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**AN EMPIRICAL INVESTIGATION INTO THE INDIVIDUAL AND
CONTEXTUAL FACTORS IN ADOLESCENT GAMBLING**

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Dedication

*To Marianna, my mother and my
foundation.*

To my father's good part.

*To Mauro,
in loving memory*

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Abstract

Youth problem gambling has become an emerging public health issue in many countries. Disordered gambling is a multidimensional condition involving bio-psycho-social determinants including psychological processes, individual personality characteristics, social and familial influences, and environmental stressors. Studies based on this multidimensional assumption are still limited. For instance, some limitations of the current gambling literature are that: (i) there is relatively little research on modifiable adolescent behavioural and social environmental factors contributing to the development of problem gambling (Scholes-Balog, Hemphill, Dowling, & Toumbourou, 2014); (ii) few studies have investigated the mediation effects of environment on person-gambling relationship and vice versa (Ariyabuddhiphongs, 2013); (iii) although impulsivity has been consistently associated with gambling, the psychological mechanisms by which impulsivity might influence gambling disorder are not clearly understood (Kraplin et al., 2014). According to the conceptual framework for the development of gambling in youth (Barnes, Welte, Hoffman, & Dintcheff, 1999) and the conceptual framework of harmful gambling (Abbot et al., 2013), the current research project aimed to address this gap in the literature by focusing on the interaction between socio demographic-, individual/psychological-, socialization-, and contextual-factors in determining problem gambling in adolescents and young adults.

Study 1: The first study investigated the role of socioeconomic indicators of the welfare state and family practices in explaining probable problem gambling during adolescence. A multilevel model was used to evaluate the impact of the parenting (regulation, caring and monitoring/knowledge: individual-level) and country (GDP, expenditure on public health, family/children benefits: country-level) influences on adolescent possible problem gambling in a representative sample of students living in nine European countries. Data were drawn from the 2011 European School Survey Project on Alcohol and Other Drugs (ESPAD) Study (n = 29952; 53% girls; 16-year-old

students). Students who perceived more parental monitoring/knowledge and caring reported less involvement in possible problem gambling. Moreover, students who perceived stronger parental regulation were more likely to be possible problematic gamblers. At the country level, expenditure on public health was negatively associated with possible problem gambling.

Study 2: Among parenting practices influencing adolescent gambling in the first study, the second study focused on the protective effect that parents who are knowledgeable about youth activities could have in preventing or hindering youth gambling, with the aim of elucidating some of the pathways responsible for this association. Data were drawn from the ESPAD®Italia2012 (European School Survey Project on Alcohol and Other Drugs) study which is based on a nationally representative sample (n = 19573; 54% girls; age, M = 17.11 years, SD = 1.43). In study 2, a path analysis was used to test an integrative model linking parental knowledge about their offspring's whereabouts with adolescent gambling, while evaluating the mediating effects of gambling-oriented attitudes (adolescents' own gambling approval; risk-perception of gambling; and descriptive norms on gambling shared with friends). Results showed that adolescents who perceived higher levels of parental knowledge were more likely to disapprove of gambling and had higher awareness of its harmfulness, which in turn were negatively related to gambling frequency. They were also less likely to perceive their friends as gamblers, which in turn was also negatively related to gambling frequency.

Studies 3-4: The third and fourth study investigated how gambling oriented attitudes (e.g., risk and benefits perception of gambling) and decision-making processes may explain gambling outcomes by studying the psychological mechanisms that underlie the influence of impulsivity on problem gambling. Although impulsivity traits have been linked to problem gambling, less is known about psychological mechanisms that explain the relationships between impulsivity traits and problem gambling. The purposes of Studies 3-4 were to examine a theoretical model linking impulsivity traits and gambling problems taking into account the role of gambling motives (study 3) and decision-making processes (study 4). Participants comprised students enrolled in public high

schools or universities. In Study 3 (n = 594; 73% male; mean age = 19.92 years; SD = 2.91), young people who tend to act rashly in response to extremely positive emotions showed higher coping and enhancement motives, which in turn were positively related to gambling problems. In addition, sensation seekers were more likely to have higher levels of enhancement motives, which in turn were also positively associated with gambling problems. Specific associations between impulsivity traits, gambling motives and gambling problems were significant only in young people who perceived lower risks and higher benefits of gambling. In Study 4 (n = 986; 64% male; mean age = 19.51 years; SD = 2.30), young people who tend to act rashly in response to extreme moods were more likely to have lower levels of deliberative decision-making and higher preferences for immediate/small rewards, which in turn were positively related to gambling problems.

In conclusion, taken together, the findings of the four studies suggest that gambling frequency and gambling problems are the outcome of both personal and contextual characteristics (Lussier, Derevensky, Gupta, & Vitaro, 2014). Consistent with the conceptual framework for the development of gambling in youth (Barnes et al., 1999) and the conceptual framework of harmful gambling (Abbot et al., 2013), these results may be regarded as an original example of how individual characteristics and social context may interact to affect individual behaviour. These results might also have important implications for gambling prevention programs and future social welfare policies.

Abstract (Italian)

Il gioco d'azzardo problematico nei giovani è ormai un emergente problema di salute pubblica in molti Stati. Il disturbo da gioco d'azzardo è una condizione multidimensionale caratterizzata da determinanti bio-psico-sociali che includono processi psicologici, caratteristiche individuali di personalità, influenze sociali e familiari e stressor ambientali. Gli studi basati su questa prospettiva multidimensionale del gioco d'azzardo sono ancora pochi. Per esempio, alcune limitazioni dell'attuale letteratura scientifica sul gioco d'azzardo giovanile sono: (i) la scarsa attenzione ai fattori comportamentali adolescenziali modificabili e all'ambiente sociale che favoriscono lo sviluppo del gioco d'azzardo problematico (Scholes-Balog, Hemphill, Dowling, & Toumbourou, 2014); (ii) pochi studi hanno indagato gli effetti di mediazione del contesto nella relazione gioco d'azzardo-caratteristiche individuali e viceversa (Ariyabuddhiphongs, 2013); (iii) nonostante l'impulsività sia stata associata al gioco d'azzardo in diversi studi, i meccanismi psicologici attraverso i quali può influenzare il disturbo da gioco d'azzardo non sono tuttora particolarmente chiari (Kraplin et al., 2014). In accordo con i framework teorici per lo sviluppo del gioco d'azzardo tra i giovani (Barnes, Welte, Hoffman, & Dintcheff, 1999) e del *harmful gambling* (Abbot et al., 2013), il presente progetto di ricerca ha lo scopo di contribuire alla letteratura esistente focalizzandosi sull'interazione tra fattori socio demografici, individuali/psicologici, della socializzazione e contestuali nell'influenzare il gioco d'azzardo problematico in adolescenti e giovani adulti.

Studio 1: Il primo studio ha indagato il ruolo degli indicatori socioeconomici di welfare e le pratiche familiari nello spiegare il possibile gioco d'azzardo problematico durante l'adolescenza. È stato utilizzato un modello multilivello per valutare l'impatto delle influenze genitoriali (regole, cura e monitoring/conoscenza: a livello individuale) e contestuali (prodotto interno lordo, spesa in salute pubblica, benefici economici per famiglia/bambini: a livello aggregato di nazione) sul possibile

gioco d'azzardo problematico in un campione rappresentativo di studenti che vivono in nove Stati Europei. I dati sono stati ottenuti dallo studio 2011 European School Survey Project on Alcohol and Other Drugs – ESPAD (n = 29952; 53% femmine; studenti sedicenni). Gli studenti che percepivano maggiore monitoring/conoscenza genitoriale e cura hanno riportato un minore coinvolgimento nel possibile gioco d'azzardo problematico. In aggiunta, gli studenti che hanno dichiarato di percepire maggiori regole fissate dai genitori avevano una maggiore probabilità di essere possibili giocatori d'azzardo problematici. A livello aggregato, la spesa di welfare in salute pubblica è risultata associata negativamente al possibile gioco d'azzardo problematico.

Studio 2: Tra le pratiche genitoriali che influenzano il gioco d'azzardo adolescenziale nel primo studio, il secondo studio si è focalizzato sull'effetto protettivo che i genitori caratterizzati da alti livelli di conoscenza circa le attività dei figli possono avere nel prevenire o impedire il gioco d'azzardo giovanile, con lo scopo di elucidare alcuni dei meccanismi responsabili di questa associazione. I dati sono stati ottenuti dallo studio ESPAD®Italia2012 (European School Survey Project on Alcohol and Other Drugs) e si riferiscono ad un campione rappresentativo della popolazione italiana (n = 19573; 54% femmine; età media = 17.11 anni, DS = 1.43). Nello studio 2, una path analysis è stata utilizzata per testare un modello integrativo che lega la conoscenza genitoriale dell'attività dei figli con il gioco d'azzardo adolescenziale, valutando contemporaneamente gli effetti di mediazione degli atteggiamenti relativi al gioco d'azzardo (l'approvazione individuale del gioco d'azzardo degli adolescenti; la percezione del rischio del gioco d'azzardo; e le norme descrittive sul gioco d'azzardo condivise con gli amici). I risultati hanno dimostrato che gli adolescenti che hanno dichiarato di percepire maggiori livelli di conoscenza genitoriale avevano maggiore probabilità di disapprovare il gioco d'azzardo ed avere maggiore consapevolezza della sua pericolosità; questi fattori, a loro volta, sono risultati negativamente associati alla frequenza di gioco d'azzardo. Tali studenti con alti livelli di conoscenza genitoriale percepita avevano inoltre una minore probabilità di percepire i loro amici

come giocatori d'azzardo, fattore a sua volta negativamente associato alla frequenza di gioco d'azzardo.

Studi 3-4: Il terzo e quarto studio hanno indagato come gli atteggiamenti relativi al gioco d'azzardo (per esempio la percezione dei rischi e dei benefici del gioco d'azzardo) e i processi decisionali possano spiegare i comportamenti di gioco d'azzardo tramite lo studio del loro coinvolgimento a livello dei meccanismi psicologici che sottolineano l'influenza dell'impulsività sul gioco d'azzardo problematico. Nonostante i tratti d'impulsività siano stati collegati al gioco d'azzardo problematico, si ha una scarsa conoscenza dei meccanismi psicologici che spiegano tale associazione. Gli scopi degli studi 3-4 erano di esaminare un modello teorico che colleghi i tratti d'impulsività ai problemi di gioco d'azzardo considerando il ruolo delle motivazioni al gioco d'azzardo (Studio 3) e i processi di decision-making (Studio 4) come possibili mediatori. I partecipanti agli studi erano studenti iscritti in scuole pubbliche di secondo grado o università pubbliche. Nello studio 3 (n = 594; 73% maschi; età media = 19.92 anni; DS = 2.91), i giovani che tendevano ad agire d'impulso mentre provavano delle intense emozioni positive riportavano maggiori motivazioni di coping e di rinforzo al gioco d'azzardo, che a loro volta erano positivamente relate ai problemi di gioco d'azzardo. In aggiunta, giovani caratterizzati da alti livelli di sensation seeking avevano maggiore probabilità di riportare livelli più alti di motivazioni di rinforzo al gioco d'azzardo, che a loro volta erano positivamente associati ai problemi di gioco d'azzardo. Specifiche associazioni tra tratti d'impulsività, motivazioni al gioco d'azzardo e problemi di gioco d'azzardo erano significative solo in giovani che percepivano bassi rischi ed elevati benefici del gioco d'azzardo. Nello studio 4 (n = 986; 64% maschi; età media = 19.51 anni; DS = 2.30), i giovani che tendevano a comportarsi impulsivamente mentre provavano intense emozioni avevano maggiori probabilità di riportare bassi livelli di decision-making deliberativa e maggiori preferenze per rinforzi immediati ed economicamente sconvenienti, che a loro volta erano positivamente relati ai problemi di gioco d'azzardo.

In conclusione, presi insieme, i risultati dei quattro studi suggeriscono che la frequenza ed i problemi di gioco d'azzardo sono il risultato sia di caratteristiche individuali che contestuali (Lussier, Derevensky, Gupta, & Vitaro, 2014). In accordo con i framework teorici per lo sviluppo del gioco d'azzardo tra i giovani (Barnes, Welte, Hoffman, & Dintcheff, 1999) e del *harmful gambling* (Abbot et al., 2013), questi risultati rappresentano un esempio originale di come caratteristiche individuali e contesto sociale possano interagire nell'influenzare il comportamento dell'individuo. Questi risultati possono anche avere importanti implicazioni per i programmi di prevenzione al gioco d'azzardo e le future politiche sociali di welfare.

