraclass Correlation		.40	.66	.68	.49	.35	.39
Gambling Net Expenditure Intraclass Correlation		NA	.09	.46	.08	.21	.15
Average		.40	.49	.63	.45	.32	.34

³³ Note that in the QF/TA format that Gambling Time and Gambling Expenditure asked an open-ended question about 'typical month time/expenditure in past 3 or 6 months', but Gambling Frequency provided response options asking about frequency *over the entire past 3 months or past 6 months*.

³⁴ This average does not include horse racing, whereas the other Gambling Frequency averages do. If horse racing is also excluded from the other calculations then the other averages are: .75 for QF Past 3 Months; .73 for QF Past 6 Months; .41 for GF Past 3 Months; .59 for GF Past 6 Months.

³⁵ This average does not include horse racing, whereas the other Gambling Frequency averages do. If horse racing is also excluded from the other calculations then the other averages are: .69 for QF Past 3 Months; .73 for QF Past 6 Months; .44 for GF Past 3 Months; .47 for GF Past 6 Months.

Reliability and Validity of the Finalized Gambling Participation Instrument

The reliability and validity for the finalized *Gambling Participation Instrument* using the Quantity-Frequency approach and a time frame of the past 6 months is presented in Table 16. (The finalized instrument itself is contained in Appendix A). This table also include correlations for composite measures of *aggregate* gambling participation (i.e., total number of gambling types engaged in, total number of days for all types combined, total number of hours for all types combined, total expenditure for all types combined). As can be seen, most of these aggregate validity and reliability coefficients are in the excellent range, and much higher than the coefficients averaged across individual types of gambling.

Table 16. Reliability and Validity Coefficients of the Finalized *Gambling Participation Instrument*

	Validity	Reliability
TOTAL Number of Gambling Types Engaged In	.60	.76
Frequency of Gambling (average correlation across all types of gambling)	.67	.75
TOTAL Frequency of Gambling (TOTAL days for all types of gambling combined)	.87	.84
Time Spent Gambling (average correlation across all types of gambling)	.64	.68
TOTAL Time Spent Gambling (TOTAL hours for all types of gambling combined)	.91	.79
Gambling Expenditure Losses (average correlation across all types of gambling)	.60	.46
TOTAL Gambling Expenditure Losses (TOTAL losses across all types of gambling)	.73	.68

Table 17 presents the inter-correlation matrix of these aggregate measures of gambling participation using the Quantity-Frequency approach and a time frame of the past 6 months, including their association with PPGM Category (1=Recreational Gambler; 2 =At Risk Gambler; 3=Problem Gambler; 4=Pathological Gambler). Table 17 illustrates that additional validity for the finalized *Gambling Participation Instrument* (Appendix A) is attained, as evidenced by the significant correlation between every aggregate measure of gambling participation from the retrospective report and PPGM category. Furthermore, total gambling expenditure losses correlates most strongly with PPGM category and total number of types engaged in correlates the least. Of final note, as mentioned earlier, *total* time spent gambling is not strongly associated with *total* frequency of gambling (whereas this correlation was found to be very strong for individual types of gambling).

Table 17. Pearson Inter-Correlation Matrix of Aggregate Measures of Gambling Participation and PPGM Category from the Finalized *Gambling Participation Instrument*.

	TOTAL Gambling Types Engaged In	TOTAL Frequency of Gambling	TOTAL Time Spent Gambling	TOTAL Expenditure Losses	PPGM Category
TOTAL Gambling Types Engaged In	1.0	.49**	.12**	-.31**	.17**
TOTAL Frequency of Gambling	.49**	1.0	.32**	-.60**	.53**
TOTAL Time Spent Gambling	.12	.32**	1.0	-.62**	.31**
TOTAL Expenditure Losses	-.31**	-.60**	-.62**	1.0	-.63**
PPGM Category	.17**	.53**	.31**	-.63**	1.0

** $p < .01$; * $p < .05$ (2 tail)

Note that for expenditure, a negative correlation is in the expected direction, as loss is denoted by a negative value.

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APPENDIX A: Gambling Participation Instrument (GPI)

Please take as much time as needed to complete this questionnaire and try to answer the questions as accurately as you can. Many of these questions ask about the past 12 months, which would be from [specify month and year] to the present time.

Note: 'a' questions address frequency of gambling, 'b' questions address subtype of gambling, 'c' questions address location of play and/or means of access, 'd' questions address time spent gambling, and 'e' questions assess gambling expenditure. If a shorter instrument is desired some of these dimensions could be omitted.

PAST YEAR GAMBLING PARTICIPATION

G1a. In the past 12 months, how often would you say you have purchased **lottery or raffle tickets**?

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month
- Not at all (go to G2a)

G1b. What type of lottery or raffle did you participate in? (check all that apply)

- [provide names of the main national, regional, and daily lotteries]
- A charity, hospital, or community group lottery or raffle
- An out-of-state/province/country lottery. Specify jurisdictions and/or lottery _____
- An unregulated lottery [provide local name, e.g., 'numbers game', 'fafi', 'bolita', 'jogo do bicho'] (do not include this option if no unregulated lotteries are known to exist in the jurisdiction)

G1c. Did you purchase these tickets in person or remotely via a computer or other device? (check all that apply)

- In person
- Remotely via a computer, phone, television, or other device. Specify device(s) _____

G1d. In the past 12 months, how many hours do you estimate you spent on lottery or raffle tickets in a typical month (this includes any time taken to purchase tickets, check results, and/or do research)? _____ (limit to numerals with a maximum value of 400)

G1e. In the past 12 months, how much money do you estimate you spent on lottery and raffle tickets in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit to numerals)

G2a. In the past 12 months, how often would you say you have purchased **instant lottery tickets** (scratchcards, break-open tickets, pull-tabs, etc.) or played **online instant games** for money? (use terminology appropriate for the jurisdiction)

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month
- Not at all (go to G3a)

G2c. Did you purchase these tickets or play these instant games in person or remotely via a computer or other device? (check all that apply)

- In person
- Remotely via a computer, phone, television, or other device. Specify device(s) _____

G2d. In the past 12 months, how many hours do you estimate you spent on instant lottery tickets or instant games in a typical month? _____ (limit to numerals with a maximum value of 400)

G2e. In the past 12 months, how much money do you estimate you spent on instant lottery tickets or instant games in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit to numerals)

G3a. In the past 12 months, how often would you say you have spent money on **electronic gambling machines**, also known as slot machines, video lottery terminals, video gaming terminals, pokies, fixed odds betting terminals, fruit machines, electronic roulette, electronic baccarat, electronic blackjack, electronic bingo, electronic keno machines, electronic racing machines, electronic big wheel, pachislo, pachinko, etc., either in person or online? (eliminate names that would be unfamiliar to participants)

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month
- Not at all (go to G4a)

G3b. What type of electronic gambling machine did you play (check all that apply)

- Traditional machine with fruits/symbols/pictures and paylines



- Electronic machine offering virtual casino table games such as poker, blackjack, baccarat, roulette, craps, big wheel, or virtual bingo, keno, or virtual horse or dog racing, etc.



- Other type of machine (e.g., pachinko, skill-based video gambling machine)

G3c. Where did you play these machines (check all that apply) (edit this list as appropriate for the jurisdiction)

- At a land-based gambling venue (casino, racetrack, bookmaker, gambling arcade, etc.) in [home state/province/country]
- At a land-based gambling venue (casino, racetrack, bookmaker, gambling arcade, etc.) outside of [state/province/country]. Specify jurisdictions _____
- In a bar/lounge/club, hotel, restaurant, retail shop, airport, etc. in [home state/province/country]
- In a bar/lounge/club, hotel, restaurant, retail shop, airport, etc. outside of [home state/province/country]. Specify jurisdictions _____
- At an online casino or other online site in [home state/province/country]. Specify device(s) used to access these online sites (i.e., computer, phone, television) _____

- At an online casino or other online site outside of [home state/province/country]. Specify jurisdictions and/or websites_____. Specify device(s) used to access these online sites (i.e., computer, phone, television)_____
- At an underground/illegal casino or some other underground/illegal location in [home state/province/country]
- On a ship in international waters

G3d. In the past 12 months, how many hours do you estimate you spent playing electronic gambling machines in a typical month?_____ (limit to numerals with a maximum value of 400)

G3e. In the past 12 months, how much money do you estimate you spent on electronic gambling machines in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money spent on transportation, food, drinks, or parking. _\$_____ (limit to numerals)

G4a. In the past 12 months, how often would you say you have bet money or something of material value on **casino table games**, either in person or online? This includes poker, blackjack, baccarat, roulette, craps, mahjong, sic bo, pai gow, and other traditional gambling games often found in casinos. It also includes playing any of these casino table games for money at a private residence or somewhere else. However, it does not include electronic machine versions of these games, which should be reported in G3.

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month
- Not at all (go to G5a)

G4b. What casino table games did you play (check all that apply)? (adjust the order so that the earliest items represent the most common games in the jurisdiction)

- Poker
- Blackjack
- Baccarat
- Roulette
- Craps
- Mahjong
- Sic Bo
- Pai Gow
- Big Wheel (Wheel of Fortune; Big Six)
- Other_____ [specify]

G4c. Where did you play these table games (check all that apply) (edit this list as appropriate for the jurisdiction)

- At a land-based gambling venue (casino, card room, Mahjong house, etc.) in [home state/province/country]
- At a land-based gambling venue (casino, card room, Mahjong house, etc.) outside of [home state/province/country]. Specify jurisdictions_____
- At a bar/lounge/club/hotel in [home state/province/country]
- At a bar/lounge/club/hotel outside of [home state/province/country]. Specify jurisdictions_____
- At an online casino, online poker room, or other online site in [home state/province/country]. Specify device(s) used to access these online sites (i.e., computer, phone, television)_____
- At an online casino, online poker room, or other online site outside of [home state/province/country]. Specify jurisdictions and/or websites_____. Specify device(s) used to access these online sites (i.e., computer, phone, television)_____
- At a land-based underground/illegal casino, card room, or other venue in [home state/province/country]
- At a private residence or workplace
- On a ship in international waters

G4d. In the past 12 months, how many hours do you estimate you spent playing casino table games in a typical month? _____ (limit to numerals with a maximum value of 400)

G4e. In the past 12 months, how much money do you estimate you spent on casino table games in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking. _\$ _____ (limit to numerals)

G5a. In the past 12 months, how often would you say you have bet money or something of material value on **sports** either in person, or remotely via a computer or other device? Sports are defined as competitive human activities involving some degree of physical skill or coordination. It includes professional sporting events (e.g., soccer, football, horse racing, boxing, motor racing, golf, e-sports, etc.); fantasy sports; virtual sports; and sports that you participate in yourself (e.g., pool, bowling, darts).

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month
- Not at all (go to G6a)

G5b. What type of sports betting did you engage in? (check all that apply)

- Betting on professional football/soccer, basketball, baseball, American football, cricket, tennis, golf, rugby, boxing, mixed martial arts, motor racing, horse racing, ice hockey, e-sports (professional video game competitions) or any other professional sporting event (edit this list as appropriate for the jurisdiction and adjust the order so that the earliest items represent the most common sports that are wagered on). Which specific sports did you bet on? _____
- Sports pools/lotteries (i.e., betting on the outcomes of several different professional sporting matches)
- Fantasy Sports betting (exclude as an option if uncommon)
- Virtual Sports betting (i.e., betting on computer-generated sporting competitions) (exclude as an option if uncommon)
- Betting on sports that you participated in yourself (e.g., golf, pool, bowling, darts, foosball) (edit the list of examples as appropriate for the jurisdiction and age group)

G5c. Where did you bet on sports? (check all that apply) (edit this list as appropriate for the jurisdiction)

- At a legal land-based sports betting shop, racetrack, or bookmaker
- At an illegal/underground land-based sports betting shop or bookmaker
- At an online sports betting site or racebook in [home state/province/country]. Specify device(s) used to access these online sites (i.e., computer, phone, television) _____
- At an online sports betting site or racebook outside of [home state/province/country]. Specify jurisdictions and/or websites _____. Specify device(s) used to access these online sites (i.e., computer, phone, television) _____
- At a private residence, my place of work, or some other non-commercial location

G5d. In the past 12 months, how many hours do you estimate you spent on sports betting in a typical month? (this includes any time taken to do research and calculate odds)? _____ (limit to numerals with a maximum value of 400)

G5e. In the past 12 months, how much money do you estimate you spent on sports betting in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit to numerals)

G6a. In the past 12 months, how often would you say you have bet money or something of material value on **other types of gambling** that have not yet been mentioned? This includes keno, bingo, cock fights, dog racing, dog fights, non-casino card or dice games (e.g., rummy, backgammon), video games, board games, television events (e.g., reality show winners), political events, or anything else. (Edit and/or add to this list as appropriate for the jurisdiction and age group. This question is intended to capture uncommon types of gambling that have not yet been asked. If one of these activities is common within the jurisdiction or age group it could be asked as separate question).

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month
- Not at all (go to G7a)

G6b. What are these other types of gambling you bet money on? (check all that apply) (edit this list as appropriate for the jurisdiction and age group, and order from most to least common)

- Keno
- Bingo
- Cock fights
- Dog racing
- Dog fights
- Other animal contests
- Non-casino card games (e.g., rummy, euchre, [hanafuda](#) (hwatu))
- Non-casino dice games (e.g., backgammon, Yahtzee)
- Video games (i.e., other than electronic video gambling machines in casinos and e-sport competitions)
- Board games
- Televised entertainment events
- Political events
- Other _____ [specify] (record financial index wagering in G7)

G6c. Where did you make these bets? (check all that apply)

- At a land-based gambling venue (casino, bingo hall, racetrack) in [home state/province/country]
- At a land-based gambling venue (casino, bingo hall, racetrack) outside of [home state/province/country]. Specify jurisdictions _____
- At a bar/lounge/club/hotel in [home state/province/country]
- At a bar/lounge/club/hotel outside of [home state/province/country]. Specify jurisdictions _____
- At an online casino, bingo hall, sports betting site, or other online site in [home state/province/country]. Specify device(s) used to access these online sites (i.e., computer, phone, television) _____
- At an online casino, bingo hall, sports betting site, or other online site outside of [home state/province/country]. Specify jurisdictions and/or websites _____. Specify device(s) used to access these online sites (i.e., computer, phone, television) _____
- At a land-based underground/illegal venue in [home state/province/country]
- At my place of work, a private residence, or some other non-commercial location

G6d. In the past 12 months, how many hours do you estimate you spent on these other types of gambling in a typical month? _____ (limit to numerals with a maximum value of 400)

G6e. In the past 12 months, how much money do you estimate you spent on these other types of gambling in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit to numerals)

G7a. (Optional) In the past 12 months, how often would you say you have purchased or engaged in any **speculative financial market activities**? This refers to things such as day trading, purchase of penny stocks, shorting, purchase of options or futures, or placing a wager on the direction or future value of a financial index (e.g., composite index such as Dow Jones, currency value, commodity value)?

