Dimensions of Problem Gambling Behavior Associated with Purchasing Sports Lottery

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Abstract The purpose of this study was to identify and examine the dimensions of problem gambling behaviors associated with purchasing sports lottery in China. This was accomplished through the development and validation of the Scale of Assessing Problem Gambling (SAPG). The SAPG was initially developed through a comprehensive qualitative research process. Research participants ($N = 4,982$) were Chinese residents who had purchased sports lottery tickets, who responded to a survey packet, representing a response rate of 91.4%. Data were split into two halves, one for conducting an EFA and the other for a CFA. A five-factor model with 19 items (Social Consequence, Financial Consequence, Harmful Behavior, Compulsive Disorder, and Depression Sign) showed good measurement properties to assess problem gambling of sports lottery consumers in China, including good fit to the data (RMSEA = 0.050, TLI = 0.978, and CFI = 0.922), convergent and discriminate validity, and reliability. Regression analyses revealed that except for Depression Sign, the SAPG factors were significantly ($P < 0.05$) predictive of purchase behaviors of sports lottery. This study represents an initial effort to understand the dimensions of problem gambling associated with Chinese sports lottery. The developed scale may be adopted by researchers and practitioners to examine problem gambling behaviors and develop effective prevention and intervention procedures based on tangible evidence.

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Introduction

Sport is now an indispensable part of modern life. In recent years, various segments of the sport industry, such as spectator and participant sports, have experienced soaring growth globally, confirming the presence and significance of sports in human society. In some countries and regions, the sports industry is already one of the mainstream industries. For instance, in North America, the estimated size of the sport business industry has risen sharply, from $213 billion at the end of the 1990s (Broughton et al. 1999) to over $400 billion in 2010 (Plunkett Research 2010). Even in China, the average annual growth rate of the sports industry has been about 20% or higher in recent years. In 2008, the sports industry realized a total transaction value of $22.87 billion, counting for 0.52% of China's total GDP (General Administration of Sport of China 2010).

To some extent, professionalization and commercialization of sports have made sport events more visible and appealing to the consumers. At the same time, uncertainty and popularity of sports also make the "marriage" between sports and gambling inevitable (Koning and Velzen 2009). The combination between sports and gambling can, on the one hand, attracts more sport fans and even non-fans to be involved in the gambling form of sport consumptions and consequently extend the market scale of the sport industry; on the other hand, it can help collect public welfare funds from sports betting to promote the development of sport programs. Today, sports betting are the fastest growing area of the gambling industry globally, and it is increasingly becoming a significant part of the sports industry. During the 2009–2010 fiscal year, the British gambling industry generated a gross income of £5.7 billion (Gambling Commission 2010), where the sports betting sector had the largest market share within the sports industry, counting for 53% of all gambling transactions. Gambling is now so popular that in 2007, the gross gambling revenues in the United States topped $92.27 billion. Although illegal in every state except Nevada, one of the most popular forms of gambling is betting on the outcome of sporting events (Wolohan 2009). In 2009, $2.57 billion was legally wagered in Nevada's sports books. More bets are placed on the Super Bowl than on any other sporting event of the year. Approximately, $82.7 million was wagered on the Super Bowl, according to the Nevada Gaming Control Board, and the event earned net income of $6.9 million (American Gaming Association 2009). In North America, sports betting represents 9.86% of the sports industry (Zhang and Cianfrone 2011); whereas, in China the percentage was 2.34% in 2007 (General Administration of Sport of China 2010).

The last decade witnessed the rocketing of Chinese economy and a gradual open-up of the gambling market. Since the issuance of China's first welfare lottery in 1987, it has been just over 20 years. During this period, the gambling market has been rising remarkably. There are two lottery administrative institutions in China, where the China Welfare Lottery Distribution Center was founded in 1987 and the China Sports Lottery Administration Center was founded in 1994. In the early 1990s, draw games and scratch cards were the only gambling options. As of now, almost all mainstream gambling types, such as lotto, sports betting, numbers game, and high frequency lotteries (e.g. Keno and VLTs) are available. Even horseracing and internet lottery, currently under debates, are expected to be soon launched in China. In the past 5 years, sales of all types of gambling have increased in exponent rate. Scratch card rose from a low of $138 million in 2005 to a high of $2.95 billion in 2008, an increase of more than 20 times over a period of 4 years. Lotto realized a

steady increase from $5 billion in 2004 to $11.8 billion in 2008, among which dual color ball and super lotto were pillars of welfare lottery and sports lottery, respectively. The magnitude of China's entire gambling market grew in total sales from $2.5 million 1987 to $85.5 billion in 2009 (China Lottery Almanac 2007, 2008, 2009). Sales of sports betting remained steady, with a high of $0.85 billion in 2007. According to *La Fleurs's* 2010 *World Lottery Almanac*, sales of Chinese lotteries reached to $19.1 billion in 2009, consisting of $10.8 billion of welfare lottery (i.e., Global Top 5) and $8.3 billion of sports lottery (i.e., Global Top 7). This rate of rapid growth in China is unforeseen by both gambling administrators and consumers; essentially, Chinese gambling market is facing an unprecedented opportunity.

When managed properly, gambling may help generate revenues to advance economic and social development of a community. It is an effective mean to boost consumer spending and generate tax incomes, which may also help promote other related industries, such as printing, communication and advertisement, transportation, manufacture, and financing and banking. For example, during the 2009–2010 fiscal year, there were 58,418 employees within the sports betting sector in the UK (Gambling Commission 2010). Sports wagering helps bring more than 30 million visitors to Nevada each year and provides employment for thousands of people. The Las Vegas Convention and Visitors Authority estimated that the 2007 Super Bowl weekend generated $109.5 million in non-gaming economic impact, attracting 287,000 visitors (American Gaming Association 2009). As Hong Kong's largest single taxpayer, the Hong Kong Jockey Club contributed more than HK $14.1 billion to public funds through betting duties and taxes during the 2009–2010 fiscal year, which represented nearly 8% of all revenue that the Government's Inland Revenue Department collected in 2009–2010. Moreover, the club operation sustained employment of more than 26,000 people directly, and tens of thousands more indirectly (Hong Kong Jockey Club 2010). In mainland China, sports lottery provides nearly 300,000 jobs. An official in China Sports Lottery Administration Center claimed that sports lottery directly provided as much as $176.5 million, $205.9 million, and $235.3 million in tax income for the years 2006, 2007, and 2008, respectively. Income from sports gambling has a wide range of influence on various areas of the society (e.g., public welfare, sanitation, and education; nevertheless, it most contributes to the development of sport programs. Since its inception in 1994, aggregate sales of sports lottery amounted to $46.6 billion, accumulating over $14.7 billion for public welfare funds. According to the *Provisional Regulations on the Administration of Public Welfare Funds Collected from Sports Lottery* (General Administration of Sport of China 1998), income from sports lottery sales is the main source of the Olympic Supporting Program. The General Administration of Sport of China (GASC) spent 60% of its public welfare funds generated from sports lottery sales on national fitness programs and 40% on the Olympic Supporting Program in such areas as athlete training, sport event bidding, and event operations. For instance, over $400 million generated from sport lottery sales were invested in the Beijing Olympic Games between 2001 and 2008. As to public fitness, by 2009, public welfare funds derived from sports lottery sales were appropriated by the GASC to finance 110,000 walking/jogging trails nationwide and establish more than 100 public fitness centers. Using the same funds, 20,000 more public fitness centers have been planned for construction throughout China in the near future (China Lottery Almanac 2007, 2008, 2009).