Overview

A person is gambling whenever he or she takes the chance of losing money or belongings, and when winning or losing is decided mostly by chance. Gambling in Italy has grown at an exceptional proportion over the last decade and is an increasingly popular recreational activity. While gambling was once illegal, or viewed as a disreputable activity, social norms have shifted. Gambling is now a multi-million euro industry in Italy, and its growth is likely to continue.

A recent theoretical shift in gambling studies led scholars to conceptualize adolescent gambling beyond addiction taking into account the continuing role of environment in the case of gambling disorder. Although studies based on this assumption are still limited, the existing evidence suggests that gambling frequency and gambling problems are the outcome of both personal and contextual characteristics (Lussier, Derevensky, Gupta, & Vitaro, 2014).

The present thesis, fitting in with this more recent line of research, aims to expand the existing evidence by examining how individual and contextual factors are involved in explaining adolescent gambling. The first two chapters of the thesis will offer the essential introduction of the topics investigated.

Chapter 1 will give an overview presentation of the most appropriate definitions of these phenomena and the possible measures of problem gambling in adolescence, along with a general description of health consequences with a specific focus on psychological, relational and economic consequences.

Chapter 2 will introduce two theoretical frameworks adopted in literature to explain and, subsequently modify problem/harmful gambling, focusing on four explanatory domains: macroeconomic factors (socio-economic indicators of welfare), sociodemographic factors (gender, age, parental education and family structure), socializations factors (parental knowledge/monitoring

and parental caring), and individual/psychological factors (impulsivity traits, gambling motives, gambling oriented attitudes, decision making processes).

According to the conceptual framework for the development of gambling in youth (Barnes, Welte, Hoffman, & Dintcheff, 1999) and the conceptual framework of harmful gambling (Abbot et al., 2013), the research work presented in this thesis has been conducted following a logical succession for an in-depth investigation of the youth gambling, as represented by the sequence of the four studies. From Chapters 3 to 6, the four studies that composed the current thesis will be presented.

Given the paucity of research on social environmental factors contributing to the development of problem gambling, the aim of the study presented in **Chapter 3** was to examine the role of family and socio-economic indicators of the welfare state in explaining probable problem gambling. A part of the results has been published in *Addiction* (Molinaro et al., 2014).

The study described in **Chapter 4** was aimed to fulfil a lack of literature, i.e. the absence of studies examining the mediation effects of individual factors (gambling oriented attitudes) on parental influences-gambling relationship. A part of the results is under review at *Prevention Science*.

Chapters 5-6 will present two studies designed to examine for the first time a theoretical model linking impulsivity traits and gambling problems taking into account the role of gambling motives (study 3, Chapter 5) and decision-making processes (study 4, Chapter 6). Part of the results section has been published in *Psychology of Addictive Behaviors* (Canale, Vieno, Griffiths, Rubaltelli, & Santinello, 2015a) and *Addictive Behaviors* (Canale, Vieno, Griffiths, Rubaltelli, & Santinello, 2015b).

In the last part of the thesis (**Chapter 7**) I will draw conclusions about the importance of a social-ecological approach in explaining adolescent gambling.

Chapter 1

Youth gambling: Issues, concerns, and recommendations

Gambling, wagering real money in order to win money, is a social activity existing in almost all cultures and across development. Gambling becomes a problem when gamblers lose control and cause harms to themselves, their family, friend or society (Neal, Delfabbro, & O'Neil, 2005). Beyond the general definition, well-accepted screening methods for identifying problem gambling in the youth population have been developed. Developing effective measures for the identification of adolescent problem gambling in non-clinical populations is a high priority for prevention and treatment because adolescence is a period of heightened risk behaviours, and retrospective studies from adult pathological gamblers found that gambling involvement peaked in the late adolescence period and in early adulthood. In fact, youth problem gambling is an emerging public health issue in many European countries (Molinaro et al., 2014; Volberg, Gupta, Griffiths, Olason, & Delfabbro, 2010) and it has been associated with significant health and psychosocial problems (Blinn-Pike, Worthy, & Jonkman, 2010). This chapter has the aims to answer four main questions:

- (1) what is adolescent gambling?;
- (2) how can we measure adolescent gambling?;
- (3) why pay attention to adolescent gambling?;
- (4) how widespread are gambling frequency and problem gambling among adolescents?

This chapter will first describe the most appropriate definitions of these phenomena and the possible measures of problem gambling in adolescence and will then go on to present the adolescence as an important stage for the study of gambling. Finally, there will be provided a

general description of health consequences with a specific focus on psychological, relational and social consequences.

1.1. Definitions of gambling and related terms

Gambling is a cultural, social and economic phenomenon that has pervaded most cultures in the world (Binde, 2005). For instance, with regard to its economic definition in Western societies, gambling is “wagering money or something of material value on an event with an uncertain outcome with the primary intent of winning additional money and/or material goods” (Dickerson & O’Connor, 2006). In general, two of the most useful definitions of gambling are the following: i) “using real money for a variety of types of activities, including: purchasing lottery tickets, betting on sports pools, playing cards, playing bingo, playing slot machines, betting on video games or video poker, and betting on other games of skill.” (Gupta & Derevensky, 1996; p. 381); ii) “an activity that implies an element of risk, and that money, or something of sentimental or monetary value, could be won or lost by the participants.” (Ladouceur, Boudreault, Jacques, & Vitaro, 1999; p. 57).

There is actually a wide range of gambling forms. Usual forms of gambling among youth involve card playing for money (e.g., poker), arcade or video games for money; purchasing lottery tickets, gambling in bingo halls and card rooms, playing slot machines and table games in casinos; gambling on video lottery/poker terminals, wagering on the Internet, betting with peers on games of personal skill (e.g., pool, bowling and other sports) and sport wagering, dice, and board games with family and friends (Derevensky, 2012; Griffiths & Parke, 2010).

Recently, the growing of Internet gambling and the convergence of gambling with digital media technologies like social networking sites, mobile phones, interactive television, and video games has drawn increased gambling opportunities (King, Delfabbro, & Griffiths, 2010). Griffiths et al. (2014) identified several gambling practices due to this technological convergence. Take into account the convergence of gambling and social networking sites (i.e., *Facebook*), there are

hundreds of poker applications, pseudo gambling (i.e., '*Fluff Friends*') that provides sophisticated and realistic simulated gambling opportunities to youth, and gambling game (i.e., *Bingo Friendzy* developed by *Gamesys* for *Facebook*). More recently, it was also recently noticed that a growing number of adolescents engaged in these forms of gambling via smartphones or the Internet (Griffiths & Parke, 2010; McBride & Derevensky, 2012). In addition, the interactive television (i-TV) is another container of a lot of gambling activities. One of the most popular methods is the television show to answer quiz questions where people pay premium rates to call in and be selected to answer simple questions. A winner is then selected from all those participants (or viewers) with the correct answer. This television game can be considered a form of gambling because people (viewers) are staking money (through the cost of the premium-rate telephone call) on the outcome of a future event (i.e., whether they will get the correct answer) (Griffiths, 2007). Many companies have already developed interactive television play-by-play betting system (i.e., *SportXction*).

Although gambling is generally a positive experience in most cases and a socially acceptable behaviour (Griffiths, 1996), a minority of the population can develop a gambling disorder. The American Psychiatric Association (APA) formally recognized pathological Gambling as a mental disorder in 1980 in the third edition of the Diagnostic and Statistics Manual (DSM-III). Diagnostic criteria for pathological gambling were revised in 1987 for DSM-III-R (American Psychiatric Association, 1987), and again in 1994 for DSM-IV (American Psychiatric Association, 1994), and most recently in 2013 for DSM-V (American Psychiatric Association, 2013).

Gambling disorder was recognized by the DSM-IV (American Psychiatric Association, 1994) as an impulse control disorder that is characterized by chasing losses (i.e., betting more money after losses in an attempt to 'win back' the money lost), difficulties in controlling gambling (i.e., salience, increased tolerance, impaired control, withdrawal symptoms, mood modification) and social problems (i.e., illegal acts, problems with spouse and/or other people, work-related problems, and financial problems).

In the DSM-V are included the following changes: (i) renaming the disorder from

pathological gambling to gambling disorder; (ii) reclassifying the disorder from Impulse Control Disorders Not Elsewhere Classified to Substance-Related Disorders which will be renamed Addiction and Related Disorders; (iii) elimination of the criterion “has committed illegal acts such as forgery, fraud, theft, or embezzlement to finance gambling”; (iv) decreasing the threshold for diagnosis from five to four criteria; (v) specifying that symptoms must be presented during a 12 month time period; and (vi) considering a severity specification [mild (4-5 criteria), moderate (6-7 criteria), and severe (8-9 criteria)]. Diagnostic criteria for pathological gambling in the DSM-V (American Psychiatric Association, 2013) are presented in Table 1.

A. Persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress, as indicated by the individual exhibiting four (or more) of the following in a 12-month period:

1. Needs to gamble with increasing amounts of money in order to achieve the desired excitement.
2. Is restless or irritable when attempting to cut down or stop gambling.
3. Has made repeated unsuccessful efforts to control, cut back, or stop gambling.
4. Is often preoccupied with gambling (e.g., having persistent thoughts of reliving past gambling experiences, handicapping or planning the next venture, thinking of ways to get money with which to gamble).
5. Often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed).
6. After losing money gambling, often returns another day to get even (“chasing” one’s losses).
7. Lies to conceal the extent of involvement with gambling.
8. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling.
9. Relies on others to provide money to relieve desperate financial situations caused by gambling.

B. The gambling behavior is not better explained by a manic episode.

Table 1. DSM-V Diagnostic criteria for gambling disorder.

From the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (section 312.31)

The decision to eliminate one of the ten criteria and reduce the threshold from five to four criteria was based on empirical studies that found a reduction in false negatives and a modest improvement in classification accuracy using a cut score of four in three different countries, USA (Stinchfield, 2003), Canada (Stinchfield, Govoni & Frisch, 2005), and Spain (Jimenez-Murcia et al., 2009). In short, gambling disorder is no longer classified as an impulse control disorder but as an addiction. As a consequence of this reclassification, gambling disorder now joins substance and alcohol use because of similar aetiology, symptoms, course, correlates, and treatment approaches (Hasin et al.,

2013). Currently, it seems that while the changes in the DSM-V are likely to improve classification accuracy, they will not substantially impact prevalence rates (Denis, Fatseas, & Auriacombe, 2012; Petry et al., 2014).

Although there are various terms to describe problems with gambling in the gambling literature, two categories of gambling disorders are salient in published studies: pathological gambling and problem gambling. The former is medically defined, with diagnostic criteria described in both the International Classification of Diseases, 10th revision (ICD-10) and the DSM-IV-text revision (DSM-IV-TR). Gambling becomes a problem (problem gambling) when gamblers lose control and cause harms to themselves, their family, friends or society (Ferris & Wynne, 2001; Neal et al., 2005). More specific, according to the general definition proposed by Neal et al. (2005) in their report to the Ministerial Council on Gambling of Australia, and adopted by Canada's Problem Gambling Research Centre of Ontario (Williams, West, & Simpson, 2012): "Problem gambling is characterized by difficulties in limiting money and/or time spent on gambling which leads to adverse consequences for the gambler, others, or for the community" (p. 125). The category of "problem gambling" is generally used in research where screening measures are used to identify problem gamblers without confirmation through clinical interviews and, as such, typically includes those with gambling disorder. Problem gambling is also generally used among adolescents, while pathological and other disordered forms of gambling have been considered as an adult problem (e.g., Griffiths, 1995; Stinchfield, Cassuto, Winters, & Latimer, 1997). Thus, among gamblers who meet threshold for gambling disorder, adolescents are categorized as problem gamblers while adults as pathological gamblers (Winters, Stinchfield, & Fulkerson., 1993). However, in many cases, youth may not be aware of the presence of a (potential) gambling problem and may have it identified by others. Descriptions of the utility of screening and assessment instruments, can be found in the next paragraph.