- 4 or more times a week
- 2-3 times a week
- Once a week
- 2-3 times a month
- Once a month
- Less than once a month
- Not at all (go to G8)

G7b. Which specific activities did you engage in? (check all that apply)

- Day trading
- Penny stocks
- Shorting stocks
- Options
- Futures
- Financial index betting. Specify whether fixed odds (binary options), spread betting, or both _____
- Other _____ [specify]

G7d. In the past 12 months, how many hours do you estimate you spent on speculative financial market activities in a typical month? (this includes time taken to do research and check prices) _____ (limit to numerals with a maximum value of 400)

G7e. In the past 12 months, how much money do you estimate you spent on these speculative financial market activities in in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit to numerals)

Go to next Section if there has been no participation in any type of gambling in the past 12 months.

G8. Has your frequency of gambling over the past 12 months been steady and regular or more variable and irregular?

- Very regular and steady
- Fairly regular and steady
- Fairly variable and irregular
- Very variable and irregular

GTYPES. Total number of different types of gambling engaged in within past 12 months.

GFREQ. Total frequency reported on all types of gambling in past 12 months.

GMAXFREQ. Maximum frequency reported on any type of gambling in past 12 months.

GTIME. Total time reported on all types of gambling in past 12 months.

G\$\$\$\$. Total net loss/win on all types of gambling in past 12 months.

G\$\$\$LOSS. All net wins in G\$\$\$ replaced with either zeros or missing values.

RESPONSIBLE GAMBLING (Optional)

RG1a. Have you been a member of the [name of the jurisdiction-specific Player Reward] Program in the past 12 months?

- No (go to RG2)
- Yes

RG1b. Do you use the responsible gambling features on your card (allowing you to put limits on your time and expenditure)?

- No
- Yes
- Not applicable

RG3. In the past 12 months how often have you accessed additional money from automatic teller machines or other cash machines when you go gambling?

- Never
- Occasionally
- Most times that I go

RG4. In the past 12 months how often have you borrowed money or played on credit when you gambled?

- Never
- Occasionally
- Most times that I go

GAMBLING ATTITUDES³⁶ (Optional)

For the following questions, when we refer to “gambling” we are referring to participation in the activities we just asked about: lottery and raffle tickets, instant lotteries, electronic gambling machines, casino table games, sports betting, betting on other games, bingo, keno, etc.

GA1. Which best describes your belief about the benefit or harm that gambling has for society?

- The harm far outweighs the benefits
- The harm somewhat outweighs the benefits
- The benefits are about equal to the harm
- The benefits somewhat outweigh the harm
- The benefits far outweigh the harm

³⁶ These questions comprise the ‘*Gambling Attitude Measure*’ (Williams, 2003). One month test-retest reliability for the composite score in adults is $r = .78$. The four questions that comprise the measure have relatively low internal consistency due to the small number of questions and the fact that each question addresses a somewhat different issue (which is why the instrument is described as a “measure” rather than a “scale”). The measure is face valid, as the four questions cover the four attitudinal areas that are of greatest policy relevance. Concurrent validity is established by its consistently positive relationship to gambling participation in 8 different studies with ~30,000 participants. The strength of this association is lower for money spent gambling compared to time spent gambling, frequency of gambling, and number of types of gambling engaged in. The overall magnitude of the correlations are moderate ($r = .25$ to $r = .50$), which is partly due to the fact that some of the people with the highest levels of involvement (problem gamblers), have very negative attitudes toward gambling. Predictive validity has been established by its significant and consistent positive correlation with future gambling involvement in all studies the present author has conducted (3 studies with ~6,500 participants). Normative data is not available, as attitudes toward gambling are very fluid and vary substantially as a function of jurisdiction and prior exposure to gambling.

GA2. Do you believe that gambling is morally wrong?

- No
- Yes
- Unsure/don't know

GA3. Which of the following best describes your opinion about legalized gambling?

- All types of gambling should be legal
- All types of gambling should be illegal
- Some types of gambling should be legal and some should be illegal. Specify ones that should be illegal _____

GA4. Which of the following best describes your opinion about gambling opportunities in your province/state/country?

- Gambling is too widely available
- The current availability of gambling is fine
- Gambling is not available enough

GAMBLING MOTIVATION³⁷ (Optional)

Do not ask GM1 to anyone who has not participated in any type of gambling in the past 12 months.

GM1. What would you say are the main reasons that you gamble? (check all that apply)

- Excitement/entertainment/fun
- To win money
- To develop my skills
- To compete or for the challenge
- To socialize
- To support worthy causes
- To escape, relax, or relieve stress
- It makes me feel good about myself
- Other _____ [specify]

GAMBLING CONTEXT (Optional)

The following questions are not asked of people who only purchase lottery or instant lottery tickets.

GC1. In the past 12 months have you typically gambled alone or with friends/family?

- Always alone
- Mostly alone
- Sometimes alone and sometimes with friends/family
- Occasionally alone but usually with friends/family
- Always with friends/family

GC2. In the past 12 months how often did you drink alcohol when you gambled?

- Always
- Often
- Sometimes
- Rarely
- Never

³⁷ This question was developed by the first author. The response option categories are based on extensive analysis of both open-ended and closed-ended responses given to this question in several different population surveys involving several thousand people.

GC3. In the past 12 months how often did you smoke or use tobacco when you gambled?

- Always
- Often
- Sometimes
- Rarely
- Never

GAMBLING SOCIAL EXPOSURE (Optional)

GE1a. How many of your close friends and family members are regular gamblers?

- None
- One
- A few of them
- Many of them
- All of them
- Unsure

GE1b. How many of your close friends and family members would you say have had gambling problems in the past 12 months? Someone is a 'problem gambler' if they have impaired control over their gambling that has caused a significant problem for them or someone in their immediate social network.

- None
- One
- A few of them
- Many of them
- All of them
- Unsure

GE2a. How many adults living in your household (not including yourself) would you say have had gambling problems in the past 12 months?

- 0 (go to GE3)
- 1
- 2
- 3
- 4
- 5 or more
- Unsure

GE2b. What is their relationship to you? (i.e., wife/husband, son/daughter, friend, parent, etc.)? _____

GE3. How available are opportunities to gamble at your workplace or school?

- Not available
- Available on occasion
- Readily available if you seek them out
- Readily available
- Unsure or not applicable

GE4. Have you been exposed to any problem gambling prevention or awareness campaigns at your workplace or school in the past 12 months?

- No
- Yes
- Unsure or not applicable

GAMBLING-RELATED HARM

Threshold to be asked questions about gambling-related harm

The threshold used to determine whether someone is asked questions about problem gambling and gambling-related harm significantly impacts the prevalence rate of harms and problem gambling (e.g., Stone et al., 2015; Williams & Volberg, 2010). Thresholds that are too low (e.g., any past year gambling) have been shown to produce too many false positives (i.e., people who are wrongly identified as problem gamblers and/or experiencing harms), whereas thresholds that are too high (gambling on a weekly basis or having to report a net gambling loss) exclude too many genuine problem gamblers (Williams & Volberg, 2010; Williams, Volberg, & Stevens, 2012). Research by Williams & Volberg (2010) and Williams, Volberg, & Stevens (2012) has established that **gambling at least once a month one or more on any type of gambling in the past 12 months** provides a good balance of minimizing both false positives and false negatives. That being said, there may be other time-related or expenditure-related thresholds that would work equally well or better.

Problem Gambling Instruments

There are several instruments with established reliability and validity for assessing problem gambling:

- *Problem Gambling Severity Index (PGSI)* (Ferris & Wynne, 2001)
- *Diagnostic and Statistical Manual of Mental Disorders criteria for Disordered Gambling (DSM-5)* (APA, 2013)
- *Problem and Pathological Gambling Measure (PPGM)* (Williams & Volberg, 2010, 2014)
- *South Oaks Gambling Screen - Revised (SOGS)* (Abbott & Volberg, 1992, 1996)
- *Victorian Gambling Screen (VGS)* (Ben-Tovim et al., 2001)

Gambling-Related Harm

Reports of problem gambling symptomatology below levels needed to identify someone as a problem gambler are sometimes used to assess the level of gambling-related harm in the general population (i.e., scores of 1-7 in the PGSI; DSM scores of 1-3; SOGS scores of 1-4). The limitation of this approach is that a) several items in these instruments do not necessarily entail 'harm' (i.e., preoccupation, tolerance, going back the next day, guilt, gambling more than intended); b) most problem gambling assessment instruments do not comprehensively assess the full range of harms that can occur; c) the harm questions in most of these instruments refer to problems experienced by the gambler rather than harms he/she may be also causing in his/her immediate social network. If a single instrument is being used to assess both problem gambling and gambling-related harm, then the *Problem and Pathological Gambling Measure* is best suited to this task, as the questions in the Problems Section of this instrument constitute a fairly comprehensive and unambiguous list of harms: financial problems, mental health problems, relationship problems, physical health problems, work/school problems, commission of illegal acts to support gambling. Furthermore, each of these questions ask about whether these problems have occurred for the gambler or someone close to him/her in his/her immediate social network. Alternatively, there have been instruments developed in recent years just to measure harm, independent of problem gambling (e.g., Browne et al., 2016; Langham et al., 2016) (with the taxonomy of harms in these latter instruments paralleling the list in the PPGM).

DEMOGRAPHICS

D1. Gender

- Male
- Female

D2. In what year were you born? _____

D3. What is your current marital status?

- Single (never married and not living in a common-law relationship)
- Married or living in a common-law relationship
- Separated, but still legally married
- Divorced
- Widowed

D4a. Do you have any children (biological, stepchildren, or adopted)?

- Yes
- No (go to D5)

D4b. How many? _____

D4c. How many currently live with you? _____

D5. How many adults currently live in your household? _____

D6. What is the highest level of education you have achieved?³⁸

- Primary level
- Some Secondary schooling
- Completion of Secondary school
- Some Vocational training
- Completion of Vocational training
- Some Post-Secondary schooling at college, university or other post-secondary institute
- A post-secondary certificate, diploma, or degree below a bachelor's degree
- Bachelor's degree or equivalent
- Professional degree (e.g., law, medicine) requiring additional education beyond standard bachelor degree
- Master's or doctorate degree

D7a. Which category best describes your current employment situation?

- Employed full-time
- Employed part-time (includes people who may also be retired, or a homemaker, or fulltime student)
- Sick leave, maternity leave, on strike, on disability
- Homemaker and not working for money (go to D8)
- Unemployed (go to D8)
- Full-time student and not working for money (go to D8)
- Retired and not working for money (go to D8)

D7b. What is your current occupation? _____

D8. What was your approximate *household income* last year (i.e., the combined salaries, wages, retirement income, support payments, and investment income of everyone in your household)? \$_____ (this can also be done with response options, as long as the middle option represents the median household income for the jurisdiction).

- Unsure
- Refused

D9a. What do you estimate your current household debt to be? This would include mortgages, credit cards, loans, car payments, etc.?

- No debt
- \$ _____
- Unsure
- Refused

Do not ask D9b of people who did not qualify for the GAMBLING-RELATED HARM SECTION and/or have no debt.

D9b. What percentage of this debt has resulted from gambling? _____%

- Unsure
- Refused

³⁸ Based on the [International Standard Classification of Education](#)

D10a. Were you born in [country]?

- Yes (go to D11)
- No

D10b. What country were you born in? _____

D11. What language is usually spoken at home? (list the most common languages for the jurisdiction)

D12. What are the main ethnic or cultural origins of your ancestors? (check as many as apply) (response options should be adapted for the local context)

- European
- South Asian (*i.e., Bangladesh, India, Pakistan, Sri Lanka*)
- East Asian (*i.e., Cambodia, China, Hong Kong, Indonesia, Japan, Korea, Laos, Malaysia, Philippines, Taiwan, Thailand, Vietnam*)
- Latin American (*i.e., Mexico, all Central American countries, all South American countries*)
- Middle Eastern
- African
- Indigenous
- Other _____ [specify]
- Unsure
- Refused

D13. What is your postal or zip code? _____

D14. What city or town do you live in? _____

APPENDIX B: National Adult Prevalence Studies of Gambling

AUSTRALIA	
Year Study Conducted	1999
Age	18+
Sources	Productivity Commission. (1999). <i>Australia's Gambling Industries. Report No. 10. Chapter 6. What is Problem Gambling? & Appendix F. National Gambling Survey.</i> Canberra: AusInfo.
Administration Method	telephone interview
Past Year Gambling Prevalence	82% (excluding raffles); 80% NSW; 81% Victoria; 86% Queensland; 77% South Australia; 84% Western Australia; 77% Tasmania; 80% ACT; 80% Northern Territory.
Participation in Individual Types Assessed?	Yes. Questions asked about past 12 month participation in: poker or gaming machines; horse or greyhound races; instant scratch tickets; lotto or any other lottery game; keno at club, hotel, casino or any other place; table games at casino; bingo at club or hall; betting on a sporting event; casino games on Internet; games like cards, mahjong privately for money at home or other place; raffle tickets.
Gambling Frequency Assessment	Yes. For each type asked to provide open-ended answer about number of times person engaged in it either per week, per month, or per year, in past 12 months.
Gambling Expenditure Assessment	Yes. For each type asked to provide open-ended answer about amount of money usually won per occasion (or day), amount of money usually lost per occasion (or day), and amount of money outlayed per occasion (or day).
Time Spent Gambling Assessment	Yes. For each type asked to provide open-ended answer about amount of time spent per occasion.
Comments	

BELGIUM	
Year Study Conducted	2006?
Age	16-99
Sources	<p>Druine, C., Delmarcelle, C., Dubois, M., Joris, L., & Somers, W. (2006). <i>Etude quantitative des habitudes de Jeux de hasard pour l'offre classique et un ligne en Belgique [Quantitative study on online and offline gambling behaviour in Belgium]</i>. Bruxelles: Foundation Rodin.</p> <p>Druine (2009). Belgium. In G. Meyer, T. Hayer, & M. Griffiths (Eds.), <i>Problem Gambling in Europe: Challenges, Prevention, and Interventions</i>. New York: Springer. doi: 10.1007/978-0-387-09486-1 (citing Druine et al., 2006).</p>
Administration Method	telephone interview
Past Year Gambling Prevalence	59.7%
Participation in Individual Types Assessed?	Yes. Past year participation in lotteries, scratch tickets, television phone-in quizzes, gambling machines, bingo machines, casino table games, sports betting through newspaper shops or betting offices, playing cards or dice for money, hippodrome (horse racing), Internet gambling.
Gambling Frequency Assessment	Yes. Never, occasionally, or regularly in past year.
Gambling Expenditure Assessment	Unknown.
Time Spent Gambling Assessment	No.
Comments	Another Belgium study (Minet et al., 2004) also assessed gambling venue location: gaming arcades; pubs offering a bingo machine; casinos; lotto centres; betting offices.