Despite the positive aspects of sports gambling, there are noticeably negative impacts associated with this segment of the sports industry; of which problem gambling is a major issue and can have drastic impact on a community if not managed properly. While most people play the lottery for fun and entertainment, without negatively influencing

themselves or their families, a small percentage of the population experiences tribulations with gambling. These people spend increasing amounts of time and money on gambling activities, may lie about their gambling, find it difficult to control the impulse to gamble, and even engage in socially destructive behaviors ranging from relationship breakdown to committing crimes. Problem gambling can cause serious social problems and add unnecessary costs and burden to a community (Productivity Commission 1999). Dickerson (1993) categorized the negative effects of problem gambling into individual, interpersonal, employment, economical, and legal domains. Individual effects include, but are not limited to, loss of self-esteem and depression; interpersonal effects may involve marital and family relationships; employment effects include loss of productivity and even job loss; economic effects include excessive spending and even gambling debts; and legal effects involve illegal acts to support gambling and related legal proceedings. On an average, a problem gambler negatively affects 10–17 people around him/her, usually including family, friends, and employers (Shaffer and Korn 2002). In recent years, criminalities caused by sports lottery buying have considerably increased in China. For instance, in 2007 two employees of the Agriculture Bank- Handan Branch were caught to divert $6.3 million of bank funds to buy lottery tickets, winning nothing. As the media revealed many extreme problem-gambling cases, it is obvious that extreme lottery buying activities of a small number of gamblers greatly influenced the overall well-being of China's lottery market, hampering its healthy and sustainable development (Wang 2008).

Problem gambling is nothing new in countries with well-developed gambling industry. Various studies have shown that to varying extent, 70–90% of adults gamble in their lives (Ladouceur et al. 1991; Productivity Commission 1999). Similar rates have been found for adolescents (Gupta and Derevensky 1997; Shaffer and Hall 1996). Gambling studies in the US, Canada, Australia, and some European countries show that as the means of gambling increase, more people have pathological gambling issues and have to seek personal, counseling, or even medical assistance. Research evidence shows that in North America, the prevalence rate of pathological gambling is between 1 and 3% (Cunningham-Williams et al. 2005; Pietrzak and Petry 2005; Shaffer et al. 1999; Westermeyer et al. 2005). Other countries reported similar phenomenon (Becoña 1996, 1997; Bondolfi et al. 2000; Productivity Commission 1999; Volberg and Abbott 1994; Volberg et al. 2001; Wong and So 2003). Concerning the assessment and screening of problem gamblers, more than 20 instruments have been developed since the DSM-III (APA 1980) was published. In recent years, researchers in various countries have been making efforts to develop culturally sensitive and appropriate assessment and screening instruments. Of these instruments, DSM, the South Oaks Gambling Screen (SOGS), and the Canadian Problem Gambling Index (CPGI) are most prevailingly referenced or adopted for clinical screening or research investigations. Other scales are also available and can be used to detect problematic gambling attitude, intentions, and activities; however, these are not widely adopted, possibly due to issues in their measurement properties or limitations in their applicability as problem gambling measures are usually culturally sensitive. The DSM, SOGS, and CPGI also have their limitations as they were developed in a western cultural context. While the DSM and SOGS were primarily developed for medical diagnoses, the CPGI was designed for epidemiological studies.

Problem gambling prevention consists of a range of initiatives, with each being intended to reduce potential harm of legalized gambling. Harm minimization initiatives across international jurisdictions can be classified into three basic types: primary, secondary, and tertiary prevention programs. Each has its own set of objectives and outcome indicators (Blaszczynski et al. 2004). Primary prevention is an effort to prevent individuals in the

general populace from becoming problem gamblers. Secondary prevention is an effort to prevent the development of problem gambling in individuals with high risk factors. Tertiary prevention is an effort to stop and potentially reverse the problems occurring in existing problem gamblers. Another approach of prevention program classifications is based on the nature of an initiative, which can be either education- or policy-oriented. Educational initiatives are intended to improve individual knowledge, attitudes, beliefs, and life skills to deter from problem gambling; whereas, policy initiatives are intended to prevent problem gambling by altering external environmental controls to limit or restrict the availability and provision of gambling (Williams et al. 2007). Regardless the approach of classification, effective prevention always have to be based on a valid assessment and screening of the nature and severity of problem gambling.

Unlike mainstream gambling, problems in sports gambling often involve individuals who make a bet on too many sport events. Due to the simplistic nature of various sports competition forms, along with consumer familiarity and interest of sports, gamblers often feel having superior expertise and intelligence in beating the predicting odds, which is a main characteristic of sports gambling; consequently, this is also the major attraction for many gamblers. Some gamblers feel excited after a few successful predictions about sports events and start developing an efficacy of betting more to win more. If the result is unfavorable, they bet even more in hope of 'chasing' losses by turning the tide, which can eventually lead to becoming problem gamblers.

Most sports lotteries around the world are purchased by two means: (a) traditional sales outlets and (b) websites. Internet gambling can be one of the easiest forms of gambling to hide from friends and family. According to a number of researchers, the nature of the internet gambling interface and experience, which is convenient, easily accessible, anonymous, immersive, and potentially more affordable, may facilitate problem gambling (Griffiths 2003; Griffiths and Parke 2002; Griffiths and Wood 2000). To prevent "problematization" of gamblers, some sports lottery distributors have taken some precaution measures by restricting gambling activities from online betting. For example, Scientific Games Corporation, a world leading sports lottery operator, restrict gamblers with such measures as issuing player's card, requiring age verification, capping maximum betting amount, and enforcing self-exclusion. Although cases like this exist, a majority of distributors of sports lotteries ignore their social responsibility for gamblers and the community. An investigation of 30 internet sports betting companies showed that very few sites engaged in socially responsible practices and much more could be done to protect vulnerable segments of gamblers (Smeaton and Griffiths 2004). Sports gambling are a major segment of China's sport industry. Although various forms of sports gambling may help generate revenues, increase governmental tax income, and advance social and economic development, it has the potential to cause social, family, and individual problems, thus imposing cost and burden on a community. In recent years, problem gambling associated with purchasing sports lottery has gradually emerged as a major social issue in China.