1.2. Screening and assessment instruments: the validity of self-reported gambling in adolescence

Despite considerable interest in the study of prevalence and demographic correlates of adolescent gambling, the field of youth gambling measurement has received little attention in the gambling research. The (majority of) few screens for adolescent gambling have been typically adapted and modified from adult screening instruments. More specifically, they were adapted with wording and content considered more suitable for adolescents. The most common assessments include the South Oaks Gambling Screen-Revised for Adolescents [SOGS-RA; Winters et al., (1993)] and the DSM-IV-J (Fisher, 1992) and its revision the DSM-IV-MR-J (Fisher, 2000). It was noted that the most widely used problem gambling instruments for adolescent can have several limitations, such as a lack of theoretical, clinical and empirical rational and a lack of adequate test-retest reliability (Derevensky & Gupta, 2004; Ladoucer et al., 2000). Despite such concerns however, there are at least two good reasons of why instruments for adolescent gambling can be considered as the best approximations for the measurement of problem gambling among adolescents. First, Derevensky and Gupta (2000) found substantial agreement between these two instruments and one other assessment of problem gambling [the Gamblers Anonymous 20 Questions (GA-20Q); see Stein (1989) for a description of the questionnaire], although the DSM-IV-J reported a lower prevalence estimate than either the SOGS-RA or the GA-20Q. In addition, Barbaranelli et al. (2013) found that both South Oaks Gambling Screen (SOGS), and the Problem Gambling Severity Index (PGSI) scales can be used to screen for problem gambling in Italy. Second, previous studies have found similar profiles of personality (impulsivity and sensation seeking), internalizing symptom (depression and anxiety), physiological resting state and distraction-oriented coping between adolescent problem gamblers and adult pathological gamblers (Hardoon & Derevensky, 2002; Stucki & Rihs-Middel, 2007).

These instruments are usually administered among youths by surveys and/or interviews that require retrospective self-reports about engaging in these behaviours. The validity of these self-

reports may be compromised because some gambling behaviours (i.e., losses) are difficult to recall and some are so sensitive that respondents may not want to report them (i.e., “has jeopardised or lost a significant relationship, job, or educational or career opportunity because of gambling”). In addition, adolescents may intentionally underreport some gambling behaviours for social desirability, which is the desire to provide others with a favourable impression of oneself. Despite these factors, several previous studies have established the validity of self-reported behavioural outcomes in the area of problem gambling (i.e., Wood & Williams, 2007). Further support to the validity of self-reported measures comes from the literature about other risk-behaviours in adolescence. For example, a review on the validity of six self-reported health-risk behaviour among adolescents (alcohol and other drug use, tobacco use, behaviours related to unintentional injuries and violence, dietary behaviours, physical activity, and sexual behaviour) found that cognitive (i.e., memory recall) and situational factors (i.e., social desirability) did not threaten the validity of self-reports of each type of behaviour equally (Brener, Billy, & Grady, 2003).

However, there has also been a number of different approaches to collecting data about gamblers (offline and online). Behavioural tracking studies, for instance, collect data based on real online gamblers’ data usually provided by online gaming operators to academic researchers (Griffiths & Auer, 2011; Auer & Griffiths, 2015). Behavioural tracking data can provide an objective record of an individual’s gambling behaviour, for instance on a particular online gambling website, whereas self-report data may be subject to social desirability biases and memory recall biases. Behavioural tracking data can also be revisited after the event itself has finished. Despite the advantages of these data, Griffiths and Auer (2011) argued that self-reported studies could use data come from random and nationally representative samples, whereas behavioural tracking data always come from unrepresentative samples. In addition, self-reported studies provide clear information about gambling motivation and other individual characteristics that cannot be obtain by behavioural tracking data. Behavioural tracking studies are less likely to provide insights into the

comorbidity of gambling and other risk behaviours. Finally, behavioural tracking data cannot assess problem gambling using current diagnostic criteria.

1.3. Adolescent gambling: an issue of concern and an emerging field of research

Despite an age limit of 18 years in many European countries, gambling prevalence studies from Europe (e.g., Froberg, Modin, Rosendahl, Tengstrom, & Hallqvist, 2015; Molinaro et al., 2014; Raisamo, Halme, Murto, & Lintonen, 2013) have consistently shown that gambling is a common activity among young people. Although for most adolescents gambling is a harmless activity enjoyed in moderation, gambling can become problematic with severe problems (psychosocial and financial) for approximately 15% of youth (Derevensky & Gupta, 2007).

In addition, adolescent gambling is an issue of concern for many reasons. First, youth may be considered an at-risk group because they tend to underestimate gambling risks and often fail to be referred to or seek treatment for gambling problems (Calado, Alexandre, & Griffiths, 2014; Blinn-Pike et al., 2010) because, for example, there are few or not appropriate and/or suitable treatment programs available for adolescents and/or screening instruments for adolescent problem gambling are used incorrectly (Chevalier & Griffiths, 2004). Second, one of the most consistent epidemiological findings in the gambling literature was that estimates of problem gambling are typically higher among adolescent than adults (Barnes, Welte, Hoffman, & Dintcheff, 1999; Derevensky et al., 2003). More specifically, adolescent rates of problem gamblers are 2-4 times higher than those of adults (Blinn-Pike et al., 2010). Thus, adolescents can be considered as a group that constitutes a high-risk vulnerable population for gambling problems (Volberg et al., 2010). Third, previous studies have shown that adult gamblers with severe gambling-related problems began gambling at a much earlier age than people without gambling problems (Burge, Pietrzak, & Petry, 2006; Kessler et al., 2008). Fourth, adolescent problem gamblers were at increased risk for other addiction, including substance abuse and mental health problems (e.g., depression) (Blinn-Pike et al., 2010). Particularly during adolescence, these unaddressed problems may affect

adolescents' success in overcoming other difficulties in their lives (Volberg et al, 2010). Finally, contemporary youth are the first generation to be exposed to such a range of gambling opportunities, advertising and social approval of gambling (Griffiths et al., 2014).

In light of these concerns, and considering that adolescents move quickly from social to problem gambling, more research needs to be focused on the study of adolescent gambling (Ariyabuddhiphongs, 2013; Hayer & Griffiths, 2015) that is also recognized as an emerging field of research (Ariyabuddhiphongs, 2013). Moreover, a review of adolescent gambling revealed that research in the field of adolescent gambling is still in its infancy compared with the study of adult gambling and other comorbid adolescent behaviours (Blinn-Pike et al., 2010). In fact, a search was performed of all articles that included or mentioned either “adolescent gambling” or “adolescent alcohol” or “adolescent drug” as keywords (see Figure 1). The search was performed on SciCurve, a data intelligence platform designed to generate truly systematic review of scientific literature and global trends in science.

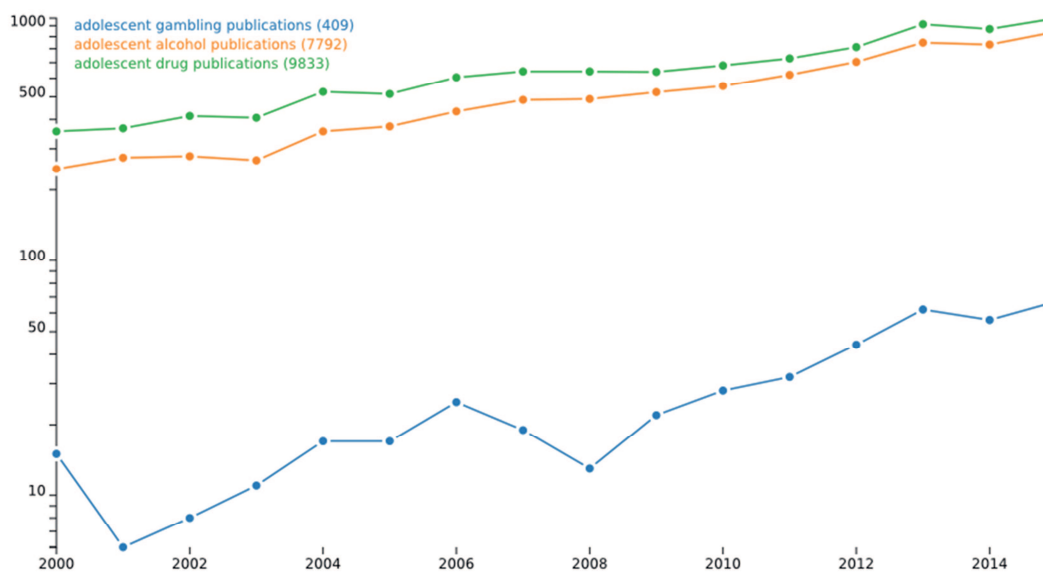


Figure 1. Papers published between 2000 and 2014.

Note: The research was performed on SciCurve. The research was performed in September 2015.

Moreover, a better understanding of the mechanism involved in adolescent problem gambling is therefore critical because, while adolescent gamblers do not necessarily become adult gamblers (Vitaro et al. 2004), the trajectories of many adult problem gamblers can be drawn during the adolescence (e.g., Carbonneau, Vitaro, Brendgen, & Tremblay, 2015). For instance, a previous study found that roughly 75% of the pathological gamblers reported having started gambling by the age of 18 (Turner, Zangeneh, & Littman-Sharp, 2006). Thus, a better understanding of adolescent gambling behaviour is needed in order to design prevention actions with regards to restrictive gambling opportunities among youth.

1.4. Gambling as a Public Health Issue

A public health perspective supports consideration of gambling activities as a continuous variable. It is now well accepted that the severity of gambling problems in youth, similar to adults, can be represented along a continuum of gambling risk (Messerlian et al., 2005). In the gambling literature, there are at least two conceptualizations of gambling continuum: the spectrum of gambling behaviour (Korn & Shaffer, 1999) and the continuum of gambling behaviour (Derevensky, 2012). Taken together these two conceptualizations provide a descriptive definition of the main phases characterizing the “career” of the problematic/pathological gambler.

Regarding the former, people's gambling behaviour can range from none (no gambling) to a great deal (pathological gambling). At the first level of risk, infrequent (light) gambling, individuals who gamble in a low-risk manner have few, if any, gambling problems. This level is characterized by degree of pleasure, enjoyment, or benefit (Korn & Shaffer, 1999). At the next level, frequent (heavy) gambling, youth who wager at higher levels can experience problems associated with their gambling. As individuals move up the continuum of gambling risk (problem gambling and pathological gambling), the impaired personal, health, financial, and social consequences of gambling become more frequent. Thus, youth gamblers have a wide array of gambling-related

problems. Individuals on the end of the continuum (pathological level) meet established diagnostic criteria and are in need of therapeutic treatment.

According to Derevensky (2012), gambling can move from non-gambling to social or recreational gambling to at-risk gambling. In the at-risk gambling stage, although individuals start to develop a number of gambling-related problems, they don't meet the established criteria for a gambling disorder. At the end of the continuum there is a compulsive, habitual, problem, pathological, or disordered gambling.

Gambling prevalence studies provide evidence that gambling among youth is widespread and that adolescents can be considered as a group constitute a high-risk vulnerable population for gambling problems (Blinn-Pike et al., 2010; Volberg et al., 2010). Adolescent rates of problem gambling were 2-4 times higher than those of adults (Blinn-Pike et al., 2010). In fact, according to the Shaffer and colleagues' meta-analysis, the lifetime prevalence of gambling disorder was 5.5% among adults, 12.3% among adolescents, and 14.0% among young adults (Shaffer et al., 1999). A comprehensive 2010 review of youth gambling studies across three continents, Australia, Europe and North America, found that: i) 60-80% of adolescents reported having engaged in some form of gambling during the past year; ii) 2-8% of adolescents reported experiencing serious gambling problems; iii) 10-15% of adolescents were at-risk for the development of gambling problem (Volberg et al., 2010).