BRAZIL	
Year Study Conducted	2005-2006
Age	14+
Source(s)	Tavares, H., Carneiro, E., Sanches, M., Pinsky, I., Caetano, R., Zaleski, M., & Laranjeira, R. (2010). Gambling in Brazil: Lifetime prevalences and socio-demographic correlates. <i>Psychiatry Research, 180</i> (1), 35-41. doi: 10.1016/j.psychres.2010.04.014
Administration Method	face-to-face residential interview
Past Year Gambling Prevalence	(12% engage in monthly gambling)
Participation in Individual Types Assessed?	No.
Gambling Frequency Assessment	No.
Gambling Expenditure Assessment	Yes. "Average monthly expenditure" on all types of gambling combined. Answers categorized into one of 4 expenditure categories. No time frame provided.
Time Spent Gambling Assessment	No.
Comments	Lotteries, electronic gambling machines, and horse race betting are legally available in Brazil.

CANADA	
Year Study Conducted	2006-2007
Age	18+
Sources	<p>Williams, R.J. & Wood, R.J. (2008). <i>Prevalence of Gambling and Problem Gambling in Canada 2006/2007</i>. Unpublished analysis of prevalence data collected by the authors in 2006/2007.</p> <p>Some details of this study are reported in Wood, R.T. & Williams, R.J. (2009). <i>Internet Gambling: Prevalence, Patterns, Problems, and Policy Options</i>. Final Report prepared for the Ontario Problem Gambling Research Centre, Guelph, Ontario. January 5, 2009</p>
Administration Method	telephone interview
Past Year Gambling Prevalence	70.7% (includes risky stock market but excludes raffles). 75.4% Newfoundland; 72.2% PEI; 72.8% Nova Scotia; 68.9% New Brunswick; 71.7% Quebec; 70.4% Ontario; 71.0% Manitoba; 68.1% Saskatchewan; 70.3% Alberta; 69.7% British Columbia.
Participation in Individual Types Assessed?	Yes. Past 12 month participation in: Instant win tickets; lottery tickets; sports betting; horse or dog racing; bingo; games of skill for money against other people; slot machines, video lottery terminals, or other electronic gambling machines (e.g., electronic keno, electronic racing); table games (not poker); high risk stocks, options, and futures.
Gambling Frequency Assessment	Yes. In the past 12 months people asked to indicate whether they have gambled on that type: 4 or more times a week; 2-3 times a week; once a week; 2-3 times a month; once a month; less than once a month; not at all in past 12 months.
Gambling Expenditure Assessment	Yes. Opened ended question about spending in typical month in past 12 months.
Time Spent Gambling Assessment	Yes. Time spent per session for online Types (as online gambling was a focus of this study).
Comments	Modality assessed for each format (online versus land-based); specific online gambling site assessed; in versus out-of-province play assessed for EGMs and casino table games.

CYPRUS	
Year Study Conducted	2007
Age	18 – 65
Sources	Çakıcı, M. (2012) The prevalence and risk factors of gambling behavior in Turkish Republic of Northern Cyprus. <i>Anatolian Journal of Psychiatry</i> , 13(4), 243-249. http://www.scopemed.org/?mno=31832
Administration Method	Face-to-face residential interviews
Past Year Gambling Prevalence	55% in lifetime.
Participation in Individual Types Assessed?	Yes. Lifetime participation in national lottery, sports lotto, instant scratch games, bingo-lotto, horse racing, dog racing, casino games, card games at cafes, dice games, cockfighting, speculation, skill games (billiards, etc.), internet gambling
Gambling Frequency Assessment	Yes. Less than once a week or once a week or more. No time frame provided.
Gambling Expenditure Assessment	Yes.
Time Spent Gambling Assessment	No.
Comments	

DENMARK	
Year Study Conducted	2005
Age	18-74
Sources	Bonke, J., & Borregaard, K. (2006). Ludomani I Danmark: Udbredelsen af Pengespil og Problemspillere . Danish National Institute of Social Research.
Administration Method	Telephone interview. Face-to-face residential interview for people who could not be contacted by phone.
Past Year Gambling Prevalence	77%
Participation in Individual Types Assessed?	Yes. Lifetime, past year, and past month participation in: Lotto, scratch tickets, other lotteries, slot machines, poker gaming machines, sports betting, bingo, card games, roulette, dice games, betting with foreign bookmakers, internet gambling.
Gambling Frequency Assessment	Yes. Response options of every day, several times a week, several times a month, few time a month, not played during last month, not played during last year.
Gambling Expenditure Assessment	Yes. Open-ended question asking about amount spent on each type in past month.
Time Spent Gambling Assessment	No.
Comments	Location of slot machine play also assessed: tavern, snack bar, restaurant, casino, kiosk, gas station, video store, Banko Center, bowling center, illegal gambling club.

ESTONIA	
Year Study Conducted	2006
Age	15-74
Sources	Turu-uuringud. (2006). <i>Elanikkonna kokkupuude hasart- ja õnnemängudega (Gambling prevalence in Estonia)</i> . Tallinn: Turu-uuringud. Laansoo & Niit (2009). Estonia. In G. Meyer, T. Hayer, & M. Griffiths (Eds.), <i>Problem Gambling in Europe: Challenges, Prevention, and Interventions</i> . New York: Springer. doi: 10.1007/978-0-387-09486-1 .
Administration Method	self-administered
Past Year Gambling Prevalence	75% ("admitted to have played games of chance")
Participation in Individual Types Assessed?	Yes. Past year participation in: lotteries, slot machines, playing cards for money, sports betting, casino games, internet gambling, horse race gambling.
Gambling Frequency Assessment	Yes.
Gambling Expenditure Assessment	Yes. Amount spent per type per occasion.
Time Spent Gambling Assessment	No.
Comments	

FINLAND	
Year Study Conducted	2011 (Oct 3, 2011 – Jan 14, 2012)
Age	15 – 74
Sources	Turja, T., Halme, J., Mervola, M., Järvinen-Tassopoulos, J., Ronkainen, J-E. (2012). Suomalaisten Rahapelaaminen 2011 [Finnish Gambling 2011]. Helsinki: National Institute for Health and Welfare.
Administration Method	telephone interview
Past Year Gambling Prevalence	78%
Participation in Individual Types Assessed?	Yes. Past 12 month participation in: lotteries, daily lotteries, scratchcards, non-casino EGMs, casino EGMs, sports betting, casino table games, private card games, horse race betting, internet betting, online casino, online poker, casino gambling, non-domestic internet gambling.
Gambling Frequency Assessment	Yes. Response options provided for each type in past 12 months of daily or almost daily; several times a week; 3 time a week; 2-3 times a month; once a month; less than once a month.
Gambling Expenditure Assessment	Yes. Open-ended response to amount of money used to play each type in past 30 days and in past week.
Time Spent Gambling Assessment	Yes. Response options provided for each type in past 30 days: of less than 1 hour; 1-4 hours; 5-10 hours; more than 10 hours.
Comments	

FRANCE	
Year Study Conducted	October 2009 – July 2010
Age	18 – 75
Sources	Costes, J-M., Pousett, M., Eroukmanoff, V., le Nezet, O., Richard, J-B., Guignard, R., Beck, F., & Arwidson, P. (2011). Les Niveaux et Pratiques des Jeux de Hasard et D'argent en 2010 . French Monitoring Centre for Drugs and Drug Addiction and the National Institute for Prevention and Health Education. September 2011.
Administration Method	telephone interview
Past Year Gambling Prevalence	47.8%
Participation in Individual Types Assessed?	Yes. Past 12 month participation in: lotteries, scratch tickets, horse race betting, rapido, sports betting, poker, slot machines, table games, internet gambling.
Gambling Frequency Assessment	Yes. Past 12 month participation on each type being categorized into 52 times or more or less than 52 times.
Gambling Expenditure Assessment	Yes. Past 12 month expenditure on all types categorized into 4 groups: 1,500+ €; 1,000 – 1,499 €; 500 – 900 €; and < 500 €.
Time Spent Gambling Assessment	No.
Comments	

GERMANY	
Year Study Conducted	2013 (April – June)
Age	16-65
Sources	Bundeszentrale für gesundheitliche Aufklärung (BZgA) (2013). Glücksspielverhalten und Glücksspielsucht in Deutschland 2013 . Bundeszentrale für gesundheitliche Aufklärung (BZgA). April 2014.
Administration Method	telephone interviews
Past Year Gambling Prevalence	44.9%
Participation in Individual Types Assessed?	Yes. Past 12 month participation in 12 different types of lotteries (instant win tickets, bingo, and keno being listed as subtypes of lotteries); 4 different types of sports betting (horse race betting being a subtype); casino table games; casino EGMs; slot machines; private gambling.
Gambling Frequency Assessment	Yes. Past 12 month frequency for each type of gambling with response options of less than monthly, monthly, 2-3 times a month, once a week, several times a week.
Gambling Expenditure Assessment	Yes. Monthly expenditure for each type of gambling, with categories of less than 10 euros; 10 – 20 euros; 20 – 50 euros; 50 – 100 euros; 100+ euros.
Time Spent Gambling Assessment	No.
Comments	Gambling location also assessed. Gambling modality (internet, mobile phone, etc.) also assessed. Cash versus non-cash payment also assessed.

GREAT BRITAIN (England, Wales, Scotland)	
Year Study Conducted	2010
Age	16+
Source(s)	Wardle, H., Moody, A., Spence, S., Orford, J., Volberg, R., Jotangia, D., Griffiths, M., Hussey, D., & Dobbie, F. (2011). British Gambling Prevalence Survey 2010 . Prepared for The Gambling Commission. London: National Centre for Social Research.
Administration Method	computer-assisted self-interview + supplemental telephone interviews
Response Rate	47%
Past Year Gambling Prevalence	73%
Participation in Individual Types Assessed?	Yes. Past 12 month participation in: National lottery; charity or other lottery; bingo; football pools; horse racing; dog racing; sports betting; betting on other events; spread betting; virtual gaming machines in a bookmaker's (fixed odds betting terminals); fruit/slot machines; poker in pub/club; roulette, poker, cards or dice in a casino or online; online fruit/slot machines style games or online instant win games; private betting; other forms.
Gambling Frequency Assessment	Yes. Past 12 month frequency of gambling on each type with response options of everyday/almost every day; 4-5 days a week; 2-3 days a week; about once a week; 2-3 days a month; about once a month; 6-11 times a year; 1-5 times a year. For people who report gambling monthly or weekly they are then asked how many days per month or per week they participate.
Gambling Expenditure Assessment	Yes. For people who participate in a type once a month or more, they are asked how much money they usually spend per month with response options of £1-10; £11-30; £31-50; £51-100; £101-200; £201-500; £500 or more.
Time Spent Gambling Assessment	Yes. Usual length of time playing per session asked of certain types, with response options of less than 30 minutes per day; 30-59 minutes; 1-2 hours; 2-3 hours; 3-4 hours; 4-6 hours; 6-8 hours; 8+ hours.
Comments	Mode of access for certain forms also assessed (e.g., online, in-person, both). How bets were placed for certain forms also assessed (e.g., online with bookmaker, in person, on phone to bookmaker, online with betting exchange).

HONG KONG	
Year Study Conducted	2011 (mid July to early August)
Age	15-64
Sources	Hong Kong Polytechnic University (2012). <i>The Study on Hong Kong People's Participation in Gambling Activities</i> . Department of Applied Social Sciences. The Hong Kong Polytechnic University. Commissioned by the Secretary for Home Affairs, Government of Hong Kong Special Administrative Region. March 2012.
Administration Method	telephone interview
Past Year Gambling Prevalence	62.0%
Participation in Individual Types Assessed?	Yes. Past year participation in Mark Six lottery with the Jockey Club, illegal Mark Six, horse racing with the Jockey Club, illegal horse racing, football betting with the Jockey Club, illegal football betting, Macau casinos, Macau horse racing, Mahjong House, social gambling (playing mahjong or poker with friends or relatives), casino ships departing from Hong Kong, illegal/underground casinos, online casinos, overseas casinos, gambling in public places.
Gambling Frequency Assessment	No.
Gambling Expenditure Assessment	Yes. Average monthly spending on each type assessed with an open-ended question.
Time Spent Gambling Assessment	No.
Comments	

HUNGARY	
Year Study Conducted	2007
Age	18-64
Source(s)	Kun B., Balázs H., Arnold, P., Paksi, B., & Demetrovics, Z. (2012). Gambling in western and eastern Europe: The example of Hungary. <i>Journal of Gambling Studies</i> , 28 (1), 27-46. doi:10.1007/s10899-011-9242-4
Administration Method	face-to-face residential interview; self-administered SOGS
Past Year Gambling Prevalence	(65.3% Lifetime)
Participation in Individual Types Assessed?	Yes. Questions asked about participation in 11 types: Playing cards for money, horse/dog/animal betting, sports betting, dice games for money, casinos, number-draw games, scratch tickets, stock/commodities market, slot/gambling machines, internet casino, billiards/bowling/other games for money, any other gambling.
Gambling Frequency Assessment	Yes. Response option provided for each type: weekly but not in past year; weekly in past year; weekly in past month.
Gambling Expenditure Assessment	No.
Time Spent Gambling Assessment	No.
Comments	Gambling and problem gambling assessed in the context of a national study on addiction.