The term of problem gambling can denote varying degrees of gambling, ranging from an early stage of on-site problems to compulsive or pathological gambling as diagnosed by applying the DSM-IV diagnostic instrument (Moore and Thomas 2002; Raylu and Oei 2002; Rosenthal 1989; Volberg et al. 2001). When people refer to problem gambling, it typically means subclinical level of gambling problems. While many studies have been conducted on general problem gambling, few have focused on issues that are primarily caused by sports betting. Noticeably, previous studies on problem gambling have mainly been conducted in western countries, such as the US, Australia, Britain, and Canada; research findings from these studies are limited in their applicability to China due to

historical, social, and cultural differences. For instance, the government-run sports lottery in China has existed for merely 20 years and because of the absence of other gambling forms in mainland China, sports lottery is the primary outlet of gambling with a large participation rate among Chinese residents. Understanding the fundamental issues caused by sports lottery is precursor to formulating effective strategies for prevention, intervention, and even rehabilitation. The purpose of this study was to identify and examine the dimensions of problem gambling behaviors associated with purchasing sports lottery in China. This was accomplished through the development and validation of the initial Scale of Assessing Problem Gambling (SAPG), and examination of the relationship between the SAPG factors and sports lottery purchase behaviors of consumers.

Review of Literature

In contrast to the seemingly agreeable definition of gambling, many controversies are surrounding various definitions of problem gambling, that are commonly referred as compulsive, pathological, probable pathological, disordered, Level 3, excessive, or obsessive problem (Blaszczynski and Nower 2002; Productivity Commission 1999). The term 'problem gambling' is most often adopted in two situations. In one situation, it is used to indicate all patterns of gambling behavior that compromise, disrupt, or damage personal, family, or vocational pursuits (Lesieur 1988). From this perspective, pathological gambling can be regarded as a sub-category, or one end of a continuum of gambling-related problems. In such situation, problem gambling covers all gambling behaviors that have 'problems' while pathological gambling is a sub-criterion of problem gambling to indicate problems when they become more severe. In the other situation, problem gambling is used to denote an earlier stage of gambling that leads to fewer problems than the later stage with more severe problems experienced or caused by those gamblers who are diagnosed by diagnostic tests as compulsive or pathological gamblers (Moore and Thomas 2002; Raylu and Oei 2002; Rosenthal 1989; Volberg et al. 2001). In such situation, problem gambling evolves to a higher level of gambling called pathological. While clinicians, psychologists, and psychiatrists tend to focus on individual behaviors and so prefer definitions within the medical disorder/mental health problem frameworks that define problem gambling with reference to diagnostic criteria, others, such as researchers, government officials, and service providers, tend to perceive environmental and social factors as important determinants of problem gambling and therefore favor definitions that see gambling as problematic and harmful, without referencing to diagnostic criteria (Neal et al. 2004). In this study, a broader concept of problem gambling was adopted to embrace both a problematic condition that shows few clinical symptoms and a pathological situation with more severe symptoms. In most common circumstances, problem gambling is referred as a non-clinical condition as opposed to the pathological one.

While no motive for gambling has been consistently identified to distinguish social gamblers and problem gamblers (Murray 1993), numerous researchers have recognized different motives for gambling. These include demonstrating one's worth, getting approval and social acceptance from others, rebelling, relieving negative and painful emotions (e.g., anger, depression, frustration, and anxiety), hoping to win, socializing, trying to beat the odds, risk-taking, participating in a favorable activity, experiencing the excitement (e.g., to reduce boredom), passing time, and having fun (Blaszczynski 1995; Cotte 1997; Dumont and Ladouceur 1990; Griffiths 1991, 1993; Productivity Commission 1999). Tracing motives for gambling, researchers have further investigated factors that influence, cause,

channel, and sustain problem-gambling behaviors, which have been primarily focused on family, social, and individual factors. The role of family influences on the cause, development, and maintenance of problem gambling can be viewed from two perspectives: genetics and social learning. Genetics theory suggests that causes of problem gambling are related to family inheritance. While social learning theory suggests that individuals learn, model, and maintain behaviors that are observable and reinforced. Thus, family members as well as friends can often act as significant models for gambling. Children who gamble tend to gamble with friends and family members (Daghestani et al. 1996; Gupta and Derevensky 1997). However, both genetics and social learning perspectives need further empirical studies to confirm their intrinsic relationship.

A sociological perspective assumes that problem gambling may be a response to an inability to cope with the larger society, implicating that gambling lies on a spectrum with social gambling at one end and problem gambling on the other. Sociological studies have typically been conducted utilizing intensive interviews and observations of gamblers of varying levels, rather than only those problem gamblers who need treatment (Lesieur 1987). The sociological perspective accounts for environmental and cultural factors, which are both a major advantage and disadvantage when compared to other theories as the sociological approach has also been criticized for its lack of clinical focus (Lesieur and Rosenthal 1991).

Studies on personal factors focus mainly on personality, biology/biochemistry, cognition, and/or psychological state. Personality factors include sensation-seeking, impulsivity, and personality disorders. In cognitive studies, evidence suggests that irrational thinking plays a significant role in the development and continuation of problem gambling, where gamblers hold a set of false and erroneous beliefs about gambling despite heavy, continuous losses. Gamblers typically have two types of biases in their beliefs: (a) they can directly or indirectly influence the outcome of a game; and (b) they can correctly predict the outcome. Mood states, such as anxiety and depression, have been frequently linked to problem gambling (Blaszczynski and McConaghy 1989). While there is sufficient evidence to suggest that some psychological states may make an individual more susceptible to begin gambling and subsequently develop problem gambling, it is difficult to determine the cause-and-effect relationship.

While considerable controversy clearly exists about the definition of problem gambling, there appears to be consensus that this disorder exists. While problem gambling behaviors of a substantial minority of people differs drastically in their frequency, nature, and consequences of gabling (Neal et al. 2004), it is usually agreeable that a valid assessment instrument would allow one to distinguish a problem gambler from a non-problem gambler and also identify those who genuinely need help. Neal et al. (2004) identified four principal functions of screening and assessment tools, including identification, classification, description, and therapy. Over the past two decades, numerous screen tools and scales have been developed in a variety of cultural contexts for screening, assessment, diagnosis, epidemiological research, treatment planning, and/or treatment monitoring (e.g., Stinchfield et al. 2004). Of these, today the most frequently adopted instruments are still the DSM-IV, SOGS, and CPGI.