In Europe, there are relatively few studies of adolescent gambling with a relative quality in terms of sample size, representativeness, and quality of data (Griffiths, 2011). According to the review of Volberg and colleagues (2010), the prevalence rates of gambling were: Belgium (42% lifetime prevalence), Estonia (75% lifetime prevalence), Finland (52% past year prevalence), Germany (62% past year prevalence), Great Britain (19–70% past year prevalence), Iceland (57–70% past year prevalence), Norway (74–82% past year prevalence), Romania (82% lifetime prevalence), Slovakia (27.5% lifetime prevalence), and Sweden (76% past year prevalence). In addition, the prevalence rates of adolescent problem gambling were: Estonia (3.4% lifetime

prevalence), Finland (2.3% past year prevalence), Germany (3% past year prevalence), Great Britain (2–5.6% past year prevalence), Iceland (1.9–3.0% past year prevalence), Italy (6% past year prevalence), Norway (1.8–3.2% past year prevalence), Romania (7% lifetime prevalence), Spain (0.8%–4.6% past year prevalence), and Sweden (0.9% past year prevalence).

In Italy, trends in school-aged children’s gambling have been studied from the year 2009 as part of the European School Survey Project on Alcohol and Other Drugs (ESPAD). According to the results of the ESPAD®Italia2013 school survey (Molinaro, Potente, & Cutilli, 2014), 44% of students (aged between 15 and 19 years) reported having engaged in some form of gambling during the past year. Figure 2 shows the gambling prevalence in each Italian region. On average, southern regions reported higher gambling prevalence [Calabria (53%), Basilicata (52%), Sicily (51%)].

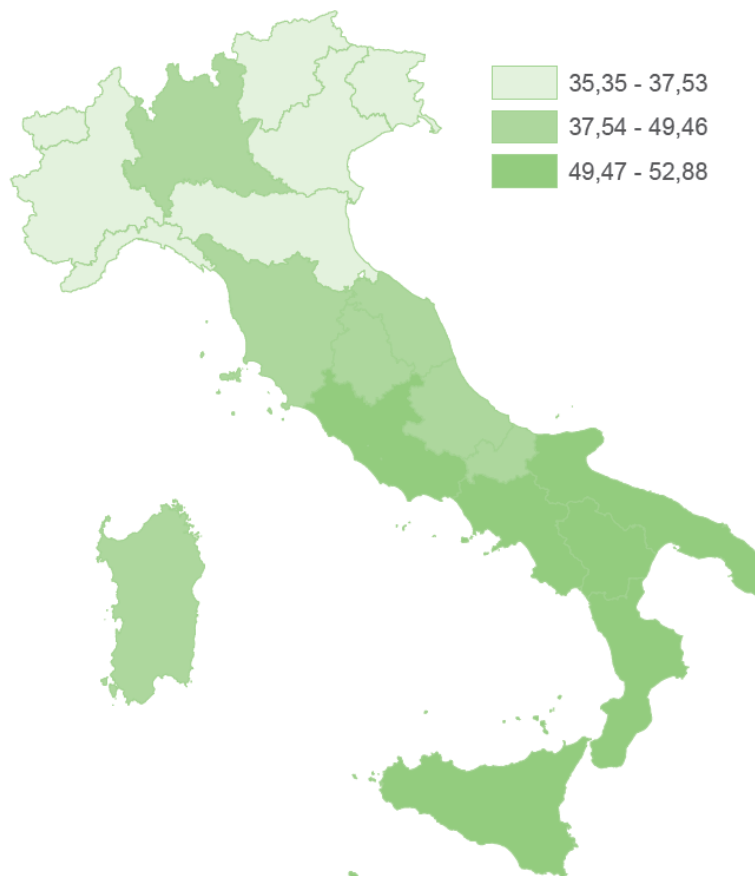


Figure 2. Gambling prevalence in each Italian region (in the last 12 months)- ESPAD®Italia2013.

(Adapted from Molinaro et al., 2014).

The ESPAD®Italia2013 data have also shown that the most endorsed activities were instant scratch/lottery tickets (73% participation) and sport betting (48% participation). Among boys, the most common activities were sport betting (67%), Texas hold'en (33%), cards games (31%) and new slot-machine (21%). Among girls, the most common activity was instant scratch/lottery tickets (84%). Although there is an age limit of 18 years for gambling in Italy, 36% of 15 years old students and 43% of 17 years old students reported having engaged in some form of gambling during the past year. Finally, 11.6% were at-risk gamblers and 7.5% were problem gamblers.

In a further investigation of the data from the ESPAD®Italia2013, Canale and colleagues (2016) have examined the relationships between specific forms and mediums of gambling (e.g., Internet gambling) and problem gambling severity. Of the students who reported gambling at least once in their life, 2,257 (15.3%) were classified as non-gamblers in the past 12 months, 10,222 (69.2%) were classified as non-online gamblers in the past 12 months, and 2,299 (15.6%) were classified as online gamblers in the past 12 months. Rates of problem gambling were five times higher among online gamblers (21.9%) than non-online gamblers (4.0%). In addition, less than 10% of non-online gamblers were classified as at-risk gamblers, whereas more than 20% of online gamblers were classified as at-risk gamblers. It is quite clear that online gambling environment may pose significantly greater risk to vulnerable players because for example online gamblers have higher scores than non-online gamblers in different reasons (motivations) to gambling related to the online specific characteristics, such as privacy and greater variety of games (Gainsbury, Wood, Russell, Hing, & Blaszczynski, 2012; McCormack & Griffiths, 2012).

Beyond the prevalence, adolescent gambling is increasingly recognized as an important public health issue (Messerlian & Derevensky, 2005; Räsänen, Lintonen, & Konu, 2013). It's important to note that excessive gambling is known to have negative impact in major areas of life. More specifically, adolescent problem gambling was associated with a wide range of personal, academic, familial, mental health, social, economic, criminal, delinquent and legal problems. The mental illnesses include high rates of depression (Molde, Pallesen, Bartone, Hystad, & Johnsen,

2009) and anxiety (Gupta & Derevensky, 1998), high risk for other addictions including alcohol and substance abuse (Hardoon, Gupta, & Derevensky, 2004), risk of suicidal ideation and suicide attempts, and poor overall health (Potenza et al., 2011) such as psychological distress (Cook et al., 2014). Several studies have also shown an association between school achievement and problem gambling in terms of truancy, difficulty in school, decreased academic performance, and drop out (Froberg et al., 2015; Spritzer et al., 2011). Interpersonal consequences include strained relationships, delinquency, criminal behaviour (Derevensky & Gupta, 2004), aggressive behaviours such as participation in serious fights (Potenza et al., 2011) and difficult peer relationships (Blinn-Pike et al., 2010).

The negative consequences of gambling can also have economic costs for the individual gambler, family members and the wider community and society (e.g., Derevensky et al. 2004; Ellenbogen et al. 2007). According to Grinols (2011), the social costs of gambling can be summarized into nine group: crime costs, business and employment costs, bankruptcy, suicide, illness related to pathological gambling, social service costs, direct regulatory costs, family costs, and abused dollars. Although there were not sufficient and reliable data to predict the long-term social costs (Derevensky, Gupta, Hardoon, Dickson, & Deguire, 2003), Grinols (2011) provided estimates of the financial cost of gambling addiction in Germany according to the standards of the World Health Organisation (WHO). The estimated follow-up costs caused by gambling addiction in Germany were 326 million euro. More specifically, the direct costs amounted to 152 million euro: costs for inpatient (17 million euro) and outpatient treatment (24 million euro) of pathological gamblers, acquisitive crime (30 million euro), courts and criminal prosecution (18 million euro), administrative overhead for unemployment (12 million euro), divorces (16 million euro), player protection (26 million euro) and prevention research (9 million euro). The indirect costs amounted to 174 million euro: job losses due to gambling (85 million euro), gamblers missing workdays (75 million euro), and reduced labour productivity (14 million euro). In addition, this study provided estimates of gambling activity. Furthermore, 225 million euro was due to slot machines (outside

casinos), 36 million euro to slot machines in casinos, almost 31 million euro to casino games, 30 million euro to sport betting and 3 million euro to lotteries.

1.5. Conclusions

In conclusion, this chapter has highlighted some definitions and the possible measures of problem gambling in adolescence. However, beyond these aspects, several reasons were listed that encourage the study of the excess of gambling problems in adolescence. Finally, there is a clear consensus about the importance of preventing adolescent gambling because adolescent gambling is a serious public health problem (Messerlian et al., 2005; Räsänen et al., 2013; Molinaro et al., 2014). Taking into account the several consequences linked with problem gambling involving adolescents' physical, relational, and psychosocial well-being, a growing number of studies in recent years have studied the determinants, correlates and mechanisms involved in the onset and maintenance of problem gambling in adolescence. So, what kind of theoretical models are adopted most commonly in the research literature concerning individual and environmental correlates of problem gambling? This question will attempted to be answered in the next chapter.

Chapter 2

Youth gambling: What we know and what still needs to be learned

In the previous chapter the importance of problem gambling in adolescence in terms of prevalence was described as well as the impact on psychosocial and physical health and possible economic consequences. In view of the several consequences linked with problem gambling involving adolescents' physical, relational, and psychosocial well-being, a growing number of studies in recent years have studied the determinants, correlates and mechanisms involved in the onset and maintenance of problem gambling in adolescence. Several conceptual models were adopted in literature to explain and to understand problem gambling in adolescence. The aim of this chapter is to describe two theoretical frameworks adopted in literature to explain and, subsequently modify problem gambling and its correlates in adolescence. In the study of adolescent problem gambling, two basic assumptions should be considered together.

(1) Recently, gambling disorder was classified as an addictive disorder in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, representing a new category of behavioural addiction similar to substance use disorders in terms of aetiology, symptoms, course, correlates, and treatment approaches (Hasin et al., 2013). Problem gambling, similar to many other antisocial behaviours, has been shown to have multiple related risk factors (Shead, Derevensky, & Gupta, 2010). It should also be noted that many of the identified risk factors were similarly associated with other mental health and/or addictive disorders; one of the reasons disordered gambling is now classified as a Behavioural Addiction.

Given the similarity between gambling and other addictive behaviours, especially substance abuse, it is important to test the degree to which gambling disorder shares the same risks and protective factors as alcohol and drug use. Understanding these similarities more precisely could

help advance future research on gambling, by suggesting, for example, that verified models for substance abuse could also be useful in explaining problem gambling (Leeman & Potenza, 2012).

(2) The multidimensional nature of the phenomena should also be noted: disordered gambling is a multidimensional condition involving bio-psycho-social determinants including psychological processes, individual personality characteristics, social and familial influences, and environmental stressors. Thus, problem gambling is a multifaceted rather than unitary phenomenon (Griffiths, 2005), with the unique correlates and weightings of the risk factors contributing to problem gambling differing amongst individuals. It was noted that sports gamblers, poker players and Internet gamblers might differ as to their motivations and their gambling behaviours. For instance, previous studies have shown that online gamblers and non-online gamblers display different motivations to gambling associated with online specific characteristics (e.g. privacy, greater variety of games) (Gainsbury, Wood, Russell, Hing, & Blaszczynski, 2012; McCormack & Griffiths, 2012). In a more recent study, Dowling and colleagues (2015) found that reasons for gambling among Internet gamblers were more likely to be for a challenge, for positive feelings, for fun and/or excitement, or to relieve boredom compared non-internet gamblers. As such, there is no single pattern of risk factors that can alone predict with certainty that an individual will develop a gambling disorder.

Problem gambling is governed by a complex set of interrelating factors, causes and determinants ranging from biology and family history to social norms and existing statutes (Abbott et al., 2013; Messerlian et al., 2005). Consequently, many factors may come into play in various ways and at different levels that together contribute to the development and maintenance of gambling-related problems (e.g., biological, social, or psychological). Addiction behaviours always result from an interaction and interplay between many determinants, including the person's biological and/or genetic predisposition, their psychological constitution, their social environment, and the nature of the activity itself.

An important limitation in the gambling literature is that there is a relatively little research on modifiable adolescent behavioural and social environmental factors contributing to the development of problem gambling (Scholes-Balog et al., 2014). The social variables are under-represented in the theories most often used to explain problem gambling because most models, such as the general theory of addiction (Jacobs, 1986) and the cognitive-behavioural model (Sharpe, 2002), consider primarily the ontosystemic level of variables. Although several divergent theoretical models have tried to explain problem and pathological gambling including addiction, biological/genetic, neurobiological, cognitive behavioural, learning, and sociological theories (Gupta & Derevensky, 2004; Petry, 2005), they each assume that the interaction of significant biopsychosocial and environmental variables in the aetiological process may be accounted for by one set of fundamental principles. Theories must be complementary rather than mutually exclusive, which suggests that limits of individual theories might be overcome through the combination of factors from different perspectives (Griffiths, 2011).