ICELAND	
Year Study Conducted	2007
Age	18-70
Source(s)	Ólason, D.T. (2009). <i>Gambling and Problem Gambling Studies among Nordic Adults: Are they Comparable?</i> Conference presentation @ 7th Nordic Conference, Helsinki, Finland, May, 2009.
Administration Method	telephone interview
Past Year Gambling Prevalence	69.4% (11.8% weekly)
Participation in Individual Types Assessed?	Yes. Lifetime and past year participation in: lotto, monthly lotteries, scratch tickets, EGMs, sports pools, sport betting, bingo, card games, games of skill, internet gambling, illegal casinos.
Gambling Frequency Assessment	Yes. For each type response categories of: less than monthly; at least monthly; weekly or more.
Gambling Expenditure Assessment	Yes. Spending on each type assessed.
Time Spent Gambling Assessment	Unknown.
Comments	

MACAU	
Year Study Conducted	2003
Age	15-64
Sources	Fong , D. K. C., & Orozio, B. (2005). Gambling participation and prevalence estimates for pathological gambling in a far east gambling city: Macau. <i>UNLV Gaming Research & Review Journal</i> , 9(2), 15-28.
Administration Method	telephone interview
Past Year Gambling Prevalence	67.9%
Participation in Individual Types Assessed?	Yes. Past year participation in Macao casinos, legal betting on soccer/basketball with Macauslot, legal betting on greyhound races, legal keno tickets, legal betting on horse racing with Macau Jockey Club, playing in an authorized Mahjong house, illegal Mark Six lottery tickets from the Hong Kong Jockey Club, illegal betting on Hong Kong horse racing, Macao horse races and soccer/basketball matches with illegal bookmakers, online casino gambling, social gambling with relatives and friends, casino ship.
Gambling Frequency Assessment	Yes. Number of times participating for each type was asked.
Gambling Expenditure Assessment	Yes. Monthly expenditure on each type.
Time Spent Gambling Assessment	No.
Comments	

NETHERLANDS	
Year Study Conducted	2011
Age	16+
Sources	Bieleman, B., Biesma, S., Kruize, A., Zimmerman, C., Boendermaker, M., Nijkamp, R., & Bak, T. (2011). <i>Gokken in kaart: Tweede meting aard en omvang kansspelen in Nederland.</i> Groningen-Rotterdam: WODC, ministerie van Veiligheid en Justitie. December 2001.
Administration Method	Predominantly telephone interview. However, respondents could also complete online or via paper & pencil and mail-in.
Past Year Gambling Prevalence	65.3%
Participation in Individual Types Assessed?	Yes. Past year participation in lotteries, scratch tickets, gaming machines, casino gambling, betting on horses, cards or dice for money, bingo, sports pools, illegal gambling, internet gambling, poker, other gambling.
Gambling Frequency Assessment	No.
Gambling Expenditure Assessment	No.
Time Spent Gambling Assessment	No.
Comments	Location of playing gaming machines, casino games and poker also assessed.

NEW ZEALAND	
Year Study Conducted	2012
Age	15+
Sources	Tu (2013). New Zealanders' Participation in Gambling . Wellington: Health Promotion Agency. December 2013.
Administration Method	Residential face-to-face
Past Year Gambling Prevalence	70.3%
Participation in Individual Types Assessed?	Yes. Past 12 month participation in horse or dog racing with NZ TAB; betting on any other sports with NZ TAB; instant Kiwi or scratch ticket; Lotto, Strike, Powerball, or Big Wednesday ticket; keno or Bullseye ticket; gaming machines or pokies at pub or club; gaming machines at casino; table games, such as card games or dice at casinos; housie or bingo; game for money on mobile phone; internet gambling (horse or dog race; sports betting; other event (raffle tickets, casino fundraising evening, sweepstakes with friends, bets with family or friends on card games); poker; casino games; bingo; skill games such as chess, scrabble etc.; overseas lottery; lotto or keno ticket; virtual race or sports event).
Gambling Frequency Assessment	Yes. Response options of almost every day; more than once a week; more than once a month; once a month; once every three months; less than once every three months; once a year; less than once a year.
Gambling Expenditure Assessment	No.
Time Spent Gambling Assessment	No.
Comments	Internet access assessed for relevant forms after person reported participating in that type.

NORTHERN IRELAND	
Year Study Conducted	2010
Age	16+
Sources	Department for Social Development [Northern Ireland]. (2010). <i>Northern Ireland Gambling Prevalence Survey 2010</i> . Belfast: Author
Administration Method	Face-to-face residential interview; although CPGI section completed privately.
Past Year Gambling Prevalence	75.3%
Participation in Individual Types Assessed?	Yes. Questions asked about past 12 month participation in: National lottery; scratch cards; raffles/ballots; football pools; bingo, fruit or slot machines; virtual gaming machines in a bookmaker's to bet on virtual roulette, keno, bingo etc.; table games (roulette, cards or dice) outside the home; online gambling (not including buying National Lottery tickets online); betting in a bookmakers (including by phone); betting at the race or dog track; private betting playing cards or games for money with friends/family/colleagues.
Gambling Frequency Assessment	Yes. For each type engaged in provided with response options asking about average frequency: every day or almost every day; 2-5 times a week; about once a week; 2-3 days a month; once a month; 6-11 times a year; 2-5 times a year; once a year; not in the last 12 months.
Gambling Expenditure Assessment	Yes. For each type engaged in provided with response options concerning spending in the past 7 days: less than £1; £1-5; £5.01 – 10; £10.10 – 20; £20.01 – 50; more than £50; nothing.
Time Spent Gambling Assessment	No.
Comments	Location of participation in past 7 days asked for each type as well. e.g., Lottery: at a shop, as part of a syndicate, on the internet, through a mobile phone, through interactive TV e.g., Scratchcards: at a shop; at a large supermarket; at a petrol station; on internet

NORWAY	
Year Study Conducted	2013
Age	16-74
Sources	Pallesen, S., Hanss, D., Mentzoni, R.A., Molde, H., & Morken, A.M. (2014). Omfang av penge – og Dataspillproblemer i Norge 2013 . Universitetet i Bergen.
Administration Method	Self-administered questionnaire
Past Year Gambling Prevalence	59.1%
Participation in Individual Types Assessed?	Yes. Past 12 month participation on scratch tickets; online scratch tickets; bingo in a bingo hall; electronic bingo machines; EGMs in a bingo hall (Belago); online bingo; slots in a store or other location; cash games on boats/ ferries between Norway and abroad; online poker; online slot machines or other casino games; horse race betting; sports betting and live odds with Norsk Tipping; sports betting and live odds with an agency other than Norsk Tipping; lotteries; private gambling; skill games with money (e.g., Candy Crush, king.com); other games.
Gambling Frequency Assessment	Only online gambling, with 4 response options.
Gambling Expenditure Assessment	Yes. Past 12 month total expenditure for each type with 5 response options: 1-1000 krona; 1001-5000 krona; 5001-10000 krona; 10001 – 25000 krona; more than 25000 krona.
Time Spent Gambling Assessment	No.
Comments	

SINGAPORE	
Year Study Conducted	2011 (May – August)
Age	18+
Sources	National Council on Problem Gambling (2012). <i>Report of Survey on Participation in Gambling Activities among Singapore Residents, 2011.</i> Singapore: Author. February 23, 2012.
Administration Method	face-to-face residential interview
Past Year Gambling Prevalence	47.0%
Participation in Individual Types Assessed?	Yes. Questions asked about past 12 month participation in: 4D (sports pool), toto (lottery), social gambling, Singapore sweep (sports pool), sports betting, jackpot machines in local clubs, jackpot machines in cruises/outside Singapore, table games in local casinos, table games in cruises/outside Singapore, horse betting, online gambling.
Gambling Frequency Assessment	Yes.
Gambling Expenditure Assessment	Yes. Aggregate spending on all types in the past 12 months.
Time Spent Gambling Assessment	No.
Comments	

SOUTH AFRICA	
Year Study Conducted	2008
Age	18+
Source(s)	<p>Ross, D., Barr, G., Collins, P., Dellis, A., Hofmeyr, A., Kincaid, H., Rousseau, J., Schuhr, A., Sharp, C., Visser, M., & Vuchinich, R. (2010). Summary of Basic Data on from the National Urban Prevalence Study of Gambling Behaviour. The Research Division of the National Responsible Gambling Programme.</p> <p>Collins, P. & Barr, G. (2009). Gambling and Problem Gambling in South Africa: A Comparative Report. A report prepared for the South African Responsible Gambling Foundation.</p>
Administration Method	face-to-face residential interview
Past Year Gambling Prevalence	52.1%
Participation in Individual Types Assessed?	Yes. Lucky draws excluding lottery; scratch cards; fafi/ichina; lottery/lotto; bingo; dice games for money; roulette; card games for money; slot machines; horse racing or other animal betting games; sport betting; electronic gaming machines/grandslots
Gambling Frequency Assessment	Yes. More than monthly, monthly, weekly, daily.
Gambling Expenditure Assessment	Yes. Ranking of different types of gambling for most money spent.
Time Spent Gambling Assessment	No.
Comments	Location also assessed: casinos; other legal; informal

SOUTH KOREA	
Year Study Conducted	2011
Age	19+
Sources	Williams, R.J., Lee, C-K., & Back, K-J. (2013). The Prevalence and Nature of Gambling and Problem Gambling in South Korea. <i>Social Psychiatry and Psychiatric Epidemiology</i> , 48 (5), 821-834.
Administration Method	telephone interview; self-administered online (Online Panel)
Past Year Gambling Prevalence	41.8%
Participation in Individual Types Assessed?	Yes. Past 12 month participation in flower cards or other types of social gambling (e.g., poker) for money between friends or family; lotteries or instant lotteries; horse, bicycle, or motor boat racing; sports toto/proto (online and non-online); casino gambling; specific casino games (baccarat, poker, blackjack, tai sai, sic bo, roulette, wheel of fortune, slot machines); Internet gambling (other than online toto).
Gambling Frequency Assessment	Yes. Past 12 month response options for each type: 4 or more times a week; 2-3 times a week; once a week; 2-3 times a month; once a month; less than once a month.
Gambling Expenditure Assessment	Yes. Open-ended question asking about typical month spending on each type in past 12 months.
Time Spent Gambling Assessment	No.
Comments	Specific casino patronage also assessed.

SWEDEN	
Year Study Conducted	2008-2009
Age	16-84
Sources	Swedish National Institute of Public Health. (2011). <i>Spel om pengar och spelproblem i Sverige 2008/2009, SWELOGS, Swedish Longitudinal Gambling Study. Report No. 3.</i>
Administration Method	telephone interview + mail (for individuals uncontactable by phone)
Past Year Gambling Prevalence	70%
Participation in Individual Types Assessed?	Yes. Past 12 month participation in lottery, number games at a betting shop or online (lotto, keno, joker), sports, horses, poker, casino games, gambling machines, tv-contests, bingo, and internet gambling.
Gambling Frequency Assessment	Yes. Response options of: not in past year, a few times past year, every month, every week.
Gambling Expenditure Assessment	Yes? amount spent gambling in typical month on each type?
Time Spent Gambling Assessment	Yes.
Comments	

SWITZERLAND	
Year Study Conducted	2006-2007
Age	14+
Sources	<p>Brodbeck, J., Durrenberger, S., & Znoj, H. (2007). <i>Grundlagenstudie Spielsucht: Prävalenzen, Nutzung der Glücksspielangebote und deren Einfluss auf die Diagnose des Pathologischen Spielens</i> [Baseline study: Prevalences and consumption of games of chance and their influence on the diagnosis of pathological gambling]. Bern: University of Bern.</p> <p>Hafeli, J. (2009). Switzerland. In G. Meyer, T. Hayer, & M. Griffiths (Eds.), <i>Problem Gambling in Europe: Challenges, Prevention, and Interventions</i> (pp. 317-326). New York: Springer. doi: 10.1007/978-0-387-09486-1 (citing Brodbeck et al., 2007).</p>
Administration Method	telephone interview
Past Year Gambling Prevalence	(34.4% participated in at least one game of chance during the month prior to the survey)
Participation in Individual Types Assessed?	Yes. Participation in lotteries, tv contests, casinos, electronic gambling machines, private jassen for money (card game), private poker for money, other private games for money, internet casinos, internet sports betting, other internet games, internet games without money.
Gambling Frequency Assessment	Yes. Response options for each type of: 1-3 times a month; 1-2 times a week; 3-6 times a week; daily.
Gambling Expenditure Assessment	Yes. Average monthly spending with response options of < 50 CHF; 50 – 200 CHF; 200-300 CHF; 300-500 CHF; 500-1000 CHF; > 1000 CHF.
Time Spent Gambling Assessment	No.
Comments	

UNITED STATES	
Year Study Conducted	2001-2003
Age	18+
Sources	Kessler, R.C., Hwang, I., LaBrie, R., Petukhova, M., Sampson, N.A., Winters, K.C., et al. (2008). DSM-IV pathological gambling in the National Comorbidity Survey Replication. <i>Psychological Medicine</i> , 38(9), 1351-1360. doi: 10.1017/S0033291708002900
Administration Method	face-to-face residential interview
Past Year Gambling Prevalence	(Lifetime =78.4%)
Participation in Individual Types Assessed?	Yes, participation assessed for 11 activities: bet on sports with friends, bet on sports with bookie, play cards, dice, chess or other game of mental skill for money, play game of physical skill for money, speculate on high risk stocks, play numbers/Lotto/video lottery games, instant scratch off tickets, gamble on the Internet, play video poker machines or other gambling machines, play slot machines/bingo/pulltabs, bet on horse/dog races or dog/cockfights, gamble at a casino.
Gambling Frequency Assessment	Respondents asked to estimate number of times in lifetime participated in each activity (never, 1-10, 11-100, 101-500, more than 500).
Gambling Expenditure Assessment	“Taking all your wins and losses over a full year together, what is the largest amount of money you ever lost in a single year?”
Time Spent Gambling Assessment	No.
Comments	

APPENDIX C: Online Panel Recruitment Email

Subject Line: Gambling Study

Introduction

Text: We at Leger are recruiting people to participate in a research study titled, “Development and Validation of a *Gambling Participation Instrument*”. This is a study designed by Dr. Robert Williams from the University of Lethbridge and Dr. Rachel Volberg of Gemini Research and is being funded by the Canadian Consortium for Gambling Research. The study will record people’s gambling behaviour for a 6 month period. The eventual purpose of this research is to develop a self-report measure of gambling participation. To be eligible for this study you need to a) participate in some form of gambling at least once a month or more (i.e., lottery tickets; scratchcards; bingo; horse racing; slot machines or video lottery terminals; poker; sports betting; etc.); and b) be available and willing to answers questions about your gambling behaviour every week for the next 6 months. Depending on how much or how little you gamble, these weekly diaries should take between 1 to 9 minutes each time.