Within the framework of the DSM-III (APA 1980), pathological gambling has been regarded as an impulse control disorder that are strongly related to other psychiatric illnesses, including affective and anxiety disorders (Dannon et al. 2006), personality disorders (Petry et al. 2005), psychoactive substance use disorders (Desai 2006), other impulse control disorders (Dannon et al. 2004), and eating disorders (Fernandez-Aranda et al. 2006). The DSM is a clinical, diagnostic tool based on the experiences and

characteristic behaviors of those treated for their gambling problems (Galski 1987). When the pathological gambling diagnosis first appeared in the DSM-III in the 1980s, the criteria for diagnosing problem or pathological gambling were very similar to those for alcohol and drug dependence (Rosenthal 1989). Though subsequent versions of the DSM were modified in its screening criteria, the basic assumptions have remained the same, comprising a 10-item, self-evaluation items on a Likert 10-point scale, with 5 or higher indicating problem gambling. The scale has been widely adopted for English-speaking natives, with a satisfying reliability, validity, and classification accuracy. One major issue associated with this instrument is that it is too sensitive and concentrative, causing higher false positive incidence (Stinchfield 2003; Stinchfield et al. 2005). The original SOGS was developed based on a modification of the DSM's psychiatric criteria for pathological gambling, which contains 20 items to screen for pathological gambling in clinical settings. The diagnostic criteria in this scale have proved to be of satisfying reliability and validity as in the DSM-IV (Lesieur and Blume 1987). Its diagnostic accuracy of classification was found to be comparable to that of the DSM-IV (Echeburu'a et al. 1994). The CPGI is a frequently used tool that was developed by Ferris and Wynne (2001) to assess gambling problems in non-clinical settings, and it is purposed to be adopted to assess the general population. With 31 items in the scale, this measure adopts an epidemiological perspective and regards problem gambling as a public health issue. Today, the CPGI has been widely used in general population surveys in western countries (Svettieva and Walker 2008).

Although these aforementioned instruments provide useful tools for assessing problem gambling behaviors, various issues associated with these measures have been recognized, which are usually related to their validity, reliability, generalisability, and applicability in various cultural contexts. The purpose, usefulness, delimitations, and limitations of these scales are always controversial (Ferris and Wynne 2001; Svettieva and Walker 2008; Volberg and Young 2008). It is particularly true that as a socio-psychological phenomenon, even same problem gambling issues and behaviors can be caused, manifested, observed, and expressed in quite different ways under different cultures. Although the DSM-IV and SOGS criteria have been adopted in studies to examine problem gambling of residents in Hong Kong and Macau, two autonomous administrative regions due to historical reasons, no such studies have been found that examined problem gambling of residents in mainland China. One major reason that studies are rarely done in mainland China is that the Chinese people hold excessive importance about the social appearance, dignity, and respect (i.e., 'mianzi' in Chinese term), and this cultural bias hinders many Chinese people from admitting their pathological tendency and consequently disallows them to seek professional help (Loo et al. 2008). Lack of acknowledgement and delayed professional intervention may cause serious issues in people's well-being (Tang et al. 2007). Considering the population size, growth of the sport gambling industry, and increasing numbers of incidents of problem gambling in the mainland China, it appears very necessary to examine those factors that cause, channel, and sustain problem gambling and their influence on the gambling behaviors of mainland China's residents.

Sports betting is one of the most popular lotteries among regular and occasional gamblers. Because of consumer's interest, occasional involvement, and indulgence in the uncertainty of competition results, betting and sports have always been naturally connected (Koning and Velzen 2009). While some level of sport betting contributes positively to the overall achievement of the sport industry, excessive betting on sports events may lead social issues, including problem gambling. Risto Nieminen, President of the Sports Betting Commission of European Lotteries and Toto Association, once said that "Our socially responsible objective is to gain more players seeking to spice up their sports experiences

with extra excitement by spending just a small sum of money on a bet. In such a situation, gaming will not pose an overly heavy burden on anyone's wallet, but will rather remain an enjoyable pastime" (2006, p. 6). However, within the last few years, substantial increases in the amount of gambling opportunities have been seen on the internet. Many concerns have been expressed about excessive gambling, and the lack of safeguards for vulnerable populations, such as adolescents and problem gamblers (Smeaton and Griffiths 2004). As there are very few studies on the relationship between problem gambling and sports betting, understanding this relationship can be constructive for the administration of sport gambling.

As a result of this exploratory study that involved extensive interviews of sports lottery consumers, it was expected that the developed SAPG scale may be adopted by researchers and practitioners to examine problem gambling behaviors and develop effective prevention and intervention procedures in China as China's gambling industry needs empirical evidence to support its healthy development in a massive, potential market with the largest population in the world. Findings on problem gambling behavior associated with purchasing sports lottery could also help enrich the theoretical framework for studying problem gambling.

Method

Participants

Research participants were Chinese residents ($N = 4,982$) who had purchased sports lottery tickets in the past 12 months prior to participating in this interview study. A majority of the sport lottery buyers were male (i.e., over 75%), between 21 and 60 years old, married, and with high school or lower level of education. They came from a variety of employment backgrounds and purchased various forms of sport lottery tickets (Table 1).

Development of Scale

The Scale of Assessing Problem Gambling (SAPG) was initially developed through a qualitative research process, including review of literature, interviewing officials of China's sports lottery administration ($n = 40$), interviewing managers of sports lottery retail stores/outlets ($n = 20$), interviewing consumers ($n = 20$), and examining the transcripts of a hotline phone assistance system provided by the national sports lottery administration. A comprehensive review of literature was conducted on the definition and construct of problem gambling, as well as the characteristics of problem gamblers. In particular, development of the SAPG took into consideration the concepts of psychological state (e.g., ulterior motives, cognitive bias, dysthymia, and paranoid personality), harmful behavioral patterns (e.g., excessive energy expenditure, excessive money expenditure, inability of self correction, and lying), and threats (e.g., self, family, and community). Items in various existing scales (e.g., DSM-IV, SOGS, and CPGI) were modified or adapted to reflect the unique characteristics of China's sports gambling environment and Chinese consumers. During the interviews, open-ended questions were carried out that focused on the concept and composition of problem gambling. When an item generated from the interviews or phone message transcripts was consistent with an item derived from a previous scale(s), a decision was made to adopt the word in the literature based on a belief that items in previous scales had gone through psychometric testing. Consequently, a total of 45 items were formulated for the preliminary SAPG scale.