However some studies have been mainly descriptive rather than analytical, and so far, few attempts have been made to explain why an adherence to singular perspectives is untenable. In the study of adolescent gambling, as well as other risky behaviours in adolescence, no single level of analysis is considered sufficient to explain either the aetiology or maintenance of gambling behaviour (Griffiths, 2011). Moreover, this opinion states that all research is context-bound and should be analysed from a combined, or biopsychosocial, perspective (Griffiths, 2005). In addition, an investigation of relevant biopsychosocial variables is also necessary in order to understand the mechanisms that associate these instigative factors with problem gambling behaviour (Toneatto & Nguyen, 2008). In this direction, according to a public health perspective of youth gambling problems (Messerlian et al., 2005), gambling problems need to be conceptualized as a community/social issue and not merely the problem of sick individuals, addressing the individual, environmental and socio-economic determinants of gambling. The goal of the present thesis is to fill this research gap by using nationally representative sample of high school students (for the study

of social environmental factors) and students enrolled in public high schools or universities (for the study of individual factors).

2.1. Two theoretical frameworks to understand problem gambling

According to Griffiths and Delfabbro (2001), it seems that gamblers are first influenced by sociological factors; for example, the attitudes and habits of parents, friends and peer groups. Through the development, there are many factors which heavily influence the maintenance of gambling behaviour, such as the schedules of reinforcement, the escape qualities from unpleasant mood states of gambling and the cognitive bias, all of which have been explained by three general classes of theory, respectively behaviourist theories, need-state models and cognitive theories. Gambling is a complex, multidimensional activity that is not likely to be explained by any single theory. Instead, biological, psychological, and social factors are all relevant to the development of problematic levels of gambling (Sharpe, 2002). In order to emphasize the role of contextual factors internal and external to the process of gambling itself, this thesis is guided by a conceptual framework for the development of gambling and alcohol use in youth (Barnes et al., 1999), and the conceptual framework of harmful gambling (Abbot et al., 2013). In fact, a good strategy for theory generation in this field is to integrate these two frameworks developed in gambling studies, chosen based on the reason to use a multidimensional/ecological integrative perspective of youth gambling. Integrating these perspectives allows us to begin to understand how to examine the possible cumulative role of factors across different levels (i.e., personal and environmental) in regard to youth gambling problems. For instance, it may be possible that youth who are less well off in society compare themselves relative to those who are better off, causing stress that manifests in maladaptive coping strategies and behavioural effects, such as gambling, especially for those with higher levels of impulsivity. In addition, higher benefit in kind for families/children may also affect the way that families deploy social and economic resources such as the need to earn income, which,

in turn might increase parents' ability to support and protect young people, thus making youth less likely to engage in gambling activities.

Barnes et al. (1999) adapted their conceptual framework for the development of adolescent alcohol misuse to the study of the co-occurrence of gambling behaviours and alcohol use in youth, given the lack of theoretically derived adolescent gambling research. The conceptual framework for the development of gambling and alcohol use in youth (Barnes et al., 1999) can be considered a good example of an integrated theoretical perspective for youth gambling that encompass individual as well as social and environmental factors. In this theoretical model, the effects of individual differences (e.g., impulsivity, intellectual ability, cognitions) are likely to provide only a relative portion of the explanation of gambling in young people. Barnes and colleagues (1999; 2005) proposed that individual/psychological factors may influence gambling directly, however, individual-personality characteristics may also be shaped and acted on by socialization influences, in particular by parental monitoring/knowledge and associations with problem-behaving peers. In this theoretical model, family socialization is shown as the linkage between individual factors (psychological) and more distal factors (including sociodemographic factors). The present thesis was based on this conceptual framework (see Figure 3).

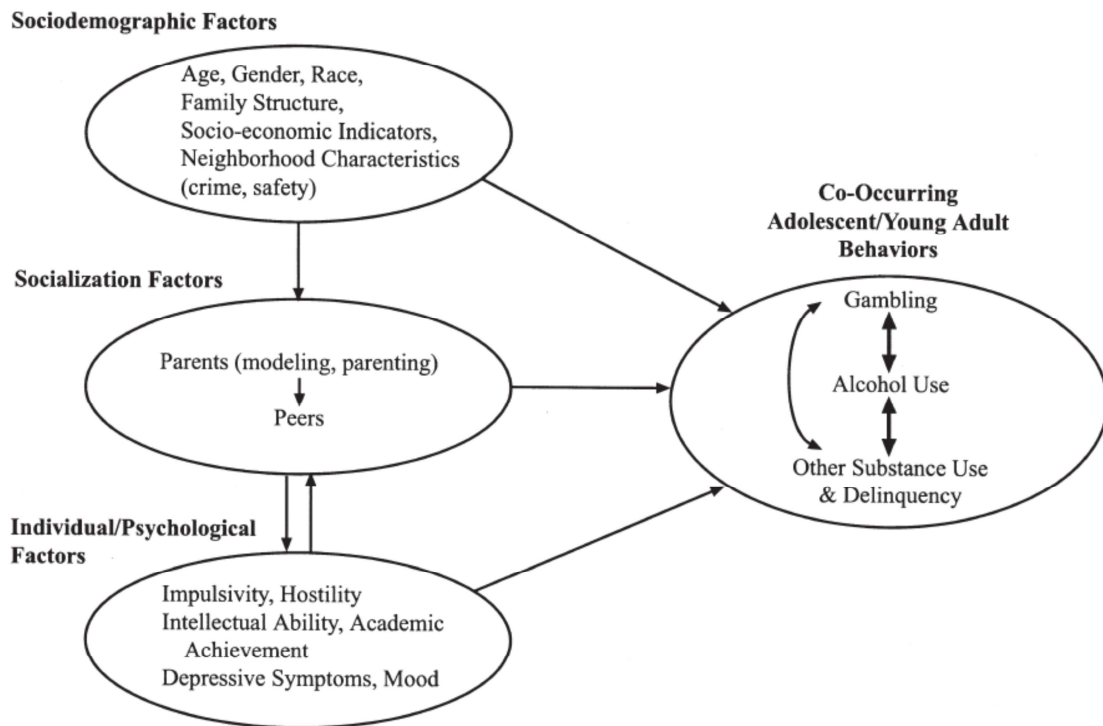


Figure 3. Conceptual framework for the development of gambling and alcohol use in youth.

(Adapted from Barnes et al., 1999).

This framework focuses on three primary explanatory domains: sociodemographic factors (e.g., gender, age, family structure, socio-economic indicators), socialization factors (especially parents and peers) and individual factors (e.g., impulsivity).

Below is one example of how the framework might be applied to identify future research directions by examining the three primary explanatory domains: sociodemographic factors, socialization factors and individual factors.

- Under sociodemographic factors, family structure can affect gambling behaviour. Thus, it is possible that youth not living with their birth parents (e.g., grand-parents, step-parents) would provide insufficient resources for adequate adolescent socialization and control (e.g., amount of money spent on gambling or use of credit cards).
- Under socializations factors, parenting behaviours more focused on autonomy development, gain greater relevance (e.g., parental monitoring/knowledge). It possible that parents who

are aware of upcoming youth activities may be more likely to discuss their views on whether or not gambling is morally acceptable for their children (as also a safe activity) and thus adolescents would learn that there are consequences for gambling, which, in turn, could bring to avoid or reduce gambling participation.

- Under individual/psychological factors, personality and gambling-oriented attitudes also interact with gambling problems. More specific, positive gambling attitudes may lead people to more often engage in gambling-related behaviour as a social pursuit or a leisure activity. Impulsivity, on the other hand, is hypothesised to contribute to the propensity to lose control over gambling behaviour and gamble to excess.

In addition to the three domains highlighted by the Barnes et al.'s framework, an ecological approach to the study of gambling requires to view gambling behaviour from additional perspectives. According to Messerlian and colleagues (2005), public policy is another important domain to be analysed in the study of youth gambling problems. In this direction, Abbott and colleagues (2013) presented a comprehensive conceptual framework of harmful gambling that moves beyond a symptom-based view of harm and addresses a broad set of factors related to population risk, community and societal effect. Interactive factors denoted in the framework characterize key themes in gambling that range from specific (gambling environment, exposure, types, and resources) to general (cultural, social, psychological, and biological). In particular, gambling environment (i.e., the environment in which an adolescent lives) can impact on the nature and the frequency of gambling, and the degree of subsequent gambling related harms. According to this framework, gambling environments include a broad set of factors ranging from economics, to politics to public policy including macroeconomics, microeconomics, socio-political environment, corporate environment, culture of social responsibility, availability of leisure options, and public policy. Therefore, an addition level of influence on gambling behaviour is public policy. Public policy factors related to gambling intersect a number of different domains including social,

educational, health, economic, legislative and judicial. It's possible that public policy factors, such as local, state, federal policies and laws that regulate, support, or constrain healthy actions and practices can determine one's propensity to develop a gambling-related problem (Messerlian et al., 2005).

Below is one example of how the framework might be applied to identify future research directions by examining the public policy factors that can be associated with gambling. Under public policy factors, socio-economic indicators of welfare (e.g., public expenditures on health and social protection) may play a key role in explaining problem gambling among adolescents.

Taken together, these two frameworks indicate that it is important to adopt a broader perspective in the consideration of problem gambling, focusing on the role of environmental context (social, economic and political forces), sociodemographic factors (e.g., family structure), social relationships (e.g. parental practices), and individual/psychological characteristics (e.g., attitudes and personality). In each of the following sections, broad details of each level of analysis are provided. More specifically, in the following paragraphs, what is known is described and what still needs to be learned for each of the four explanatory domains: public policy, sociodemographic factors, socialization factors and individual/psychological factors.

2.2. Macroeconomic Indicators: Public Policy

The distribution of gambling problems also echoes the geographic distribution of social deprivation (Reith, 2012). For instance, Livingstone (2001) has shown that the greater the socio-economic disadvantage of a municipality (e.g., in Australia), the higher its numbers of gambling opportunities (e.g., gaming machines), with people living in the most deprived areas spending almost double the state's average on them. Other research has also found that macroeconomic inequalities have been associated with increased risk-taking behaviour in a number of different domains, including drug and substance abuse (Room, 2005), crime (Wilkinson & Pickett, 2009) and pathological gambling (Mishra et al., 2012).

Surprisingly, very few studies on the risk factors of adolescent problem gambling relate to macro/social-level or community-level factors (Barmaki & Zangeneh, 2009; Hayer & Griffiths, 2015). Abbott and colleagues (2013) presented a comprehensive conceptual framework of harmful gambling that moves beyond a symptom-based view of harm and addresses a broad set of factors related to population risk, community and societal effects. In this context, various macro-level factors (e.g., macroeconomics such as socio-economic indicators of welfare, socio-political environment, public policy, culture of social responsibility, availability of leisure options) may shape addictive behaviours, as well as gambling behaviours.