- We do not wish you to alter your normal gambling for this study. It is quite acceptable (and expected) that some or even most days will not involve any gambling.
- Your participation in the study is voluntary. You can end your participation in the study at any time. If you choose to withdraw Leger will erase any data we have collected up to that point.
- As with previous Leger surveys, all information you provide is strictly confidential and no personally identifying information is provided to the research team of Dr. Williams or Dr. Volberg.
- The data you provide to us is encrypted and stored on a password-protected computer in a secure location at Leger. The only person having access to this is the Leger Project Manager for this study and Leger’s technical support person. Only the aggregated data (containing no personally identifying information) is provided to Dr. Williams & Dr. Volberg. This data is also encrypted.
- If you have any specific questions regarding the research, you can contact Dr. Robert Williams at Robert.williams@uleth.ca.
- IRB Services is an independent ethics committee that has reviewed and approved this research.
- If you are interested in seeing the Final Report for this study, it will be available online at the [Canadian Consortium for Gambling Research](#) website in 2015.

Agreement

- Each weekly diary will be worth \$1.00 or 2 air miles reward miles + 2 chances for the monthly draw (Click here for the contest rules).
- Missing 7 weekly diaries will result in termination.
- All rewards will be given at the very end of the study, including the rewards for the terminated participants (those who miss 7 weekly diaries).
- Respondent must answer 18 out of 24 weekly diaries to be eligible for the final survey which will last 20 minutes for an extra \$10.00 or 20 air miles reward miles + 20 chances for the monthly draw.
- Respondents who answer at least 21 out of 24 weekly diaries and complete the final survey will be rewarded an additional \$5.00 or 10 air miles reward miles + 20 chances for the monthly draw for their participation.
- If you are interested in participating in this study for the next 6 months please go to the next page. Otherwise, thank you for your consideration.

APPENDIX D: Weekly Diary

Emails sent out very early each Monday morning.

Email Subject Line: Gambling Study Week XX

Text: This is a reminder that you have until midnight tonight to fill out your weekly gambling diary for the Gambling Study you have agreed to participate in (provide a link to the original description of the study) (Note: The weekly diary is only available from 5am Monday to 5am Tuesday. Past diaries are never made available).

G1a. Have you purchased any **lottery or raffle tickets** (either in person, by phone, or online) in the past week, from Monday [month] [day] to Sunday [month] [day]? *This does not include instant lottery tickets (scratchcards).*

- No (0) (go to G2a)
- Yes (1)

G1b. Did you purchase these lottery or raffle tickets in person, by phone, or online?

- In person (1)
- Phone or online (2)
- Both (3)

G1c. How many days in the past week, Monday [month] [day] to Sunday [month] [day], did you purchase lottery or raffle tickets?

- Response options of 1,2,3,4,5,6,7 provided

G1e. How much money in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent on lottery and raffle tickets? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (limit responses to numbers between 0 – 5,000,000; allow decimals)

G2a. Have you purchased any **instant lottery tickets** (scratchcards, break-open tickets, pull-tabs, etc.) (either in person, by phone, or online) or played any instant lotteries/games in the past week, Monday [month] [day] to Sunday [month] [day]?

- No (0) (go to G3a)
- Yes (1)

G2b. Did you purchase these instant lottery tickets in person, by phone, or online?

- In person (1)
- Phone or online (2)
- Both (3)

G2c. How many days in the past week, Monday [month] [day] to Sunday [month] [day], did you purchase instant lottery tickets?

- Response options of 1,2,3,4,5,6,7 provided

G2e. How much money in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent on instant lottery tickets? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (limit responses to numbers between 0 – 5,000,000; allow decimals)

G3a. Have you spent money on any **slot machines or video lottery terminals** (either in person or online) in the past week, Monday [month] [day] to Sunday [month] [day]?

- No (0) (go to G4a)
- Yes (1)

G3b. Did you play these slot machines or video lottery terminals in person or online?

- In person (1)
- Online (2)
- Both (3)

G3c. How many days in the past week, Monday [month] [day] to Sunday [month] [day], did you play slot machines or video lottery terminals?

- Response options of 1,2,3,4,5,6,7 provided

G3d. How many hours in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent playing slot machines or video lottery terminals (this does not include the time taken to travel to the slot machines or video lottery terminals)? _____ (limit responses to numbers between 0 – 112; allow decimals, e.g. 0.5)

G3e. How much money in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent on slot machines or video lottery terminals? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking. _\$ _____ (limit responses to numbers between 0 – 5,000,000; allow decimals)

G4a. Have you bet money on any card game (e.g., blackjack, baccarat, poker), dice game (e.g., craps), tile game (e.g., mahjong), or other casino type **table game** (e.g., roulette) in the past week (either in person or online), Monday [month][day] to Sunday [month][day]?

- No (0) (go to G5a)
- Yes (1)

G4b. Did you play these casino table games in person or online?

- In person (1)
- Online (2)
- Both (3)

G4c. How many days in the past week, Monday [month] [day] to Sunday [month] [day], did you play table games?

- Response options of 1,2,3,4,5,6,7 provided

G4d. How many hours in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent playing table games? _____ (limit open-ended responses to a number between 0 – 112; allow decimals)

G4e. How much money do you estimate you spent in the past week, Monday [month] [day] to Sunday [month] [day], on casino table games? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking. _\$ _____ (limit responses to numbers between 0 – 5,000,000; allow decimals)

G5a. Have you **bet on sports** either in person, or remotely by phone, television, or online in the past week (either in person or online), Monday [month][day] to Sunday [month][day]? (this would include sports that you directly participate in)?

- No (0) (go to G6a)
- Yes (1)

G5b. Did you bet on sports in person or online?

- In person (1)
- Online (2)
- Both (3)

G5c. How many days in the past week, Monday [month] [day] to Sunday [month] [day], did you bet on sports?

- Response options of 1,2,3,4,5,6,7 provided

G5d. How many hours in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent betting on sports (include time calculating odds and handicapping)? _____ (limit open-ended responses to a number between 0 – 112; allow decimals)

G5e. How much money in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent on betting on sports? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000; allow decimals)

G6a. Have you bet money in the past week, Monday [month] [day] to Sunday [month] [day] on **horse racing or dog racing** (either in person, by phone, or online)?

- No (0) (go to G7a)
- Yes (1)

G6b. Did you bet on horse racing or dog racing in person or via a phone or online?

- In person (1)
- Phone or online (2)
- Both (3)

G6c. How many days in the past week, Monday [month] [day] to Sunday [month] [day], did you bet on horse or dog racing?

- Response options of 1,2,3,4,5,6,7 provided

G6d. How many hours in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent betting on horse or dog racing (does not include travel time, but does include time calculating odds and handicapping)? _____ (limit open-ended responses to a number between 0 – 112; allow decimals)

G6e. How much money in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent on betting on horse or dog racing? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000; allow decimals)

G7a. Have you played **bingo** for money (either in person or online) in the past week, Monday [month] [day] to Sunday [month] [day]?

- No (0) (go to G8a)
- Yes (1)

G7b. Did you play bingo in person (includes satellite bingo) or online?

- In person (1)
- Online (2)
- Both (3)

G7c. How many days in the past week, Monday [month] [day] to Sunday [month] [day], did you play bingo for money?

- Response options of 1,2,3,4,5,6,7 provided

G7d. How many hours in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent playing bingo (does not include travel time)? _____ (limit open-ended responses to a number between 0 – 112; allow decimals)

G7e. How much money in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent on playing bingo? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000; allow decimals)

G8a. Have you gambled or bet money on **other things** that have not yet been mentioned, such as keno, or betting on television events, political events, video games, board games (e.g., chess, backgammon), financial indices, cock fights, dog fights, or anything else in the past week, Monday [month] [day] to Sunday [month] [day]] (either in person or remotely via the phone or online)?

- No
- Yes

G8b. Did you play these other forms of gambling in person, by phone or online?

- In person (1)
- Phone or online (2)
- Both (3)

G8c. How many days in the past week, Monday [month] [day] to Sunday [month] [day], did you play these other forms of gambling?

- Response options of 1,2,3,4,5,6,7 provided

G8d. How much time in hours in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent on these other forms of gambling (does not include travel time, but does include time calculating odds and handicapping)? _____ (limit open-ended responses to a number between 0 – 112; allow decimals)

G8e. How much money in the past week, Monday [month] [day] to Sunday [month] [day], do you estimate you spent on betting on these other forms of gambling? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000; allow decimals)

Thank you, you have completed Week 1.

Please come back to fill Week 2, starting next Monday at 5:00 am.

APPENDIX E: Retrospective Questionnaires

Quantity-Frequency/Total Amount (QF/TA) Questionnaire

Email Subject Line: Gambling Study Week 24

Text: This is the final week of the Gambling Study. This week, instead of asking about your gambling in the past week, we are going to ask about the **past 6 months**. The main purpose of this Gambling Study is actually to assess how well people can accurately remember their past behaviour over long time periods. Your weekly diaries will be used as a measure of your actual gambling in the past 6 months. We are now going to ask you to estimate your overall past 6 months of gambling behaviour as compared to what you reported in your weekly diaries. We are also going to ask these questions in different ways to determine if there are certain ways that better correspond to your gambling behaviour in your weekly diaries. So, please do not try and access any records you may have of your gambling in the past 6 months as the purpose of this study is to evaluate your unaided memory of this behaviour. Please take as much time as needed to complete this questionnaire and try to answer the questions as accurately as you can.

G1a. Have you purchased any **lottery or raffle tickets** (either in person, by phone, or online) in the past 6 months, from [month] [day] to the present? *This does not include instant lottery tickets (scratchcards).*

- No (0) (go to G2a)
- Yes (1)

G1b. Did you purchase these lottery or raffle tickets in person, by phone, or online?

- In person (1)
- Phone or online (2)
- Both (3)

Counterbalance the 6 month and 3 month questions so that half the group always gets asked the 3 month first and half always gets asked the 6 month first.

G1c1. In the past 3 months, since [month] [day] to [one week prior to present date], how often would you say you have purchased lottery or raffle tickets?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G1c2. In the past 6 months, since [month] [day] to [one week prior to present date], how often would you say you have purchased lottery or raffle tickets?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G1c3. About how many days did you purchase lottery or raffle tickets in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Indicate a number between 1 and 28 _____ (limit responses to numbers between 1 – 28)

G1e1. In the past 3 months, since [month] [day] to [one week prior to present date], how much money do you estimate you spent on lottery and raffle tickets in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G1e2. In the past 6 months, since [month] [day] to the [one week prior to present date], how much money do you estimate you spent on lottery and raffle tickets in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G1e3. About how much have you spent on lottery and raffle tickets in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G2a. Have you purchased any **instant lottery tickets** (scratchcards, break-open tickets, pull-tabs, etc.) (either in person, by phone, or online) in the past 6 months, from [month] [day] to the present?

- No (0) (go to G3a)
- Yes (1)

G2b. Did you purchase these instant lottery tickets in person, by phone, or online?

- In person (1)
- Phone or online (2)
- Both (3)

G2c1. In the past 3 months, since [month] [day] to [one week prior to present date], how often would you say you have purchased instant lottery tickets?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G2c2. In the past 6 months, since [month] [day] to [one week prior to present date], how often would you say you have purchased instant lottery tickets?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G2c3. About how many days did you purchase instant lottery tickets in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Indicate a number between 1 and 28 _____ (limit responses to numbers between 1 – 28)

G2e1. In the past 3 months, since [month] [day] to [one week prior to present date], how much money do you estimate you spent on instant lottery tickets in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (limit responses to numbers between 0 – 5,000,000)

G2e2. In the past 6 months, since [month] [day] to the [one week prior to present date], how much money do you estimate you spent on instant lottery tickets in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (limit responses to numbers between 0 – 5,000,000)

G2e3. About how much have you spent on instant lottery tickets in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (limit responses to numbers between 0 – 5,000,000)

G3a. Have you spent money on any **slot machine or video lottery terminal** (either in person or online) in the past 6 months, from [month] [day] to the present?

- No (0) (go to G4a)
- Yes (1)

G3b. Did you play these slot machines or video lottery terminals in person or online?