Table 1 Descriptive statistics for background variables of sports lottery consumers in China

Variable	Category	N	%
Gender	Male	3,851	77.3
	Female	1,131	22.7
Age	20 or under	152	3.1
	21–30	1,468	29.5
	31–40	1,325	26.6
	41–50	1,051	21.1
	51–60	703	14.1
	61 or over	281	5.6
Position	Business employed	1,961	39.4
	Retired or unemployed	1,014	20.4
	Peasants or rural migrant workers	961	19.3
	Students	306	6.1
	Self employed	619	12.4
	Others	117	2.4
Marital status	Married	3,411	68.6
	Single	1,345	27.1
	Divorced or widowed	215	4.3
Education level	Junior high school or below	1,289	25.9
	Senior high school or technical secondary school	1,935	38.9
	Junior college	935	18.8
	Undergraduate	683	13.7
	Advanced degree	134	2.7
Lottery type	Numbers game	2,718	54.6%
	Sport lotto	3,960	79.5%
	Sports event betting	1,183	23.8%
	High-frequency game	752	15.1%
	Scratch-off game	1,630	32.7%

A panel of experts ($n = 12$), including six university professors in sport management, two sports lottery administrators, and four nationally-recognized experts in gambling research, conducted a test of content validity in terms of item relevance, representativeness, and clarity. As a result of this stage, a total of nine items were deleted, resulting in 32 items retained. Each of these items was then phrased into a statement anchored by a Likert 5-point scale (1 = never to 5 = always). A pilot study was then conducted, involving a convenient sample of sports lottery ticket consumers ($n = 200$), who were recruited via a community interception approach at lottery ticket retail outlets located in all different districts of Shanghai. Participants responded to the revised scale and also provided open-ended comments about the relevance, representativeness, and clarity of the scales. Taking into consideration the item-total correlation coefficient (i.e., >0.30) and the open-ended comments for each of the items, eight items were identified as unfit and hence deleted. As a result of this step of scale development, a total of 24 items were retained. Of these, 22 items were derived from modifications of items in the existing scales, mainly the DSM-IV, SOGS, and CPGI, where all of the modifications were based on the information derived from the interviews or transcripts of telephone records; meanwhile, 2 items were purely

generated from interviews and transcripts. This version of the SAPG with 24 items was subject to further examination of measurement properties and their predictability of sports lottery purchase behaviors.

In addition to the retained SAPG items, contained in the questionnaire were four sports lottery ticket purchase behavior variables (i.e., income percentage of sports gambling expenditure, total amount of sports gambling expenditure, frequency of sports lottery purchasing, and time commitment on sports lottery related activities) that were measured as criterion variables and also demographic background variables (i.e., gender, age, education, employment status, marital status, and types of sport lottery purchased) that were designed for sample description purpose.

Procedures

Following the survey packet, the test administration was accomplished through individualized, face-to-face interviews that were conducted by trained investigators. Adoption of this data collection approach took into consideration the characteristics of Chinese residents who hold themselves excessively high on social appearance, image, and respect. (i.e., 'manzi'). At the beginning of an interview, honest responses were sincerely sought; in the meantime, confidentiality and anonymity were assured.

According to geographic characteristics and administrative zoning, China was divided into five sectors: Northern, Eastern, Southern, Western, and Middle regions. Test administration was carried out in five large cities (Shenyang, Shanghai, Guangzhou, Chengdu, and Zhengzhou) selected within each of the five regions, with residential population ranging from 7 million to 18 million. Sampling size of this study was determined by selecting one participant from every 10,000 residents within each city. Besides the population size, total sales volume of sport lottery tickets within a city and a retail sales store/outlet were also taken into consideration. Essentially, a multi-level stratified sampling approach was carried out. Following the informed consent, trained investigators conducted one-on-one interviews at a reserved space in sports lottery retail stores. Interviews were conducted on both weekdays and weekends. A total of 5,450 individuals expressed willingness to participate in the study and 4,982 completed the questions in the questionnaire, representing a response rate of 91.4%. A sports lottery ticket was used as an incentive for completing the questionnaire.

Date Analysis

Procedures from the SAS 9.2 program were used to test the multivariate normality of the data, calculate descriptive statistics, and also calculate Cronbach's alpha coefficients for the SAPG factors. To cross-validate the measurement structure of the SAPG scale, the total sample was randomly split into two halves (Lattin et al. 2003), with one half for an exploratory factor analysis (EFA) and the other for a confirmatory factor analysis (CFA). Procedures from Mplus 5.21 were utilized to conduct the EFA and CFA.,Multivariate normality is a fundamental assumption of factor analysis (Muthen and Kaplan 1985). A severe violation of this assumption can produce distorted results even using maximum likelihood (ML) estimates (Hu and Bentler 1999). The sample data were first examined using the SAS multivariate normality test. While we used Guttman-Kaiser's rule, parallel test, and scree plot, we predominantly relied on various "goodness-of-fit" information produced by Mplus 5.21 procedures and content interpretability to determine the appropriate number of factors (Fabrigar et al. 1999). Following the suggestion of Fabrigar et al. (1999), oblique rotations, which permit correlations among factors and provide a more

accurate and realistic representation of how variables of problem gambling are likely to be related to one another, were used. Specifically, we used the geomin for oblique rotation (Yates 1987), which is default in the Mplus factor procedures. This approach has been found to yield superior results and performance in comparison with direct oblimin (Browne 2001; Yates 1987). Multiple goodness-of-fit indices were used to select optimal EFA and CFA models, including the root mean square error of approximation (RMSEA), Tucker and Lewis reliability coefficient (TLI), and Bentler's comparative fit index (CFI) (Hu and Bentler 1999; Kline 2005). The RMSEA goodness of fit index (Steiger 1980; Steiger and Lind 1980) is an estimate of the discrepancy between the model and the data per degree of freedom for the model. Hu and Bentler (1999) suggested that RMSEA values less than 0.06 indicate a close fit, between 0.06 and 0.08 indicate an acceptable fit, and greater than 0.10 indicate a poor fit. Because RMSEA has been identified as the best performing index of the weighted least square parameter estimates (WLSMV) (Yu and Muthen 2002), it was our primary index to determine model fit. The TLI (Tucker and Lewis 1973), a non-normed fit index, penalizes for model complexity. Traditionally, the criterion for goodness of fit by TLI was 0.90 (Kline 2005). A rule of thumb for the CFI index is that researcher's model has a reasonable fit when a value is larger than 0.90 (Hu and Bentler 1999). Additionally, multiple regression analyses were conducted to examine the relationships between the identified SAPG factors and sports lottery ticket purchase variables.