Over the past two decades, theorists have started to debate that understanding and enhancing health needed a focus upstream from an individual's risk or protective factors to the social patterns and structures that shape people's chances to be healthy. Generally referred to as the social determinants of health approach, the health of adolescents and young adults is affected by social determinants of health. World Health Organization (WHO, 2008) defined social determinants of health as "the conditions in which people are born, grow, live, work and age", conditions or circumstances that are shaped by families and communities and by the distribution of money, power, and resources at global, national, and local levels and affected by policy choices at each of these levels. According to the conceptual framework of the WHO Commission on Social Determinants of Health, there are two main levels at which determinants operate: structural and proximal (WHO, 2008). Structural determinants can be considered as the fundamental structures that generate social stratification (e.g., global and national economic, political, and social welfare systems, and education systems). Proximal determinants refer to the circumstances of daily life, from the quality of the family environment and peer relationships, through availability of food, housing, and recreation, to access to education. These key determinants are closely interrelated. More specifically, proximal determinants are produced by the social stratification that results from structural determinants, and they are able to establish individual differences in exposure and vulnerability to health compromising factors that generate health or illness. Socioeconomic

differences in health and health behaviour among adolescents between countries are increasingly recognized as an important field of research (e.g., Bogt et al., 2014). Previous studies showed that youth from countries with lower welfare benefits have worse subjective and objective health outcomes (Holstein et al., 2009; Richter et al., 2012; Zambon et al., 2006). For example, individuals from countries characterized by lower social protection expenditure showed lower levels of perceived health (Sarti, Alberio, & Terraneo, 2013). Welfare regimes with less substantial welfare services and less redistributive welfare provision seem to have a negative effect on young people health. Social protection expenditures can build a buffer against loss of income and can redistribute income both over the life development and among individuals. Viner and colleagues reviewed available data on the effects of macro-level determinants of health in adolescence and provided a novel ecological analysis of the relations between these determinants and country variations in adolescent health outcomes (mortality, HIV, teenage births, injuries, violence, bullying, smoking). Higher national wealth was strongly associated with lower mortality, HIV, teenage births and bullying, while national health spending per person was not related to any outcomes after adjustment for national wealth (2012). To date, no study has yet examined the association between socioeconomic indicators of welfare state and adolescent gambling. Cross-national variations in adolescent problem gambling may be attributable to systematic differences in public expenditures on health and social protection (family benefits). Indeed, public health expenditure may provide more funding to gambling prevention and intervention programs, and family/children benefits may support families, thus making youth less likely to engage in gambling activities.

2.3. Sociodemographic Factors

Sociodemographic factors such gender, age, family structure and socioeconomic indicators were related to youthful gambling behaviour. Adolescent gender and age are the two sociodemographic factors consistently associated with adolescent gambling.

Gender: Generally, gambling is mainly a male-dominated activity, with significantly more male adolescents engaging in gambling compared to females (e.g., Griffiths, 2011; Hayer, 2012; Shead et al., 2010). There are many gender differences among juvenile gamblers. Male juveniles placed larger average bets (Desai, Maciejewski, Pantalon, & Potenza, 2005; Haroon & Derevensky, 2001) and were more likely to be classified as problem gamblers (Jacobs, 2000). Whereas males enjoyed sports betting and wagering on games of skill, girls preferred games of chance such as scratch card and lottery (Adebayo, 1998; Wilson & Ross, 2011). Regarding gambling motivations, while female problem gamblers mainly tended to gamble as a means of escape from emotional strain, male problem gamblers may primarily seek stimulation and action due to an abnormal physiological resting state (Gupta & Derevensky, 1998).

Gender differences have also been found with regard to factors that were implicated in the development of gambling behaviours. Boys seemed to be influenced by genetic factors whereas girls seemed to be influenced by environment factors. Analysis of twins has shown that genetic factors explained about 85% of the variance in male adolescents' gambling behaviours but explained none of the variance in female adolescents' gambling behaviours; shared environment factors explained 45% of the variance in female adolescents' gambling behaviours (Beaver et al., 2010). Previous studies found that parents and peers might have a greater influence on girls' gambling behaviours (Chalmers & Willoughby, 2006; Donati, Chiesi, & Primi, 2013).

Age: The onset of gambling problems in adolescence is a well-recognized result in literature (Burge et al., 2006; Rahman et al., 2012; Vitaro & Wanner, 2011) because age of onset and early winnings are critical events that may increase the probability of further (excessive) gambling participation among youth. Consequently, the earlier the initial contact the higher the risk of developing gambling-related problems upon reaching adulthood (Griffiths, 2011). More specifically, youth problem gamblers reported initiating gambling at an early age (approximately 10-11 years) and having had an early "big win" (Volberg et al., 2010; Gupta & Derevensky, 1997).

Of particular note is the fact that children often start gambling together with family members or receive lottery tickets/scratch cards as presents (e.g., Gupta & Derevensky, 1997; Kundu et al., 2013; Moodie & Finnigan, 2006). For instance, one British adolescent gambling survey found that a 16% of adolescents who gambled online played along with their parents (Wood & Griffiths, 2007). In addition, a recent study found that gifting instant lottery tickets to minors may normalize gambling, shape positive attitudes, and foster subsequent gambling engagement (Kundu et al., 2013). Thus, although initial gambling experiences very often originate with family members in their own homes, patterns of gambling can eventually change whereby the peer group becomes increasingly important and gambling preferences change based upon evolving interests and accessibility (Derevensky & Gupta, 2004).

While gender and age are the two sociodemographic factors consistently associated with adolescent gambling, surprisingly little information can be found with regard to socioeconomic indicators, family sociodemographic factors (e.g., family structure and family socioeconomic status) and possible underlying mechanisms of action (Hayer & Griffiths, 2014).

Socioeconomic indicators: Previous studies have found that youth with a low socioeconomic background have more gambling problems than other youth (e.g., Schissel, 2001; Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001). Pathological gambling is characterized by an unequal socioeconomic distribution of harms. Individuals from lower-income and ethnic minority groups and communities reported higher rates of pathological gambling than the general population (Marshall, 2005; Orford, Wardle, Griffiths, Sproston, & Erens, 2007; Volberg & Wray, 2007). Individuals with higher economic need, such as people who are poor compared with relevant others or victims of inequality, were more likely to engage in pathological gambling (e.g., Callan, Ellard, Shead, & Hodgins, 2008; Callan, Shead, & Olson, 2011). A recent meta-analysis has shown that gambling urges were strongly associated with personal relative deprivation, which refers to

resentment stemming from the belief that one is deprived of a desired and deserved outcome compared to some referent (Callan, Shead, & Olson, 2015).

Family sociodemographic factors: Family sociodemographic factors, including parental divorce/separation, family structure, and having older siblings were associated with increased engagement in risk taking behaviours during adolescence and across the life span (Crawford & Novak, 2008; Otten et al., 2007; Thompson, Lizardi, Keyes, & Hasin, 2008). With regard to adolescent gambling, research findings concerning the relationship between family socio-demographic characteristics (e.g., family structure and family socioeconomic status) and adolescent problem gambling have often been inconsistent. For instance, while some studies have found that family structure is not related to problem gambling (e.g., Hayer, 2012; Langhinrichsen-Rohling et al., 2004; Molinaro et al., 2014), other empirical studies have reported that young people from single parent families (Hayer, 2012) as well as adolescents who lived with unrelated others (e.g., with step-parents or neither natural parent) are at greater risk of being classified as problem gamblers (e.g., Canale et al., 2016). With regard to the socioeconomic status (SES) of the family, such as personal lifestyle variables including occupation, income, and education, the literature documenting the relationship between SES and gambling problems is both scarce and inconsistent (Lussier, Derevensky, Gupta, & Vitro, 2014). Some studies have found a positive relationship between low SES and gambling problems (Fisher, 1993; Schissel, 2001). For example, a previous longitudinal study found that boys whose mothers were below the median on maternal occupational prestige were significantly more at risk of gambling problems. Other studies also reveal a more complex relationship between SES and youth gambling problems. For instance, a previous study by Auger and colleagues (2010) revealed that low SES influenced gambling onset primarily among impulsive youth, identifying impulsivity as a risk factor for gambling onset among low but not high SES youth.

Based on these findings, it is clear that little attention has been given to the relationship between family sociodemographic characteristics and adolescent gambling behaviours. Thus, they remain important factors to study in the context of gambling behaviour. Furthermore, ecological models of health behaviour (i.e., problem behaviour theory) identify family demographic characteristics as determinants of health behaviour (Flay & Petraitis, 1994; Jessor, 1987).

2.4. Socialization Factors: family characteristics

In the conceptual framework for the development of gambling and alcohol use in youth (Barnes et al., 1999), family socialization is considered as the linkage between individual factors (psychological) and the larger culture (including sociodemographic factors). In this model, young people learn social behaviours, as gambling, during the socialization process by ongoing interactions with significant others- firstly with parents and subsequently with adolescent peers, who become gradually more influential during later adolescence.

Derevensky and Gilbeau (2015) recently examined the empirical evidence concerning the many correlates of adolescent gambling over the past 25 years. This body of evidence suggested that initial gambling experiences often begin in their own homes with family members. Family environment can be both a risk and a protective factor for adolescent gambling behaviours (see McComb & Sabiston, 2010 for a review). Consistent with McComb and Sabiston review (2010), most of the family variables examined in the gambling literature were resulting from risk and protective factors associated with adolescent substance use and misuse. These multiple family influences on adolescent gambling were conceptualized in the following domains: (1) family members' attitudes/behaviours, (2) general family climate, (3) parenting practices and (4) family relationship characteristics. For the specific aims of this thesis, only the findings on general family climate and parenting practices are presented (e.g., parental monitoring/knowledge and parental care).

Family climate: With regard to general family climate, factors such as family support and/or family cohesion appear to be negative related to adolescent gambling. For instance, youth problem gamblers reported feeling a lack of social support from their families (Hardoon et al., 2004), having bad relationships with their parents (Skokauskas & Satkeviciute, 2007), and experiencing lower levels of parental trust and communication (Magoon & Ingersoll, 2006). Hardoon and colleagues (2004) showed that non gamblers and social gamblers had significantly higher mean scores on family support (emotional, informational, feedback and reciprocal support) compared with risk and pathological gamblers. Moreover, parental care expressed as empathy, closeness, emotional warmth, affection was associated with lower scores in the gambling outcomes (Floros, Siomos, Fisoun, & Geroukalis, 2013).

Although available empirical studies have shown that associations between general family climate and adolescent gambling patterns were negative (e.g., Hayer & Griffiths, 2015), there is limited empirical attention to the influence of general family climate on gambling behaviours in adolescence.

Parenting Practices: The attention on the relationship between parental influences and the development and maintenance of gambling and gambling-related problems among adolescents has received more attention than the other family characteristics. Besides the importance of parental warmth, during adolescence parenting behaviours more focused on autonomy development, gain greater relevance (Crouter & Head, 2002). According to the social learning theory, youth learn behaviours by experiencing, observing, and interacting with individuals in their environment. Parents serve as important socializing agents for adolescents, particularly in their function as disciplinarians (Bandura, 1999). Parental knowledge and parental monitoring have often been conceptualized as important parenting practices buffering problem behaviours (for a review see Crouter & Head, 2002). For example parental monitoring, defined as parental control and rule setting, has been found to lower the risk of adolescent substance use (Kiesner, Poulin, & Dishion,

2010); likewise, parental monitoring, defined as child disclosure of information to parents, was also associated with a decrease in delinquency and antisocial behaviour (Vieno et al., 2009). Whereas the debate continues in literature regarding the best conceptualization of “monitoring”, many agree that parental knowledge of their children's activities is the critical starting point in preventing youth risk behaviour (e.g., Branstetter & Furman, 2013). Parental practices can be a protective factor for adolescent gambling behaviours (for a review, see McComb & Sabiston, 2010). Parental monitoring has been found to reduce adolescent gambling (e.g., Molinaro et al., 2014). A longitudinal study tracking children into young adulthood found that low and/or declining parental monitoring of children aged between 11 and 14 was associated with problem gambling when those children reached adulthood (Lee, Stuart, Ialongo, & Martins, 2014). Taken together, these findings indicate that parents have a fundamental role in buffering gambling behaviour.

A broad and growing body of literature suggests that family influences, such as parental knowledge and monitoring, are related to adolescent behaviours via both direct and indirect paths (Halgunseth, Perkins, Lippold, & Nixet, 2013; Kim & Neff, 2010; Lac, Alvaro, Crano, & Siegel, 2009). Social learning theory also proposes that social influences, such as parents and peers, operate through psychological mechanisms to produce behaviour effects (Bandura, 1997). It is important to understand the mechanisms through which these family characteristics exert their effects on adolescents' behaviour. Parents may seek to positively sway their children's drug attitudes and beliefs (Lac et al., 2009). Adolescent attitudes, such as disapproval and perception of a specific risk behaviour, and their (negative) evaluation of peers' risky behaviours, have been found to mediate the relationship between family factors and risk behaviours (e.g., Walker, Neighbors, Rodriguez, Stephens, & Roffman, 2011). Thus, adolescents who perceived higher levels of parental monitoring were more likely to disapprove of problem drinking and be aware of the risks of excessive drinking, which were, in turn, negatively related to alcohol use. Additionally, parental monitoring was negatively associated with individuals' estimate of their friend's drinking, which was, in turn, positively related to alcohol use (Kim & Neff, 2010). Lac and colleagues (2009) found that high

parental knowledge predicted lower pro-marijuana attitudes and subjective norms in adolescents, which in turn were positively related to the behavioural intentions to use marijuana in the future.