- In person (1)
- Online (2)
- Both (3)

G3c1. In the past 3 months, since [month] [day] to [one week prior to present date], how often would you say you have played slot machines or video lottery terminals?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G3c2. In the past 6 months, since [month] [day] to [one week prior to present date], how often would you say you have played slot machines or video lottery terminals?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G3c3. About how many days did you play slot machines or video lottery terminals in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Indicate a number between 1 and 28_____ (limit responses to numbers between 1 – 28)

G3d1. In the past 3 months, since [month] [day] to [one week prior to present date], about how many hours did you spend playing slot machines or video lottery terminals in a typical month? (this does not include the time taken to travel to the slot machines or video lottery terminals) _____. (limit responses to numbers between 0 – 500; allow decimals)

G3d2. In the past 6 months, since [month] [day] to [one week prior to present date], about how many hours did you spend playing slot machines or video lottery terminals in a typical month? (this does not include the time taken to travel to the slot machines or video lottery terminals) _____. (limit responses to numbers between 0 – 500; allow decimals)

G3d3. In the past 6 months, how many hours do you estimate you spend playing slot machines or video lottery terminals *on days when you do play them*? (this does not include the time taken to travel to the slot machines or video lottery terminals) _____. (limit responses to numbers between 0 – 24; allow decimals)

G3d4. How many hours do you estimate have you spent playing slot machines or video lottery terminals in the past 4 weeks, since [month] [day] to [one week prior to present date]? (this does not include the time taken to travel to the slot machines or video lottery terminals) _____. (limit responses to numbers between 0 – 500; allow decimals)

G3e1. In the past 3 months, since [month] [day] to [one week prior to present date], how much money do you estimate you spent on slot machines and video lottery terminals in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$ _____. (limit responses to numbers between 0 – 5,000,000)

G3e2. In the past 6 months, since [month] [day] to [one week prior to present date], how much money do you estimate you spent on slot machines and video lottery terminals in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$ _____. (limit responses to numbers between 0 – 5,000,000)

G3e3. About how much have you spent on slot machines and video lottery terminals in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Do not include money you spent on transportation, food, drinks, or parking _\$ _____. (limit responses to numbers between 0 – 5,000,000)

G4a. Have you bet money on any card game (e.g., blackjack, baccarat, poker), dice game (e.g., craps), tile game (e.g., mahjong), or other casino type **table game** (e.g., roulette) either in person or online in the past 6 months, since last [month]?

- .No (0) (go to G5a)
- Yes (1)

G4b. Did you play these tables games in person or online?

- In person (1)
- Online (2)
- Both (3)

G4c1. In the past 3 months, since [month] [day] to [one week prior to present date], how often would you say you have played table games?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G4c2. In the past 6 months, since [month] [day] to [one week prior to present date], how often would you say you have played table games?

- 4 or more times a week (6)

- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G4c3. About how many days did you play table games in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Indicate a number between 1 and 28 _____. (limit responses to numbers between 1 – 28)

G4d1. In the past 3 months, since [month] [day] to [one week prior to present date], about how many hours did you spend playing table games in a typical month? _____. (limit responses to numbers between 0 – 500; allow decimals)

G4d2. In the past 6 months, since [month] [day] to [one week prior to present date], about how many hours did you spend playing table games in a typical month? _____. (limit responses to numbers between 0 – 500; allow decimals)

G4d3. In the past 6 months, how many hours do you estimate you spend playing table games *on days when you do play them*? _____ (limit responses to numbers between 0 – 24; allow decimals)

G4d4. How many hours do you estimate have you spent playing table games in the past 4 weeks, since [month] [day] to [one week prior to present date]? _____ (limit responses to numbers between 0 – 500; allow decimals)

G4e1. In the past 3 months, since [month] [day] to [one week prior to present date], how much money do you estimate you spent on table games in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G4e2. In the past 6 months, since [month] [day] to the [one week prior to present date], how much money do you estimate you spent on table games in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G4e3. About how much have you spent on table games in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Do not include money you spent on transportation, food, drinks, or parking _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G5a. Have you bet on **sports** either in person, or remotely by phone, television, or online in the past 6 months, since last [month] (this would include sports that you directly participate in)?

- No (0) (go to G6a)
- Yes (1)

G5b. Did you bet money on sports in person or online?

- In person (1)
- Online (2)
- Both (3)

G5c1. In the past 3 months, since [month] [day] to [one week prior to present date], how often would you say you have bet money on sports?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G5c2. In the past 6 months, since [month] [day] to [one week prior to present date], how often would you say you have bet money on sports?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G5c3. About how many days did you bet money on sports in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Indicate a number between 1 and 28 _____. (limit responses to numbers between 1 – 28)

G5d1. In the past 3 months, since [month] [day] to [one week prior to present date], about how many hours did you spend betting money on sports in a typical month? (includes time taken to calculate odds and handicapping) _____. (limit responses to numbers between 0 – 500; allow decimals).

G5d2. In the past 6 months, since [month] [day] to [one week prior to present date], about how many hours did you spend betting money on sports in a typical month? (includes time taken to calculate odds and handicapping) _____. (limit responses to numbers between 0 – 500; allow decimals)

G5d3. In the past 6 months, how many hours do you estimate you spend betting money on sports on days when you did bet on sports? (includes time taken to calculate odds and handicapping) _____ (limit responses to numbers between 0 – 24; allow decimals)

G5d4. How many hours do you estimate have you spent betting money on sports in the past 4 weeks, since [month] [day] to [one week prior to present date]? (includes time taken to calculate odds and handicapping) _____ (limit responses to numbers between 0 – 500; allow decimals)

G5e1. In the past 3 months, since [month] [day] to [one week prior to present date], how much money do you estimate you spend betting money on sports in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G5e2. In the past 6 months, since [month] [day] to the [one week prior to present date], how much money do you estimate you spend betting money on sports in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G5e3. About how much have you spent betting money on sports in the previous 4 weeks, since [month] [day] to [one week prior to present date]? _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G6a. Have you bet money in the past 6 months, from [month] [day] to the present on horse racing or dog racing (either in person, by phone, or online)?

- No (0) (go to G7a)
- Yes (1)

G6b. Did you bet on horse racing or dog racing in person or remotely via a phone or online?

- In person (1)
- Phone or online (2)
- Both (3)

G6c1. In the past 3 months, since [month] [day] to [one week prior to present date], how often would you say you have bet money on horse racing or dog racing?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G6c2. In the past 6 months, since [month] [day] to [one week prior to present date], how often would you say you have bet money on horse racing or dog racing?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G6c3. About how many days did you bet money on horse racing or dog racing in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Indicate a number between 1 and 28 _____ (limit responses to numbers between 1 – 28)

G6d1. In the past 3 months, since [month] [day] to [one week prior to present date], about how many hours did you spend betting money on horse racing or dog racing in a typical month? Does not include travel time, but does include time calculating odds and handicapping). _____. (limit responses to numbers between 0 – 500; allow decimals).

G6d2. In the past 6 months, since [month] [day] to [one week prior to present date], about how many hours did you spend betting on money horse racing or dog racing in a typical month? Does not include travel time, but does include time calculating odds and handicapping). _____. (limit responses to numbers between 0 – 500; allow decimals).

G6d3. In the past 6 months, how many hours do you estimate you spend betting money on horse racing or dog racing on days when you did bet on horse racing or dog racing? (Does not include travel time, but does include time calculating odds and handicapping) _____. (limit responses to numbers between 0 – 24; allow decimals)

G6d4. How many hours do you estimate have you spent betting money on horse racing or dog racing in the past 4 weeks, since [month] [day] to [one week prior to present date]? (Does not include travel time, but does include time calculating odds and handicapping) _____ (limit responses to numbers between 0 – 500; allow decimals)

G6e1. In the past 3 months, since [month] [day] to [one week prior to present date], how much money do you estimate you spend betting money on horse racing or dog racing in a typical month? Spend means how much you

are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (limit responses to numbers between 0 – 5,000,000)

G6e2. In the past 6 months, since [month] [day] to the [one week prior to present date], how much money do you estimate you spend betting money on horse racing or dog racing in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (limit responses to numbers between 0 – 5,000,000)

G6e3. About how much have you spent betting money horse racing or dog racing in the previous 4 weeks, since [month] [day] to [one week prior to present date]? _\$_____ (limit responses to numbers between 0 – 5,000,000)

G7a. Have you played bingo for money (either in person or online) in the past 6 months, from [month] [day] to the present?

- No (0)
- Yes (1)

G7b. Did you play bingo in person (includes satellite bingo) or online?

- In person (1)
- Online (2)
- Both (3)

G7c1. In the past 3 months, since [month] [day] to [one week prior to present date], how often would you say you have played bingo?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G7c2. In the past 6 months, since [month] [day] to [one week prior to present date], how often would you say you have played bingo?

- 4 or more times a week (6)
- 2-3 times a week (5)
- Once a week (4)
- 2-3 times a month (3)
- Once a month (2)
- Less than once a month (1)

G7c3. About how many days did you play bingo in the previous 4 weeks, since [month] [day] to [one week prior to present date]? Indicate a number between 1 and 28_____ (limit responses to numbers between 1 – 28)

G7d1. In the past 3 months, since [month] [day] to [one week prior to present date], about how many hours did you spend playing bingo in a typical month? _____. (limit responses to numbers between 0 – 500; allow decimals).

G7d2. In the past 6 months, since [month] [day] to [one week prior to present date], about how many hours did you spend playing bingo in a typical month? _____. (limit responses to numbers between 0 – 500; allow decimals).

G7d3. In the past 6 months, how many hours do you estimate you spend playing bingo on days when you did play bingo? (limit responses to numbers between 0 – 24; allow decimals)

G7d4. How many hours do you estimate have you spent playing bingo in the past 4 weeks, since [month] [day] to [one week prior to present date]? _____ (limit responses to numbers between 0 – 500; allow decimals)

G7e1. In the past 3 months, since [month] [day] to [one week prior to present date], how much money do you estimate you spend playing bingo in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G7e2. In the past 6 months, since [month] [day] to the [one week prior to present date], how much money do you estimate you spend playing bingo in a typical month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$ _____ (limit responses to numbers between 0 – 5,000,000)

G7e3. About how much have you spent playing bingo in the previous 4 weeks, since [month] [day] to [one week prior to present date]? _\$ _____ (limit responses to numbers between 0 – 5,000,000)

Please answer each of the following questions in this section, even if none apply to you

GP1. **CPGI1**. Thinking about the past 12 months, have you bet more than you could really afford to lose? Would you say:

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP2. **CPGI2**. Thinking about the past 12 months, have you felt guilty about the way you gamble or what happens when you gamble? Would you say:

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP3. **CPGI3/PPGM14**. In the past 12 months, have you needed to gamble with larger amounts of money to get the same feeling of excitement? Would you say:

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP4. **CPGI4/PPGM8b**. In the past 12 months, when you gambled, did you go back another day to try to win back the money you lost? Would you say

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)

- refused (9999)

GP5. **CPGI5/PPGM1a**. In the past 12 months, have you borrowed money or sold anything to get money to gamble? Would you say

- never (0) (go to GP6a)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP6. **CPGI6/PPGM1b**. In the past 12 months, has your gambling caused any financial problems for you or your household? Would you say:

- never (0) (go to GP7a)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP7. **CPGI7/PPGM4**. In the past 12 months, has your gambling caused you any health problems, including stress or anxiety? Would you say:

- never (0) (go to GP8)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP8. **CPGI8/PPGM7**. In the past 12 months, have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? Would you say:

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP9. **CPGI9**. In the past 12 months, have you felt that you might have a problem with gambling? Would you say

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP10. **PPGM2**. Has your involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months?

- no (0) (go to GP11a)
- yes (1)
- Unsure (8888)
- refused (9999)

GP11. **PPGM3a**. Has your involvement in gambling caused significant problems in your relationship with your spouse/partner or important friends or family in the past 12 months?

- no (0) (go to GP12a)
- yes (1)
- Unsure (8888)
- refused (9999)

GP12. **PPGM3b**. Has your involvement in gambling caused you to repeatedly neglect your children or family in the past 12 months?

- no (0) (go to GP13a)
- yes (1)
- Unsure (8888)
- refused (9999)

GP13. **PPGM5**. Has your involvement in gambling caused significant work or school problems for you or someone close to you in the past 12 months or caused you to miss a significant amount of time off work or school?

- no (0) (go to GP14a)
- yes (1)
- Unsure (8888)
- refused (9999)

GP14. **PPGM6**. Has your involvement in gambling caused you or someone close to you to write bad cheques, take money that didn't belong to you or commit other illegal acts to support your gambling in the past 12 months?

- no (0) (go to GP15)
- yes (1)
- Unsure (8888)
- refused (9999)

GP15. **PPGM8**. Have you often gambled longer, with more money or more frequently than you intended to in the past 12 months?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

GP16a. **PPGM10a**. In the past 12 months, have you made attempts to either cut down, control or stop gambling?

- no (0) (go to GP17b)
- yes (1)
- Unsure (8888)
- refused (9999)

GP16b. **PPGM10b**. Were you successful in these attempts?

- no (1)
- yes (0)
- Unsure (8888)
- refused (9999)

GP17a. **PPGM13a**. In the past 12 months, when you did try cutting down or stopping did you find you were very restless or irritable?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

GP17b. **PPGM13b**. In the past 12 months, have you had strong cravings for gambling?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

GP18. **PPGM12**. In the past 12 months, would you say you have been preoccupied with gambling?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

GP19. **PPGM11** In the past 12 months, is there anyone else who would say that you were either preoccupied with gambling; or had a loss of control; or had withdrawal symptoms; or that you needed to gamble with larger amounts of money to achieve the same excitement?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

Thank you for your time. It is very much appreciated. This is the end of the questionnaire!!

Graduated-Frequency (GF) Questionnaire

Email Subject Line: Gambling Study Week 24

Text: This is the final week of the Gambling Study. This week, instead of asking about your gambling in the past week, we are going to ask about the **past 6 months**. The main purpose of this Gambling Study is actually to assess how well people can accurately remember their past behaviour over long time periods. Your weekly diaries will be used as a measure of your actual gambling in the past 6 months. We are now going to ask you to estimate your overall past 6 months of gambling behaviour as compared to what you reported in your weekly diaries. We are also going to ask these questions in different ways to determine if there are certain ways that better correspond to your gambling behaviour recorded in your weekly diaries. So, please do not try and access any records you may have of your gambling in the past 6 months as the purpose of this study is to evaluate your unaided memory of this behaviour. Please take as much time as needed to complete this questionnaire and try to answer the questions as accurately as you can.

G1a. Have you purchased any **lottery or raffle tickets** (either in person, by phone, or online) in the past 6 months, from [month] [day] to the present? *This does not include instant lotteries (scratchcards).*

- No (0) (go to G2a)
- Yes (1)

G1b. Did you purchase these lottery or raffle tickets in person, by phone, or online?

- In person (1)
- Phone or online (2)
- Both (3)

Counterbalance the 6 month and 3 month questions so that half the group always gets asked the 3 month first and half always gets asked the 6 month version first.

GG1c1. In the past **3 months**, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you purchased lottery or raffle tickets? ____ (allow numbers between 0 – 30)

GG1c2. How many months in the past 3 would you have purchased lottery or raffle tickets [range 1] days?