Results

The assumption of multinormality was violated based on skewness (37,716.0, $P < 0.01$) and kurtosis (242.2, $P < 0.01$) values (Mardia 1970, 1974) as well as Henze and Zirkler (1990) t value (21,696.0, $P < 0.01$). To overcome the violation of normality assumption, we used the WLSMV that explicitly accounted for the ordinal nature of item responses to conduct the factor analyses and also adopted Guttman-Kaiser's rule, parallel test, and scree plot to determine the number of factors, which produced convergent evidence for the number of factors. Three eigenvalues were greater than 1.0, with the fourth largest eigenvalue (i.e., 0.96) being slightly smaller than 1.0, suggesting that at least three factors would exist. The parallel test, conducted by using the SAS 9.2 macro program, demonstrated that the simulated line and the actual line crossed in-between the third and fourth factors. The scree plot showed a significant decrease after the fourth eigenvalue. Therefore, we tested both the three- and four-factor models by using the WLSMV estimates with geomin for oblique rotation. The results suggested that the four factor solution was optimal in terms of model fit (RMSEA = 0.04, TLI = 0.99, CFI = 0.96). Table 2 summarizes the factor loadings for the SAPG items that were derived from the EFA.

We eliminated five items (9, 10, 12, 13, 24), one by one by starting with the one with the least indicator loadings (i.e., $\lambda < 0.35$). Consequently, we retained a total of 19 items with original interpretation of the dimensions loaded on their respective factors and without double loadings: Harmful Behavior (9 items), Compulsive Disorder (6 items), Over Expectation (2 items), and Depression Sign (2 items). The factors had low to moderate correlation with one another (i.e., 0.18–0.69). Although the EFA results were based on empirical evidence, further examination of factor interpretability revealed that the Harmful Behavior factor might be split into two factors: Social Consequence (4 items) and Financial Consequence (5 items). Following this rationale, we explicitly compared four-factor and five-factor models in the CFA analysis. Following the indications in content interoperability, a five-factor model was proposed in the CFA for the second half of the data.

Table 2 Pattern matrix of the four-factor solution for the SAPG variables

Item statement	Factor			
	I	II	III	IV
1 Playing the sports lottery has caused family financial crises	**0.86**	−0.05	−0.03	−0.03
2 You use others' money to buy sports lottery tickets	**0.77**	−0.09	−0.01	0.03
3 You cut down your family time for sports lottery purposes	**0.52**	0.00	0.04	0.34
4 The sports lottery activity causes trouble with family members	**0.58**	0.28	−0.18	0.05
5 You give up entertainment or social life for sports lottery purposes	**0.49**	−0.02	0.15	0.33
6 Your work or life is impacted by involving in sports lottery	**0.62**	0.13	−0.09	0.17
7 You spend more on the sports lottery than you can afford	**0.60**	0.13	0.10	0.06
8 You cut down on other expenditures for sports lottery	**0.41**	0.29	0.06	0.01
9 You hide your sports lottery tickets	0.25	0.20	0.04	0.22
10 You conceal your real sports lottery expenditures	0.23	0.31	0.05	0.15
11 If you believe you may win a prize, you will buy more sports lottery	0.07	0.00	**0.62**	0.28
12 You buy sports lottery tickets more frequently than you have planned	0.34	0.28	0.25	0.01
13 You have spent excessive energy on sports lottery	0.21	0.15	0.31	−0.03
14 You feel excited about spend more on sports lottery	−0.05	0.07	**0.55**	0.32
15 You often end up spending more on sports lottery than planned	**0.58**	0.11	0.25	−0.10
16 You buy sports lottery hoping to win back the money you have spent	0.14	**0.37**	0.15	0.15
17 You keep buying sports lottery even if you doubt the credibility of the lottery administration	−0.25	**0.55**	0.13	0.06
18 You keep buying sports lottery regardless of its bad consequences	0.07	**0.68**	0.07	−0.15
19 You keep buying sports lottery despite family members' dissuasion	−0.01	**0.59**	0.00	0.12
20 You attempt to cut down your sports lottery buying but fail	−0.01	**0.69**	−0.05	0.06
21 You attempt not to recall your unhappy experiences related to the sports lottery but fail	0.13	**0.60**	0.02	−0.07
22 When you fail to win a prize through sports lottery, you attempt to conceal your disappointment but fail	0.15	0.04	0.00	**0.67**
23 You feel frustrated when you fail to win a prize through sports lottery	0.02	0.18	−0.01	**0.63**
24 You pour out your unhappy sports lottery buying experiences to others	0.13	0.33	−0.12	0.26

Factor I Harmful behavior, *Factor II* Compulsive disorder, *Factor III* Over expectation, *Factor IV* Depression sign

Factor loadings greater than .35 are bolded

Goodness of fit indexes showed that the five-factor measurement model fit the data well (RMSEA = 0.050, TLI = 0.978, and CFI = 0.922). In particular, the RMSEA value of 0.050 indicated a close fit. All factors had low to moderate correlations with one another (i.e., 0.23–0.60). The model comparison was executed by using the DIFFTEST procedure in the Mplus 5.21 program. In comparison with the empirical four-factor structure (RMSEA = 0.052, TLI = 0.976, and CFI = 0.915) suggested by the EFA, the level of model fit for the five-factor structure was significantly superior ($\chi_{(1,\ 24)}$ = 65.03, $P < 0.05$); thus, a decision was made to adopt the five-factor solution for the SAPG scale.

To assess the reliability of the factors identified in the SAPG scale, the following three tests were conducted: Cronbach's alpha (α), construct reliability (CR), and averaged variance extracted (AVE). Cronbach's alpha (α) coefficients (i.e., internal consistency values) indicate the relationship among items. CR is an internal consistency measure that accounts

for measurement errors of all indicators (Fornell and Larcker 1981). The internal consistency (α) value and CR are suggested to be equal to or greater than 0.70 cut-off point (Fornell and Larcker 1981; Nunnally and Bernstein 1994). The AVE values assessed the variance captured by the indicators relative to measurement error. AVE value above 0.50 is considered acceptable (Fornell and Larcker 1981). As the Over Expectation and Depression Sign factors comprised only two items, they were of mediocre CR coefficients (i.e., 0.60 and 0.72) and AVE values (i.e., 0.43 and 0.56). The AVE value for Compulsive Disorder was only 0.41. The CR coefficients for the remaining three factors were greater than 0.80 and AVE values for the remaining two factors were greater than 0.50, indicating good convergent validity (Table 3).