Therefore, while the results of Kim et al. (2010), Lac et al. (2009) and Halgunseth et al. (2013) provide an interesting frame of how attitudes and subjective norms mediate the relationship between parents' influence and child's outcomes (e.g., parental knowledge was positively associated with adolescent's disapproval of problem drinking and awareness of the risks of excessive drinking, which were, in turn, negatively related to alcohol use), to date, no study has yet examined the indirect pathways on adolescent gambling. A recent review on adolescent problem gambling suggested that future research should examine the impact of family influence on gamblers' perceptions and attitudes that in turn influence gambling behaviours (Ariyabuddhiphongs, 2013). This review showed that studies on adolescent gambling were guided by the hypotheses of person-gambling (cognitive bias, incentives, excitement seeking, and impulsivity) and environment-gambling relationships (parents and peers). Mediation effects of person and environmental variables should be included in future studies in order to reach a more comprehensive analysis of the relationships between person and environment characteristics and problem gambling in adolescence (Ariyabuddhiphongs, 2013).

2.5. Individual/psychological factors

Finally, according to the conceptual framework for the development of gambling and alcohol use in youth (Barnes et al., 1999; 2005), although individual-personality characteristics may be shaped and acted on by socialization influences (in particular by parental monitoring/knowledge), individual/psychological factors may also influence gambling directly. There is a substantial body of research studies addressing various adolescent individual factors, including coping, incentives, cognitions and attitudes, excitement seeking and ADHD, and personality. For the specific aims of this thesis, there will be an accurate description of cognition/attitudes and personality.

Cognitions and Attitudes: There is a broad agreement that cognitive biases might be considered as the primary predictor of gambling in terms of development and maintenance of problem gambling among adolescents as well as adults (e.g., Ariyabuddhiphongs, 2013; Goodie & Fortune, 2013). Adolescent problem gamblers tended to be more susceptible to erroneous beliefs concerning randomness and chance, and they were no less accurate in terms of understanding objective probabilities of gambling activities (Delfabbro, Lambos, King, & Puglies, 2009). For instance, Turner et al. (2008) found a negative correlation between problem gambling and the understanding of random chance among Canadian students from grades 5 to 13. Adolescent problem gamblers believed in their skills in chance activities, that gambling is a profitable activity (Delfabbro, Lahn, & Grabosky, 2006), and that they could exercise influence of their own behaviour in controlling/manipulating chance outcomes (Moore & Ohtsuka, 1999). Recently, Tang and Wu (2012) found that among three convenience samples of Chinese with different age cohorts, high school students with probable pathological gambling behaviours had the greatest cognitive biases among all subgroups.

A relatively recent review (Spurrier & Blaszczynski, 2014) reported that, despite an extensive focus in gambling studies on cognitive biases and errors associated with gambling, few studies addressed gamblers' perception (e.g., of potential risk and harms) related to gambling. According to the theory of reasoned action (TRA, Aizen & Fishbein, 1980), the intention to perform a behaviour is influenced by attitudes and perceived subjective norms regarding that behaviour. Previous studies have suggested that attitudes and perceptions towards gambling may influence gambling behaviour and individual characteristics related to gambling (e.g., Canale et al., 2015; Orford, Griffiths, Wardle, Sproston, & Erenset, 2009; Wood & Griffiths, 2004). More specific, it was found that more favourable attitudes towards gambling were associated with greater time and money spent gambling (Orford et al., 2009), while Tao et al. (2011) found that a perception that gambling carried negative consequences was associated with less gambling involvement. Regarding descriptive norms (perceptions of what others do), adolescents who

perceived their friends as gamblers were more likely to participate in gambling activities (Wickwire, Whelan, Meyers, & Murray, 2007). Martin et al. (2010) underlined that gambling frequency among college students was associated with friends' norms and attitudes. Thus, a body of research has addressed these relations among college students and adult gamblers, but it is still unclear how subjective norms and attitudes, as well as perception of peer behaviours, operate among adolescents. Few studies have examined the relationship between attitudes and subjective norms on adolescent gamblers (Orford et al., 2009; Wickwire et al., 2007). Given the paucity of existing research and the need for potential applicability of findings for use in prevention and intervention efforts, more research is needed on the gambling-oriented attitudes (self-approval, risk perception and descriptive norms) in a sample of adolescents.

Personality characteristics: Personality is conceived as a set of dynamic, self-regulatory systems that occur and work over the life course in the service of personal adaptations (Caprara & Cervone, 2000). These personal adaptations guide affective, cognitive, and motivational processes, leading people to achieve their individual and collective goals. They also provide coherence and continuity in behavioural patterns across different settings, and they generate, foster, and preserve a sense of personal identity (Bandura, 2001; Caprara & Cervone, 2000; Caprara, Schwartz, Capanna, Vecchione, & Barbaranelli, 2006). Within the field of personality psychology, traits assumed greater importance (Caprara et al., 2006). Traits are "dimensions of individual differences in tendencies to show consistent patterns of thought, feelings, and actions" (McCrae & Costa, 1990, p. 23), and describe what people are like. Thus, traits are important for predicting different kinds of behaviour.

Numerous studies (largely conducted with adults) have identified core personality traits or dispositional attributes associated with problem gambling. Adolescents with gambling problems have been shown to exhibit higher scores in sensation seeking, excitability, and risk propensity, as well as a lack of impulse control (for an overview see Hayer, 2012). Previous studies have shown

that sensation seeking predicts greater numbers of gambling problems supporting existing theories of sensation seeking, which suggest that individuals with high levels of sensation seeking are motivated by behaviours that provide stimulation and reward (Brunelle et al., 2004; Zuckerman, 1994). In addition, gamblers with high levels of sensation seeking gambled for the 'high' and feelings of excitement that gambling can create (Bonnaire et al., 2009; Stewart, Zack, Collins, & Klein, 2008; Vachon & Bagby, 2009). This finding supports the theory that sensation seekers are more likely to gamble in an attempt to experience greater thrill and stimulation from their environment (Cooper et al., 2000; Gullo, Dawe, Kambouropoulos, Staiger, & Jackson, 2010). Individuals elevated by the trait of sensation seeking, experience low basal levels of arousal, and may therefore be motivated to engage in gambling behaviours, to achieve an optimal level of stimulation.

Gupta and colleagues (2006) found that high levels of disinhibition, boredom susceptibility, cheerfulness, and excitability, alongside low levels of conformity and self-discipline, predicted problem-gambling severity level in high school students.

Among the diverse aetiological contributions of the personality correlates, impulsivity is one of the most robust characteristics associated with addictions (including gambling disorder). Impulsivity (i.e., the tendency to act rashly or without adequate forethought) has been consistently associated with pathological gambling (see MacLaren & colleagues 2011, for a recent review). Although numerous studies have recognized a strong association between impulsivity and adolescent problem gambling based on cross-sectional data (e.g., Leeman et al., 2014), emerging evidence suggest that impulsivity is not only a simple correlate of gambling-related problems but also plays a causal role in the developmental trajectory. For example, Liu and colleagues (2013) verified among urban male youth that being member of the high impulsivity class almost tripled the odds of meeting criteria for problem gambling by the age of 19 years. The impulsivity-gambling trajectory appears also to hold true over longer spans of life as 7-year old children with impulsive behaviours had an elevated risk of becoming problem gamblers by mid-adulthood (Shenassa,

Paradis, Dolan, & Wilhelm, 2012). Corresponding to this finding, Slutske et al. (2012) found that an under-controlled temperament at 3 years of age predicted disordered gambling at ages 21 and 32 years (even after controlling for childhood intellectual ability and family socio-economic status).

Early conceptualizations of impulsivity focused on one-dimensional definitions (e.g., Eysenck & Eysenck, 1978), but successive refinement of these aspects of personality has revealed several related but nonetheless putatively distinct dimensions (Patton, Stanford, & Barratt, 1995; Whiteside & Lynam, 2001). For example, the UPPS-P Impulsive Behavior Scale (Cyders et al., 2007; Whiteside & Lynam, 2001) is one of the most widely used measures of the impulsivity construct. The five UPPS-P impulsivity-related constructs have been identified (Cyders & Smith, 2007) as: negative Urgency, lack of Persistence, lack of Planning, Sensation-seeking, and Positive urgency. Negative urgency is associated with impulsive behaviour under conditions of negative affect (e.g., anger, anxiety); lack of persistence is the inability to remain focused on a task while distracted; lack of planning is the tendency to act without thinking ahead, sensation-seeking is the tendency to seek out novel and thrilling experiences; and positive urgency is expressed under conditions of positive affect (e.g., joy, elation). Among the dimensions of trait impulsivity, negative urgency is related to pathological gambling in clinical samples (Torres et al., 2013). Studies conducted on gamblers from the community (i.e., non-clinical participants) have shown that gambling problems are predicted by high urgency (Fischer & Smith, 2008) and lack of premeditation (Cyders & Smith, 2008).

A broad and growing body of literature suggests that impulsivity reflects multiple facets of personality that each contributes to rash and potentially dangerous behaviours, such as problem gambling (Cyders & Smith, 2008). The psychological mechanisms by which impulsivity traits might influence gambling disorder are not clearly understood. Proximal mechanisms, for example motivations and decision making processes, have been found to mediate the relationships between impulsivity traits and various forms of substance use (Adams et al., 2012; Stautz & Cooper, 2015).

According to the Acquired Preparedness model of alcoholism risk, a possible mechanism through which personality traits may nurture drinking behaviour is through drinking motives (Smith & Anderson, 2001; Settles, Cyders, & Smith, 2010). Considering individual motives for engaging in substance use (e.g., alcohol use) may allow for a better understanding of how certain personality traits put individuals at risk for problematic drinking (Cooper, 1994). Research supports the possibility that multiple facets of impulsivity (i.e., positive and negative urgency, sensation-seeking) contribute to rash and potentially dangerous behaviour, such as problematic drinking (e.g., King, Karyadi, Luk, & Patock-Peckham, 2011), through, in part, drinking motives (e.g., Adams et al., 2012).

Research has regularly shown that motivational factors become very important in determining the basic question why do people continue to gamble, even though they are usually aware that gambling is not a sound financial move (Walker, 1992). In order to develop prevention programs aimed at promoting responsible gambling, researchers need to have a sound knowledge based on empirical evidence of the reasons as to why people participate in gambling. This is important for any research that aims to uncover determinants of varying levels of gambling involvement (Binde, 2009). Lee, Chae, Lee and Kim (2007) developed a five-factor gambling motivation model and the five motives for gambling were socialization, amusement, avoidance, excitement and monetary motives. According to Lee et al. (2007), the avoidance and excitement motives did not have direct effects on gambling severity, but the monetary motive showed a direct positive influence. In contrast, some studies (e.g. Chantal & Vallerand, 1995) reported that some people gamble mainly due to intrinsic motivations, that is, for learning, exploring and trying something new, rather than external motivations, such as winning money. In addition, Steward and Zack (2008) developed the Gambling Motives Questionnaire (GMQ), a measure of gambling motives that was modelled after the psychometrically sound Drinking Motives Questionnaire (DMQ; Cooper et al., 1992). The measure consists of three subscales: Social (e.g., “because it’s what most of your friends do when you get together”), Coping (e.g., “to forget your worried”) and

Enhancement (e.g., “because it’s exciting”) gambling motives. Previous findings indicate that probable pathological gamblers score higher on some gambling motives (i.e., coping, enhancement, and social) than the non-pathological gamblers (e.g. Stewart & Zack, 2008). While all three motives were positively correlated with problem gambling in non-clinical populations (e.g., college students), only high enhancement motives for gambling were particularly predictive of problem gambling (Lambe, Mackinnon, & Stewart, 2014). Although previous research supports the direct effects of gambling motives on gambling behaviours, to date, no studies have investigated the possibility that motives mediate the relations between personality traits and gambling behaviours.