- Response options of 1, 2, 3

GG1c3. How many months in the past 3 would you have purchased lottery or raffle tickets [range 2] days?

- Response options of 1, 2, 3

GG1c4. How many months in the past 3 would you have purchased lottery or raffle tickets [range 3] days?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

Max days	Range 1	Range 2	Range 3	Max days	Range 1	Range 2	Range 3
30	16-30	1-15	0	15	8-15	1-7	0
29	15-29	1-14	0	14	8-14	1-7	0
28	15-28	1-14	0	13	7-13	1-6	0
27	14-27	1-13	0	12	7-12	1-6	0
26	14-26	1-13	0	11	6-11	1-5	0
25	13-25	1-12	0	10	6-10	1-5	0
24	13-24	1-12	0	9	5-9	1-4	0
23	12-23	1-11	0	8	5-8	1-4	0
22	12-22	1-11	0	7	4-7	1-3	0
21	11-21	1-10	0	6	4-6	1-3	0
20	11-20	1-10	0	5	3-5	1-2	0
19	10-19	1-9	0	4	1-4	0	
18	10-18	1-9	0	3	1-3	0	

17	9-17	1-8	0	2	1-2	0	
16	9-16	1-8	0	1	1	0	

GG1c5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you purchased lottery or raffle tickets (1-30)? ____ (allow numbers between 1 – 30)

GG1c6. How many months in the past 6 would you have purchased lottery or raffle tickets [range 1] days?

- Response options of 1, 2, 3, 4, 5, 6

GG1c7. How many months in the past 6 would you have purchased lottery or raffle tickets [range 2] days?

- Response options of 1, 2, 3, 4, 5, 6

GG1c8. How many months in the past 6 would you have purchased lottery or raffle tickets [range 3] days?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG1e1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on lottery and raffle tickets in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$____ (allow numbers only)

GG1e2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] on lottery and raffle tickets? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3

GG1e3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] on lottery and raffle tickets?

- Response options of 1, 2, 3

GG1e4. How many months in the past 3 would you have spent nothing on lottery and raffle tickets?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG1e5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on lottery and raffle tickets in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$____ (allow numbers only)

GG1e6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] on lottery and raffle tickets? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3, 4, 5, 6

GG1e7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] on lottery and raffle tickets?

- Response options of 1, 2, 3, 4, 5, 6

GG1e8. How many months in the past 6 would you have spent nothing on lottery and raffle tickets?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

G2a. Have you purchased any **instant lottery tickets** (scratchcards, break-open tickets, pull-tabs, etc.) (either in person, by phone, or online) in the past 6 months, from [month] [day] to the present?

- No (0) (go to G3a)
- Yes (1)

G2b. Did you purchase these instant lottery tickets in person, by phone, or online?

- In person (1)
- Phone or online (2)
- Both (3)

Counterbalance the 6 month and 3 month questions so that half the group always gets asked the 3 month first and half always gets asked the 6 month version first.

GG2c1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you purchased instant lottery tickets? ____ (allow numbers between 0 – 30)

GG2c2. How many months in the past 3 would you have purchased instant lottery tickets [range 1] days?

- Response options of 1, 2, 3

GG2c3. How many months in the past 3 would you have purchased instant lottery tickets [range 2] days?

- Response options of 1, 2, 3

GG2c4. How many months in the past 3 would you have purchased instant lottery tickets [range 3] days?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

Max days	Range 1	Range 2	Range 3	Max days	Range 1	Range 2	Range 3
30	16-30	1-15	0	15	8-15	1-7	0
29	15-29	1-14	0	14	8-14	1-7	0
28	15-28	1-14	0	13	7-13	1-6	0
27	14-27	1-13	0	12	7-12	1-6	0
26	14-26	1-13	0	11	6-11	1-5	0
25	13-25	1-12	0	10	6-10	1-5	0
24	13-24	1-12	0	9	5-9	1-4	0
23	12-23	1-11	0	8	5-8	1-4	0
22	12-22	1-11	0	7	4-7	1-3	0
21	11-21	1-10	0	6	4-6	1-3	0
20	11-20	1-10	0	5	3-5	1-2	0
19	10-19	1-9	0	4	1-4	0	
18	10-18	1-9	0	3	1-3	0	
17	9-17	1-8	0	2	1-2	0	
16	9-16	1-8	0	1	1	0	

GG2c5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you purchased instant lottery tickets? ____ (allow numbers between 0 – 30)

GG2c6. How many months in the past 6 would you have purchased instant lottery tickets [range 1] days?

- Response options of 1, 2, 3, 4, 5, 6

GG2c7. How many months in the past 6 would you have purchased instant lottery tickets [range 2] days?

- Response options of 1, 2, 3, 4, 5, 6

GG2c8. How many months in the past 6 would you have purchased instant lottery tickets [range 3] days?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG2e1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on instant lottery tickets in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number)._\$ ____ (allow numbers only)

GG2e2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] on instant lottery tickets? **if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)**

- Response options of 1, 2, 3

GG2e3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] on instant lottery tickets?

- Response options of 1, 2, 3

GG2e4. How many months in the past 3 would you have spent nothing on instant lottery tickets?

- Response options of 1, 2, 3 **(if total does not add up to 3, point this out and allow person to change answers)**

GG2e5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on instant lottery tickets in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _____ **(allow numbers only)**

GG2e6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] on instant lottery tickets? **if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)**

- Response options of 1, 2, 3, 4, 5, 6

GG2e7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] on instant lottery tickets?

- Response options of 1, 2, 3, 4, 5, 6

GG2e8. How many months in the past 6 would you have spent nothing on instant lottery tickets?

- Response options of 1, 2, 3, 4, 5, 6 **(if total does not add up to 6, point this out and allow person to change answers)**

G3a. Have you spent money on any **slot machine or video lottery terminal** (either in person or online) in the past 6 months, from [month] [day] to the present?

- No (0) **(go to G4a)**
- Yes (1)

G3b. Did you play these slot machines or video lottery terminals in person or online?

- In person (1)
- Online (2)
- Both (3)

Counterbalance the 6 month and 3 month questions so that half the group always gets asked the 3 month first and half always gets asked the 6 month version first.

GG3c1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you played slot machines or video lottery terminals? _____ **(allow numbers between 0 – 30)**

GG3c2. How many months in the past 3 would you have played slot machines or video lottery terminals [range 1] days?

- Response options of 1, 2, 3

GG3c3. How many months in the past 3 would you have played slot machines or video lottery terminals [range 2] days?

- Response options of 1, 2, 3

GG3c4. How many months in the past 3 would you have played slot machines or video lottery terminals [range 3] days?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

Max days	Range 1	Range 2	Range 3	Max days	Range 1	Range 2	Range 3
30	16-30	1-15	0	15	8-15	1-7	0
29	15-29	1-14	0	14	8-14	1-7	0
28	15-28	1-14	0	13	7-13	1-6	0
27	14-27	1-13	0	12	7-12	1-6	0
26	14-26	1-13	0	11	6-11	1-5	0
25	13-25	1-12	0	10	6-10	1-5	0
24	13-24	1-12	0	9	5-9	1-4	0
23	12-23	1-11	0	8	5-8	1-4	0
22	12-22	1-11	0	7	4-7	1-3	0
21	11-21	1-10	0	6	4-6	1-3	0
20	11-20	1-10	0	5	3-5	1-2	0
19	10-19	1-9	0	4	1-4	0	
18	10-18	1-9	0	3	1-3	0	
17	9-17	1-8	0	2	1-2	0	
16	9-16	1-8	0	1	1	0	

GG3c5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you played slot machines or video lottery terminals? ____ (allow numbers between 0 – 30)

GG3c6. How many months in the past 6 would you have played slot machines or video lottery terminals [range 1] days?

- Response options of 1, 2, 3, 4, 5, 6

GG3c7. How many months in the past 6 would you have played slot machines or video lottery terminals [range 2] days?

- Response options of 1, 2, 3, 4, 5, 6

GG3c8. How many months in the past 6 would you have played slot machines or video lottery terminals [range 3] days?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG3d1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent on slot machines or video lottery terminals in a month? Do not include time spent on transportation ____ (allow numbers only)

GG3d2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] hours on slot machines or video lottery terminals?

- Response options of 1, 2, 3

GG3d3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] hours on slot machines or video lottery terminals?

- Response options of 1, 2, 3

GG3d4. How many months in the past 3 would you have spent no time on slot machines or video lottery terminals?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG3d5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent on slot machines or video lottery terminals in a month? Do not include time spent on transportation _____ (allow numbers only)

GG3d6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] hours on slot machines or video lottery terminals?

- Response options of 1, 2, 3, 4, 5, 6

GG3d7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] hours on slot machines or video lottery terminals?

- Response options of 1, 2, 3, 4, 5, 6

GG3d8. How many months in the past 6 would you have spent no time on slot machines or video lottery terminals?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG3e1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on slot machines or video lottery terminals in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$_____ (allow numbers only)

GG3e2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] on slot machines or video lottery terminals? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3

GG3e3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] on slot machines or video lottery terminals?

- Response options of 1, 2, 3

GG3e4. How many months in the past 3 would you have spent nothing on slot machines or video lottery terminals?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG3e5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on slot machines or video lottery terminals in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (allow numbers only)

GG3e6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] on slot machines or video lottery terminals? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3, 4, 5, 6

GG3e7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] on slot machines or video lottery terminals?

- Response options of 1, 2, 3, 4, 5, 6

GG3e8. How many months in the past 6 would you have spent nothing on slot machines or video lottery terminals?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

G4a. Have you bet money on any card game (e.g., blackjack, baccarat, poker), dice game (e.g., craps), tile game (e.g., mahjong), or other casino type **table game** (e.g., roulette) either in person or online in the past 6 months, since last [month]?

- No (0) (go to G5a)
- Yes (1)

G4b. Did you play these tables games in person or online?

- In person (1)
- Online (2)
- Both (3)

Counterbalance the 6 month and 3 month questions so that half the group always gets asked the 3 month first and half always gets asked the 6 month version first.

GG4c1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you played table games? ____ (allow numbers between 0 – 30)

GG4c2. How many months in the past 3 would you have played table games [range 1] days?

- Response options of 1, 2, 3

GG4c3. How many months in the past 3 would you have played table games [range 2] days?

- Response options of 1, 2, 3

GG4c4. How many months in the past 3 would you have played table games [range 3] days?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

Max days	Range 1	Range 2	Range 3	Max days	Range 1	Range 2	Range 3
30	16-30	1-15	0	15	8-15	1-7	0
29	15-29	1-14	0	14	8-14	1-7	0
28	15-28	1-14	0	13	7-13	1-6	0
27	14-27	1-13	0	12	7-12	1-6	0
26	14-26	1-13	0	11	6-11	1-5	0
25	13-25	1-12	0	10	6-10	1-5	0
24	13-24	1-12	0	9	5-9	1-4	0
23	12-23	1-11	0	8	5-8	1-4	0
22	12-22	1-11	0	7	4-7	1-3	0
21	11-21	1-10	0	6	4-6	1-3	0
20	11-20	1-10	0	5	3-5	1-2	0
19	10-19	1-9	0	4	1-4	0	
18	10-18	1-9	0	3	1-3	0	
17	9-17	1-8	0	2	1-2	0	
16	9-16	1-8	0	1	1	0	

GG4c5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you played table games? ____ (allow numbers between 0 – 30)

GG4c6. How many months in the past 6 would you have played table games [range 1] days?

- Response options of 1, 2, 3, 4, 5, 6

GG4c7. How many months in the past 6 would you have played table games [range 2] days?

- Response options of 1, 2, 3, 4, 5, 6

GG4c8. How many months in the past 6 would you have played table games [range 3] days?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG4d1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent on table games in a month? Do not include time spent on transportation _____ (allow numbers only)

GG4d2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] hours on table games?

- Response options of 1, 2, 3

GG4d3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] hours on table games?

- Response options of 1, 2, 3

GG4d4. How many months in the past 3 would you have spent no time on table games?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG4d5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent on table games in a month? Do not include time spent on transportation _____ (allow numbers only)

GG4d6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] hours on table games?

- Response options of 1, 2, 3, 4, 5, 6

GG4d7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] hours on table games?

- Response options of 1, 2, 3, 4, 5, 6

GG4d8. How many months in the past 6 would you have spent no time on table games?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG4e1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on table games in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$_____ (allow numbers only)

GG4e2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] on table games? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3

GG4e3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] on table games?

- Response options of 1, 2, 3

GG4e4. How many months in the past 3 would you have spent nothing on table games?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG4e5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on table games in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$____ (allow numbers only)

GG4e6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] on table games? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3, 4, 5, 6

GG4e7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] on table games?

- Response options of 1, 2, 3, 4, 5, 6

GG4e8. How many months in the past 6 would you have spent nothing on table games?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

G5a. Have you bet on sports either in person, or remotely by phone, television, or online in the past 6 months, since last [month] (this would include sports that you directly participate in)?

- No (0) (go to G6a)
- Yes (1)

G5b. Did you bet money on sports in person or online?

- In person (1)
- Online (2)
- Both (3)

Counterbalance the 6 month and 3 month questions so that half the group always gets asked the 3 month first and half always gets asked the 6 month version first.

GG5c1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you bet money on sports? ____ (allow numbers between 0 – 30)

GG5c2. How many months in the past 3 would you have bet money on sports [range 1] days?

- Response options of 1, 2, 3

GG5c3. How many months in the past 3 would you have bet money against on sports [range 2] days?

- Response options of 1, 2, 3

GG5c4. How many months in the past 3 would you have bet money on sports [range 3] days?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

Max days	Range 1	Range 2	Range 3	Max days	Range 1	Range 2	Range 3
30	16-30	1-15	0	15	8-15	1-7	0
29	15-29	1-14	0	14	8-14	1-7	0
28	15-28	1-14	0	13	7-13	1-6	0
27	14-27	1-13	0	12	7-12	1-6	0
26	14-26	1-13	0	11	6-11	1-5	0
25	13-25	1-12	0	10	6-10	1-5	0
24	13-24	1-12	0	9	5-9	1-4	0
23	12-23	1-11	0	8	5-8	1-4	0

22	12-22	1-11	0	7	4-7	1-3	0
21	11-21	1-10	0	6	4-6	1-3	0
20	11-20	1-10	0	5	3-5	1-2	0
19	10-19	1-9	0	4	1-4	0	
18	10-18	1-9	0	3	1-3	0	
17	9-17	1-8	0	2	1-2	0	
16	9-16	1-8	0	1	1	0	

GG5c5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you bet money on sports? ____ (allow numbers between 0 – 30)

GG5c6. How many months in the past 6 would you have bet money on sports [range 1] days?