Table 3 Summary of the five-factor measurement model, including factor loading, construct reliability, alpha reliability, and average variance extracted

	Factor/item	CR	λ	α	AVE
	Financial consequence	0.84		0.72	0.52
1	Playing the sports lottery has caused family financial crises		0.81		
2	You use others' money to buy sports lottery tickets		0.68		
7	You spend more on the sports lottery than you can afford		0.76		
8	You cut down on other expenditures for the sports lottery		0.64		
15	You spend more money buying sports lottery tickets than you have planned		0.69		
	Social consequence	0.84		0.72	0.57
3	You cut down your family time for sports lottery purposes		0.79		
4	The sports lottery causes trouble with family members		0.75		
5	You give up entertainment or interpersonal communication for sports lottery purposes		0.70		
6	Your work or life is impacted by sports lottery activities		0.76		
	Over expectation	0.60		0.56	0.43
11	If you believe you may win a prize through purchasing sports lottery, you will buy more		0.69		
14	You feel excited about spending more on sports lottery		0.61		
	Compulsive disorder	0.80		0.70	0.41
16	You buy sports lottery tickets hoping to win back the money you have spent		0.69		
17	You keep buying sports lottery tickets even though you doubt the credibility of sports lottery administration		0.52		
18	You keep buying sports lottery regardless of bad consequences		0.67		
19	You keep buying sports lottery despite family members' dissuasion		0.69		
20	You attempt to cut down your sports lottery buying but fail		0.66		
21	You attempt not to recall your unhappy experiences related to sports lottery but fail		0.58		
	Depression sign	0.72		0.65	0.56
22	When you fail to win a prize through sports lottery, you attempt to conceal your disappointment but fail		0.75		
23	You feel frustrated when you fail to win a prize through sports lottery		0.75		

Table 4 Inter-factor correlations and averaged variance extracted of the SAPG factors

Factor	1	2	3	4	5
1. Financial consequence	0.85				
2. Social consequence	0.60**	0.85			
3. Over expectation	0.35**	0.35**	0.75		
4. Compulsive disorder	0.35**	0.32**	0.28**	0.84	
5. Depression sign	0.33**	0.40**	0.29**	0.23**	0.81

Diagonal entries are square root of the average variance extracted (AVE). Off-diagonal entries are the correlations between the SAPG factors

** $P < 0.01$ (two-tailed)

Table 5 Multiple regression analyses examining the relationship between the SAPG factors and the consumption factors

Variable	ß	SE B	t	P
Percentage of sports gambling expenditure over monthly income ($R^2 = 0.159$, $R^2_{adj} = 0.158$)				
Financial consequence	0.384	0.029	13.110	0.0001
Social consequence	0.080	0.028	2.890	0.0040
Over expectation	0.078	0.014	5.580	0.0001
Compulsive disorder	0.058	0.021	2.850	0.0040
Depression sign	0.004	0.016	0.260	0.7940
Amount of sports gambling expenditure ($R^2 = 0.066$, $R^2_{adj} = 0.065$)				
Financial consequence	0.174	0.047	3.700	0.0000
Social consequence	0.185	0.045	4.120	0.0001
Over expectation	0.152	0.023	6.730	0.0001
Compulsive disorder	0.081	0.033	2.450	0.0140
Depression sign	−0.021	0.026	−0.780	0.4330
Frequency of sports lottery purchasing ($R^2 = 0.070$, $R^2_{adj} = 0.069$)				
Financial consequence	0.114	0.029	3.990	0.0001
Social consequence	0.055	0.027	2.020	0.0440
Over expectation	0.099	0.014	7.240	0.0001
Compulsive disorder	0.090	0.020	4.500	0.0001
Depression sign	−0.014	0.016	−0.880	0.3800
Time spend on sports lottery related activities ($R^2 = 0.112$, $R^2_{adj} = 0.111$)				
Financial consequence	0.271	0.037	7.240	0.0001
Social consequence	0.228	0.036	6.410	0.0001
Over expectation	0.076	0.018	4.230	0.0001
Compulsive disorder	0.036	0.026	1.360	0.1730
Depression sign	0.035	0.021	1.680	0.0930
Overall consumption behavior ($R^2 = 0.158$, $R^2_{adj} = 0.157$)				
Financial consequence	0.236	0.026	8.960	0.0001
Social consequence	0.137	0.025	5.480	0.0001
Over expectation	0.101	0.013	8.040	0.0001
Compulsive disorder	0.066	0.018	3.590	0.0000
Depression sign	0.001	0.015	0.080	0.9350

Discriminant validity is the extent to which a factor is distinct from other factors. Kline (2005) suggested that discriminant validity can be established when interfactor correlation is below 0.85 (2005). In this current study, interfactor correlations ranged from 0.23 (between Depression Sign and Compulsive Disorder) to 0.60 (between Financial Consequence and Social Consequence). Another way to evaluate discriminant validity is to compare the square root of AVE with the correlation coefficients among the factors. It is recommended that the square root of AVE of a factor should be greater than the correlations between one factors and any other factor in the model (Chin 1998; Fornell and Larcker 1981; Hulland 1999). Findings in Table 4 indicate strong discriminant validity of the five SAPG factors, providing evidence of internal consistency reliability as well as convergent and discriminant validity.

Multiple regression analyses examining the predictability of the SAPG factors to the four sports lottery ticket purchase behavior variables (i.e., income percentage of sports gambling expenditure, total amount of sports gambling expenditure, frequency of sports lottery purchasing, and time commitment on sports lottery related activities) were conducted by employing the full-model approach, where all five SAPG factors were entered simultaneously to examine their influence on a purchasing behavior variable. Financial Consequence, Social Consequence, Over Expectation, and Compulsive Disorder were found to be significantly ($P < 0.05$) predictive of the income percentage of sports gambling expenditure, with a total of 15% variance explained. These four factors were also found to be significantly ($P < 0.05$) predictive of the total amount of sports gambling expenditure and the frequency of sports lottery purchasing, explaining 6.9 and 7.0% variance, respectively. Financial Consequence, Social Consequence, and Over Expectation were significantly ($P < 0.05$) predictive of time commitment on sports lottery related activities. When the four criterion variables were combined, which was based on the findings of an exploratory factor analysis that revealed high correlations among the criterion variables and an unidimensional factor structure, Financial Consequence, Social Consequence, Over Expectation, and Compulsive Disorder were found to be significantly ($P < 0.05$) predictive of the overall sports lottery purchase behavior, explaining a total of 15.8% variance. Nevertheless, Depression Sign was not found to be significantly ($P > 0.05$) related to any of the criterion variables, and Compulsive Disorder was not significantly ($P > 0.05$) related to time commitment on sports lottery related activities (Table 5).