- Response options of 1, 2, 3, 4, 5, 6

GG5c7. How many months in the past 6 would you have bet money on sports [range 2] days?

- Response options of 1, 2, 3, 4, 5, 6

GG5c8. How many months in the past 6 would you have bet money on sports [range 3] days?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG5d1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent betting money on sports in a month? (include time spent calculating odds and handicapping) _____ (allow numbers only)

GG5d2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] hours betting money on sports?

- Response options of 1, 2, 3

GG5d3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] hours betting money on sports?

- Response options of 1, 2, 3

GG5d4. How many months in the past 3 would you have spent no time betting money on sports?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG5d5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent betting money on sports in a month? Do not include time spent on transportation _____ (allow numbers only)

GG5d6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] hours betting money on sports?

- Response options of 1, 2, 3, 4, 5, 6

GG5d7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] hours betting money on sports?

- Response options of 1, 2, 3, 4, 5, 6

GG5d8. How many months in the past 6 would you have spent no time betting money on sports?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG5e1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent betting money on sports in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number _\$_____ (allow numbers only)

GG5e2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] betting money on sports? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3

GG5e3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] betting money on sports?

- Response options of 1, 2, 3

GG5e4. How many months in the past 3 would you have spent nothing betting money on sports?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG5e5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent betting money on sports in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). _\$_____ (allow numbers only)

GG5e6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] betting money on sports? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3, 4, 5, 6

GG5e7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] betting money on sports?

- Response options of 1, 2, 3, 4, 5, 6

GG5e8. How many months in the past 6 would you have spent nothing betting money on sports?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

G6a. Have you bet money in the past 6 months, from [month] [day] to the present on horse racing or dog racing (either in person, by phone, or online)?

- No (0) (go to G7a)
- Yes (1)

G6b. Did you bet on horse racing or dog racing in person or remotely via a phone or online?

- In person (1)
- Phone or online (2)
- Both (3)

Counterbalance the 6 month and 3 month questions so that half the group always gets asked the 3 month first and half always gets asked the 6 month version first.

GG6c1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you bet money on horse or dog racing? ____ (allow numbers between 0 – 30)

GG6c2. How many months in the past 3 would you have bet money on horse or dog racing [range 1] days?

- Response options of 1, 2, 3

GG6c3. How many months in the past 3 would you have bet money on horse or dog racing [range 2] days?

- Response options of 1, 2, 3

GG6c4. How many months in the past 3 would you have bet money on horse or dog racing [range 3] days?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

Max days	Range 1	Range 2	Range 3	Max days	Range 1	Range 2	Range 3
30	16-30	1-15	0	15	8-15	1-7	0
29	15-29	1-14	0	14	8-14	1-7	0
28	15-28	1-14	0	13	7-13	1-6	0
27	14-27	1-13	0	12	7-12	1-6	0
26	14-26	1-13	0	11	6-11	1-5	0
25	13-25	1-12	0	10	6-10	1-5	0
24	13-24	1-12	0	9	5-9	1-4	0
23	12-23	1-11	0	8	5-8	1-4	0
22	12-22	1-11	0	7	4-7	1-3	0
21	11-21	1-10	0	6	4-6	1-3	0
20	11-20	1-10	0	5	3-5	1-2	0
19	10-19	1-9	0	4	1-4	0	
18	10-18	1-9	0	3	1-3	0	
17	9-17	1-8	0	2	1-2	0	
16	9-16	1-8	0	1	1	0	

GG6c5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you bet money on horse or dog racing (1-30)? ____ (allow numbers between 1 – 30)

GG6c6. How many months in the past 6 would you have bet money on horse or dog racing [range 1] days?

- Response options of 1, 2, 3, 4, 5, 6

GG6c7. How many months in the past 6 would you have bet money on horse or dog racing [range 2] days?

- Response options of 1, 2, 3, 4, 5, 6

GG6c8. How many months in the past 6 would you have bet money on horse or dog racing [range 3] days?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG6d1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent betting money on horse or dog racing in a month? Do not include time spent on transportation ____ (allow numbers only)

GG6d2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] hours betting money on horse or dog racing?

- Response options of 1, 2, 3

GG6d3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] hours betting money on horse or dog racing?

- Response options of 1, 2, 3

GG6d4. How many months in the past 3 would you have spent no time betting money on horse or dog racing?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG6d5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent betting money on horse or dog racing in a month? Do not include time spent on transportation ____ (allow numbers only)

GG6d6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] hours betting money on horse or dog racing?

- Response options of 1, 2, 3, 4, 5, 6

GG6d7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] hours betting money on horse or dog racing?

- Response options of 1, 2, 3, 4, 5, 6

GG6d8. How many months in the past 6 would you have spent no time betting money on horse or dog racing?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG6e1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent betting money on horse or dog racing in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$_____ (allow numbers only; if person reports a net win then the categories are +\$1 to \$net win amount; nothing; and -\$1 to -\$net win amount)

GG6e2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] betting money on horse or dog racing?

- Response options of 1, 2, 3

GG6e3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] betting money on horse or dog racing?

- Response options of 1, 2, 3

GG6e4. How many months in the past 3 would you have spent nothing betting money on horse or dog racing?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG6e5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent betting money on horse or dog racing in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$_____ (allow numbers only)

GG6e6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] betting money on horse or dog racing? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3, 4, 5, 6

GG6e7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] betting money on horse or dog racing?

- Response options of 1, 2, 3, 4, 5, 6

GG6e8. How many months in the past 6 would you have spent nothing betting money on horse or dog racing?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

G7a. Have you played bingo for money (either in person or online) in the past 6 months, from [month] [day] to the present?

- No (0)
- Yes (1)

G7b. Did you play bingo in person (includes satellite bingo) or online?

- In person (1)
- Online (2)
- Both (3)

Counterbalance the 6 month and 3 month questions so that half the group always gets asked the 3 month first and half always gets asked the 6 month version first.

GG7c1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you played bingo? ____ (allow numbers between 0 – 30)

GG7c2. How many months in the past 3 would you have played bingo [range 1] days?

- Response options of 1, 2, 3

GG7c3. How many months in the past 3 would you have played bingo [range 2] days?

- Response options of 1, 2, 3

GG7c4. How many months in the past 3 would you have played bingo [range 3] days?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

Max days	Range 1	Range 2	Range 3	Max days	Range 1	Range 2	Range 3
30	16-30	1-15	0	15	8-15	1-7	0
29	15-29	1-14	0	14	8-14	1-7	0
28	15-28	1-14	0	13	7-13	1-6	0
27	14-27	1-13	0	12	7-12	1-6	0
26	14-26	1-13	0	11	6-11	1-5	0
25	13-25	1-12	0	10	6-10	1-5	0
24	13-24	1-12	0	9	5-9	1-4	0
23	12-23	1-11	0	8	5-8	1-4	0
22	12-22	1-11	0	7	4-7	1-3	0
21	11-21	1-10	0	6	4-6	1-3	0
20	11-20	1-10	0	5	3-5	1-2	0
19	10-19	1-9	0	4	1-4	0	
18	10-18	1-9	0	3	1-3	0	
17	9-17	1-8	0	2	1-2	0	
16	9-16	1-8	0	1	1	0	

GG7c5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum number of days in a month that you played bingo ? ____ (allow numbers between 0 – 30)

GG7c6. How many months in the past 6 would you have played bingo [range 1] days?

- Response options of 1, 2, 3, 4, 5, 6

GG7c7. How many months in the past 6 would you have played bingo [range 2] days?

- Response options of 1, 2, 3, 4, 5, 6

GG7c8. How many months in the past 6 would you have played bingo [range 3] days?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG7d1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent on bingo in a month? Do not include time spent on transportation ____ (allow numbers only)

GG7d2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] hours on bingo?

- Response options of 1, 2, 3

GG7d3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] hours on bingo?

- Response options of 1, 2, 3

GG7d4. How many months in the past 3 would you have spent no time on bingo?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG7d5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount of hours you have spent on bingo in a month? Do not include time spent on transportation ____ (allow numbers only)

GG7d6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] hours on bingo?

- Response options of 1, 2, 3, 4, 5, 6

GG7d7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] hours on bingo?

- Response options of 1, 2, 3, 4, 5, 6

GG7d8. How many months in the past 6 would you have spent no time on bingo?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

GG7e1. In the past 3 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on bingo in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking _\$ ____ (allow numbers only)

GG7e2. How many months in the past 3 would you have spent between [50% - 100% of maximum amount] on bingo? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3

GG7e3. How many months in the past 3 would you have spent between [1% - 49% of maximum amount] on bingo?

- Response options of 1, 2, 3

GG7e4. How many months in the past 3 would you have spent nothing on bingo?

- Response options of 1, 2, 3 (if total does not add up to 3, point this out and allow person to change answers)

GG7e5. In the past 6 months, since [month] [day] to [one week prior to present date], what is the maximum amount you have spent on bingo in a month? Spend means how much you are ahead or behind or your net win or loss (if you have a net win, put a '+' sign in front of the number). Do not include money you spent on transportation, food, drinks, or parking ____ (allow numbers only)

GG7e6. How many months in the past 6 would you have spent between [50% - 100% of maximum amount] on bingo? if person reports a net win in previous question then the categories are: +\$1 to +\$net win maximum amount; nothing; and -\$1 to -\$net win maximum amount)

- Response options of 1, 2, 3, 4, 5, 6

GG7e7. How many months in the past 6 would you have spent between [1% - 49% of maximum amount] on bingo?

- Response options of 1, 2, 3, 4, 5, 6

GG7e8. How many months in the past 6 would you have spent nothing on bingo?

- Response options of 1, 2, 3, 4, 5, 6 (if total does not add up to 6, point this out and allow person to change answers)

Please answer each of the following questions in this section, even if none apply to you

GP1. **CPGI1**. Thinking about the past 12 months, have you bet more than you could really afford to lose? Would you say:

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP2. **CPGI2**. Thinking about the past 12 months, have you felt guilty about the way you gamble or what happens when you gamble? Would you say:

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP3. **CPGI3/PPGM14**. In the past 12 months, have you needed to gamble with larger amounts of money to get the same feeling of excitement? Would you say:

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP4. **CPGI4/PPGM8b**. In the past 12 months, when you gambled, did you go back another day to try to win back the money you lost? Would you say

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP5. **CPGI5/PPGM1a**. In the past 12 months, have you borrowed money or sold anything to get money to gamble? Would you say

- never (0) (go to GP6a)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP6. **CPGI6/PPGM1b**. In the past 12 months, has your gambling caused any financial problems for you or your household? Would you say:

- never (0) (go to GP7a)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP7. **CPGI7/PPGM4**. In the past 12 months, has your gambling caused you any health problems, including stress or anxiety? Would you say:

- never (0) (go to GP8)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP8. **CPGI8/PPGM7**. In the past 12 months, have people criticized your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true? Would you say:

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP9. **CPGI9**. In the past 12 months, have you felt that you might have a problem with gambling? Would you say

- never (0)
- sometimes (1)
- most of the time, or (2)
- almost always (3)
- Unsure (8888)
- refused (9999)

GP10. **PPGM2**. Has your involvement in gambling caused significant mental stress in the form of guilt, anxiety, or depression for you or someone close to you in the past 12 months?

- no (0) (go to GP11a)
- yes (1)
- Unsure (8888)
- refused (9999)

GP11. **PPGM3a**. Has your involvement in gambling caused significant problems in your relationship with your spouse/partner or important friends or family in the past 12 months?

- no (0) (go to GP12a)
- yes (1)
- Unsure (8888)
- refused (9999)

GP12. **PPGM3b**. Has your involvement in gambling caused you to repeatedly neglect your children or family in the past 12 months?

- no (0) (go to GP13a)
- yes (1)
- Unsure (8888)
- refused (9999)

GP13. **PPGM5**. Has your involvement in gambling caused significant work or school problems for you or someone close to you in the past 12 months or caused you to miss a significant amount of time off work or school?

- no (0) (go to GP14a)
- yes (1)
- Unsure (8888)
- refused (9999)

GP14. **PPGM6**. Has your involvement in gambling caused you or someone close to you to write bad cheques, take money that didn't belong to you or commit other illegal acts to support your gambling in the past 12 months?

- no (0) (go to GP15)
- yes (1)
- Unsure (8888)
- refused (9999)

GP15. **PPGM8**. Have you often gambled longer, with more money or more frequently than you intended to in the past 12 months?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

GP16a. **PPGM10a**. In the past 12 months, have you made attempts to either cut down, control or stop gambling?

- no (0) (go to GP17b)
- yes (1)
- Unsure (8888)
- refused (9999)

GP16b. **PPGM10b**. Were you successful in these attempts?

- no (1)
- yes (0)
- Unsure (8888)
- refused (9999)

GP17a. **PPGM13a**. In the past 12 months, when you did try cutting down or stopping did you find you were very restless or irritable?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

GP17b. **PPGM13b**. In the past 12 months, have you had strong cravings for gambling?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

GP18. **PPGM10**. In the past 12 months, would you say you have been preoccupied with gambling?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

GP19. **PPGM11** In the past 12 months, is there anyone else who would say that you were either preoccupied with gambling; or had a loss of control; or had withdrawal symptoms; or that you needed to gamble with larger amounts of money to achieve the same excitement?

- no (0)
- yes (1)
- Unsure (8888)
- refused (9999)

Thank you for your time. It is very much appreciated. This is the end of the questionnaire!!

QF/TA and GF Questionnaire Retest

Sent out 2 weeks after completion of the first questionnaire

Email Subject Line: Gambling Study

Text: Hello, we have one final request of you for the Gambling Study. We wish to readminister the same questionnaire we administered 2 weeks ago so as to assess the “test-retest” reliability of this assessment instrument. Please take as much time as needed to complete this retest and answer the questions as accurately as you can.

The same version of the instrument the person received 2 weeks earlier was readministered.