Discussion

In the first critical review of literature on problem gambling instrumentation that was conducted nearly 20 years ago, only two screening tools could be identified (Volberg and Banks 1990). By 2004, more than 20 instruments had been developed for such reasons as screening, assessment, diagnosis, treatment planning, and treatment monitoring in clinical settings, as well as for epidemiological studies and public health research (Abbott and Volberg 2006; Stinchfield et al. 2004). While the DSM-IV and SOGS have been most adopted in research investigations, limitations have been recognized in their usefulness; in particular, they were developed in clinical settings. They perform under an assumption that problem gamblers in the general population are similar to those who end up in clinical treatment facilities; thus, these instruments are not ideal for use in studying issues in the general population (Volberg and Abbott 1994; Volberg and Steadman 1992). Walker (1996) criticized the DSM-IV definition, arguing that no pathology had been demonstrated, nor did the condition have the characteristics of classical neuroses. There is a lack of empirical evidence to classify problem gambling players into clinical patients and it is

unlikely unacceptable for defining problem gamblers as patients in the traditional "mainzi" culture of China. Apparently, these instruments may be of limited usage in China, in part due to the unique market environment of sports gambling. Additionally, the criteria within the DSM-IV and SOGS instruments were developed primarily based on investigations into the middle-class, middle-aged white males, often excluding low-income groups, females, and minorities (Volberg and Young 2008). In fact, low income and less educated individuals in China are most likely to buy sports lottery and count for the absolute majority of sport lottery consumers (Wang 2008). In an effort to conduct effective general population surveys in non-clinical settings, more recent research efforts have made to assess problem gambling as a public health issue from epidemiological perspectives (Ferris and Wynne 2001). For instance, the CPGI was developed under this premise.

In an effort to study problem gambling as a public health issue in China, in this study the SAPG was developed based on a rigorous, qualitative research process and interviews of a large sample of sport gamblers in major metropolitan areas of China. While basic elements of assessing problem gambling in previous studies were taken into consideration (e.g., DSM-IV, SOGS, and CPGI), uniqueness of China's sports gambling environment and consumer characteristics were incorporated into the formulation of the SAPG scale. Through a comprehensive investigation process, five dimensions (i.e., Financial Consequence, Social Consequence, Over Expectation, Compulsive Disorder, and Depression Sign) were identified to be relevant and reliable to assess problem gambling. Four of the five factors, except for Depression Sign, were found to be predictive of the level of sports lottery consumptions, indicating that excessive level of sports lottery purchase could be associated with higher level of Financial Consequence, Social Consequence, Over Expectation, and Compulsive Disorder. It appears reasonable that education and prevention measures should be developed based on these four factors.

Similar to previous scales (e.g., DSM-IV, SOGS, and CPGI), the behavioral and consequential aspects of sport problem gambling were strongly reflected in the developed SAPG. The behavioral domain has by far the most focused area of assessment for identifying problem gambling; for instance, in the SOGS, DSM-IV, and CPGI scale, 82, 90, and 51% items focus on behavioral indications, respectively. While behavioral indicators are still major representations of the SAPG items, a particular attention was made to assess consequences of sports gambling problems in this study. Two of the five SPAG factors were actually designed to assess consequences (i.e., Financial Consequence and Social Consequence); meanwhile, behavioral items were mainly incorporated into two factors, namely Compulsive Disorder and Depression Sign. To a great extent, the Over Expectation factor, as assessed by such an item as 'If you believe you may win a prize through purchasing sports lottery, you will buy more'. represents the unique marketing environment of China. As its gambling administration and retail stores are biased toward sales volume, there is often a tendency of misleading through their promotional practices. Many sports gamblers possess a misperceived and exaggerated belief of winning chance; oftentimes, the only reason that one purchases sports lottery is to win. In 2007, Shanghai Sports Gambling Research Center surveyed a total of 1, 512 sports gamblers and that 65.7% of gamblers were solely motivated by winning. As the cycle of being optimistic to pessimistic repeats, disappointment and even depression accompanied many individuals. Another major concern of sports gamblers was their distrust on the credibility, honesty, and social responsibilities of governmental and corporate administrative agencies in China. Several cheating incidents in recent years had worried consumers (Tang et al. 2007).

It is a common perception that sports lottery issuance and administration in China are solely concerned about the sales volume; consequently the probability of winning the game

is exaggerated in the process of sales, with advertisements highlighting 'becoming overnight rich', increasing misconceptions among gamblers and likely leading to problem gambling. Previous research findings have shown that a majority of problem and pathological gamblers bet excessively in part due to their cognitive misconceptions, including erroneous perceptions, irrational beliefs, and misunderstanding of randomness, mutual independence, and probabilities, all of which lead to the misattribution of causal connections between chance events and unrealistic estimates of the likelihood of winning (Ladouceur et al. 2002; Ladouceur and Walker 1996; Toneatto et al. 1997; Walker 1992; Sylvain et al. 1997). Nevertheless, the "mianzi" culture hinders many Chinese people from admitting their pathological tendencies and they do not seek professional help (Loo et al. 2008). Consequently, for some Chinese lottery players, their lottery activities may cause serious financial, family, and career problems (Tang et al. 2007).

The resulted SAPG scale has provided a measurement tool for future studies of Chinese sports betting problem gamblers and also empirical evidence for Chinese sports administrations to consider constructing a social assistance system and formulating gambling policies. When considering the fact that problem gambling is already a social issue, this study was timely in generating research attention among scholars and social attention in the public. The developed scale can be used for surveys of the general population of sports gamblers, similar to the usage of the CPGI.

This study represents an initial effort to understand the dimensions of problem gambling associated with Chinese sports lottery consumers. Researchers and practitioners may adopt the developed scale to examine problem gambling behaviors and develop effective prevention and intervention procedures based on tangible evidence. With proper adaption, modification, and validation, the SAPG has the potential to be adopted in other sociocultural contexts, such as North America, where few specific measurement tools are available to assess behavioral problems associated with sport gambling, which most likely occur among sport gamblers.

One reason that the Depression Sign factor was not found to be relevant to the consumption level variables in this study might be that this study involved all sports gamblers, not merely problem gamblers, potentially limiting the magnitude of influence by this factor that was more relevant to problem gamblers. Future studies may consider focusing on those sports lottery consumers who are identified as problem gamblers and further examine the relevance of this factor to the assessment of problem gambling. Additionally, a sport lottery ticket was used in this study to attract sport gamblers to participate in the survey. Although this approach was effective in achieving a high response rate, it could have unintentionally hinted for desirable responses; thus, future studies may consider not offering incentives during investigations.

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