An individual variable of potential relevance to impulsivity and addictive disorders is age. It is widely agreed among scholars in the study of adolescent health and development that adolescents are more likely than children or adults to engage in more risky behaviour, as evidenced by elevated rates of experimentation with drugs, tobacco and alcohol, violent and nonviolent crime, unprotected sexual activity and reckless driving (Steinberg, 2008). In the past several years, a social neuroscience perspective on adolescent risk-taking has emerged (Casey, Getz, & Galvan, 2008; Steinberg, 2008). More specifically, Steinberg (2008) assumed that thanks to developmental neuroscience it is possible to find an answer to the questions: “why does risk-taking increase between childhood and adolescence?”; “why does risk-taking decline between adolescence and adulthood?”. In brief, risk behaviours increase in adolescence as a product of the interaction between changes in two distinct neurobiological systems: a socio-emotional system and a cognitive control system. The former is localized in limbic and paralimbic areas of the brain, including the amygdala, ventral striatum, orbitofrontal cortex, medial prefrontal cortex, and superior temporal sulcus (Steinberg, 2007). The cognitive control system is instead localized in the lateral prefrontal and parietal cortices and those parts of the anterior cingulate cortex to which they are interconnected (Steinberg, 2007). The dual systems model (Steinberg, 2008; Steinberg et al., 2008) hypothesised that adolescent risk taking is stimulated by a rapid increase in dopaminergic activity within the socioemotional system during the puberty, a particular transition associated with a

substantial increase in sensation-seeking or increase in reward seeking. A maturational process that is gradual and unfolds over the course of adolescence instead characterizes the cognitive control system, which permits more advanced self-regulation and impulse control. Thus, “the temporal gap between the arousal of the socio-emotional system, which is an early adolescent development, and the full maturation of the cognitive control system, which occurs later, creates a period of heightened vulnerability to risk taking during middle adolescence” (Steinberg et al., 2008, p.1764). More specific, there is a temporal gap between the development of basic information-processing abilities, which is largely complete by the age of 16 with the maturation of the prefrontal cortex, and the development of abilities that underlie the coordination of affect and cognition, which is a subsequent development characterized by improved connections among cortical regions and between cortical and subcortical regions (Steinberg, 2008). Steinberg and colleagues found that basic intellectual abilities (e.g., working memory) reach adult levels at around 16 years of age long before the process of psychosocial maturation (e.g., risk perception, sensation seeking and impulsivity, future orientation and resistance to peer influence) is complete well into the young adult years. Thus, despite dominance of affect (socio-emotional system) over thinking (cognitive control system), it is the lack of coordination of both that may qualify adolescence.

The lack of coordination of affect and thinking of adolescents can also be an important factor that increases adolescent gambling. During the adolescent normative neurodevelopment, a relative immaturity of frontal cortical and subcortical monoaminergic systems increases impulsive behaviours and vulnerability to excessive gambling (Chambers & Potenza, 2003). Therefore, some adolescents are not able to regulate emotional or motivational states to the same degree as adults (Potenza, 2013a). Numerous studies have shown that adolescent problem gamblers have high scores in sensation seeking, risk propensity, as well as a lack of impulse control (for an overview see Hayer, 2012). In line with recent models on pathways of pathological gambling (Bechara, 2003; Evans & Coventry, 2006; van Holst et al., 2010), pathological gambling can also be a result of an imbalance of motivational and valuation brain networks (more automatic) and cognitive control

networks (more reflective). In accordance with these models, the motivational and valuation systems in pathological gamblers may overestimate the value of immediate short-term rewards, which in turn were found to be strongly related to impaired decision-making (Fellows, 2004; Dunn et al., 2006; Rangel et al., 2008), such as disadvantageous gambling-related decisions.

Young people's gambling behaviour tends to be emotion-based (Cyders & Smith, 2008) with negative emotional mood states increasing the likelihood of gambling engagement (Griffiths, 2011). Both negative and positive urgency is strongly associated with emotional factors (Joseph et al., 2009). More specifically, urgency depends upon inadequate appraisal of (and response to) emotions that precede decisions. Urgency has been related to specific cognitive mechanisms (Bechara & Van der Linden, 2005). Research has shown that poor prepotent response inhibition at least partly underlies urgency (Gay et al., 2008; Billieux et al., 2010). More specifically, it has been shown that the tendency to make disadvantageous choices in a situation of decision-making under risk predicts high urgency that in turn predicts the occurrence of problematic behaviours (Billieux et al., 2010). Furthermore, urgency is related to impaired decision-making (e.g., Kraplin et al., 2014). The results provide evidence for reciprocal causal relationships between the decision-making process and urgency, although the effects of personality traits on psychological mechanisms were causally predominant. A previous longitudinal study (Castellanos - Ryan, Rubia, & Conrod, 2011) found that cognitive/motivational measures of disinhibition (poor response inhibition, reward response bias) mediate the longitudinal relationship between personality measures (e.g., impulsivity) and externalizing behaviours in adolescence (e.g., binge drinking and drug use). From this perspective, urgency may reflect a disposition toward gambling problems, depending on the decision-making process.

Consistent with the Reyna and Farley's (2006) work, major explanatory models of risky decision-making can be roughly divided into (i) those that adhere to a rational behavioural decision-making framework that stresses deliberate, quantitative trading off of risks and benefits; and (ii) those that emphasize unconscious or irrational decision-making that appears to be the source of

problems in adolescence (i.e., impulsive or reactive decision-making). Thus, deliberative decision-making was considered as a measure of preferences based on conscious, analytical thought (e.g., Beyth-Marom & Fischhoff, 1997) and the delayed reward discounting was considered as a behavioural measure of preferences based on impulsive, intuitive, and affective thought (Weafer, Baggott, & de Wit, 2013).

According to Metcalfe and Mischel (1999), an increase of ‘hot’ system activation based on emotion appraisal and processing decreases the ability to delay gratification. Thus, urgency significantly predicts sensitivity to reward delay in the delay discounting task (Kraplin et al., 2014; Torres et al., 2013). Furthermore, several studies have shown that individuals with gambling problems discount delayed monetary outcomes at substantially higher rates than non-problem gambling controls (e.g., Albein-Urios, Martinez-González, Lozano, & Verdejo-Garcia, 2014; Clark, 2014; MacKillop et al., 2011 for a meta-analysis). In addition, urgency and lack of premeditation facets of impulsivity (i.e., the tendency to take into account the consequences of an act before engaging in that act) significantly correlate with each other (Whiteside & Lynam, 2001; Van der Linden et al., 2006), suggesting that higher levels of urgency could be related to lower levels of deliberative decision-making. Deliberative decision-making is the tendency to consider options and consequences before making a decision, and a failure to follow a deliberative process is associated with adolescent participation in a number of behaviours including substance use, risky sex, and delinquency (Wolff & Crockett, 2011). More research is needed to study the linkage between urgency with gambling problems, taking into account the mediating role of decision-making processes (operationalized as preference for small/immediate rewards and a lower level of deliberative decision-making).

2.6. Specific aims

Disordered gambling is a multidimensional condition involving bio-psycho-social determinants including psychological processes, individual personality characteristics, social and

familial influences, and environmental stressors. Studies based on this multidimensional assumption are still limited. For instance, some limitations of the current gambling literature are that: (i) there is relatively little research on modifiable adolescent behavioural and social environmental factors contributing to the development of problem gambling (Scholes-Balog et al., 2014); (ii) few studies have investigated the mediation effects of environment on person-gambling relationship and vice versa (Ariyabuddhiphongs, 2013); (iii) although impulsivity has been consistently associated with gambling, the psychological mechanisms by which impulsivity might influence gambling disorder are not clearly understood (Kraplin et al., 2014). According to the conceptual framework for the development of gambling in youth (Barnes et al., 1999) and the conceptual framework of harmful gambling (Abbot et al., 2013), the research work presented in this thesis has been conducted following a logical succession for an in-depth investigation of the youth gambling, as represented by the sequence of the four studies. The current thesis is aimed to address the above mentioned three gap in the literature by focusing on the interaction between socio demographic-, socialization-, individual/psychological- and contextual-factors in determining problem gambling in adolescents and young adults. More specifically, this thesis aims to fill the research gap through the following specific aims:

Aim 1. To examine the role of family and socio-economic indicators of the welfare state in explaining probable problem gambling during adolescence.

Hypothesis 1. Adolescents perceiving more parental caring and parents' monitoring-regulation are less problematic gamblers.

Hypothesis 2. National wealth (GDP), national expenditure in health and benefits in kind for children and family will show a negative association with probable problem gambling.

Hypothesis 3. Lower benefit in kind for families/children may also affect the way that families deploy social and economic resources such as the need to earn income, which, in turn might limit parents' ability to support and protect young people, including less parental caring, and less parents' monitoring – regulation.

Aim 2. To test an integrative model linking parental knowledge about their offspring's whereabouts with adolescent gambling, while evaluating the mediating effects of gambling-oriented attitudes as a mediating variable.

Hypothesis 2.1. Adolescents who perceive higher levels of parental knowledge are: a) more likely to disapprove of gambling and show higher awareness of the harmfulness of gambling, which are, in turn, negatively related to gambling frequency; b) less likely to perceive their friends as gamblers, which, in turn, is also negatively related to gambling frequency; and c) less likely to participate in gambling activities.

Aim 3. To test an integrative model linking impulsivity traits and gambling problems, evaluating the mediating effects of gambling motives.

Hypothesis 3.1. Sensation seeking and positive urgency will be positively related to problem gambling.

Hypothesis 3.2. It is hypothesised that (a) the relationship between positive urgency and gambling problems is mediated by enhancement motives and (b) the relationship between sensation seeking and gambling problems is mediated by enhancement motives.

Aim 4. To test a theoretical model linking urgency with gambling problems, taking into account the mediating role of decision-making processes (operationalized as preference for small/immediate rewards and a lower level of deliberative decision-making).

Hypothesis 4.1. It was hypothesised that the relationship between urgency and gambling problems is mediated by higher preference for small/immediate rewards, and a lower level of deliberative decision-making.

2.7. Overview of chapters

I will try to fill the research gap in the following four chapters.

Chapter 3 introduces the first study that investigated the role of socioeconomic indicators of the welfare state and family practices in explaining probable problem gambling during adolescence. A multilevel model was used to evaluate the impact of the parenting (regulation, caring and monitoring/knowledge: individual-level) and country (GDP, expenditure on public health, family/children benefits: country-level) influences on adolescent possible problem gambling in a representative sample of students living in nine European countries. Data were drawn from the 2011 European School Survey Project on Alcohol and Other Drugs (ESPAD) Study (n = 29952; 53% girls; 16-year-old students).

Chapter 4 presents the second study that focused on the protective effect that parents who are knowledgeable about youth activities could have in preventing or hindering youth gambling, with the aim of elucidating some of the pathways responsible for this association. Data were drawn from the ESPAD@Italia2012 (European School Survey Project on Alcohol and Other Drugs) study which is based on a nationally representative sample (n = 19573; 54% girls; age, M = 17.11 years, SD = 1.43). In study 2, a path analysis was used to test an integrative model linking parental knowledge about their offspring's whereabouts with adolescent gambling, while evaluating the mediating effects of gambling-oriented attitudes (adolescents' own gambling approval; risk-perception of gambling; and descriptive norms on gambling shared with friends).

Chapters 5-6 present the third and fourth study that investigated how gambling oriented attitudes (e.g., risk and benefits perception of gambling) and decision-making processes may explain gambling outcomes by studying the psychological mechanisms that underlie the influence of impulsivity on problem gambling. The purposes of Studies 3-4 were to examine a theoretical model linking impulsivity traits and gambling problems taking into account the role of gambling motives (study 3) and decision-making processes (study 4). Participants comprised students enrolled in public high schools or universities [in Study 3 (n = 594; 73% male; age, M = 19.92

years; SD = 2.91); in Study 4 (n = 986; 64% male; mean age = 19.51 years; SD = 2.30)]. A path analysis was used to test the integrative models.

Chapter 7 summarizes the main findings from each study aim (Chapters 2-5), describes study strengths and discusses the public health implications of the current studies.

Chapter 3

Study 1. Family and Public Policy: Sources of protection for adolescents at risk of problem gambling

3.1. Introduction

According to the conceptual framework for the development of gambling in youth (Barnes et al., 1999) and the conceptual framework of harmful gambling (Abbot et al., 2013), it is important to adopt a broader perspective in the consideration of problem/harmful gambling, focusing on the role of social relationships (e.g. family) and environmental context (social, economic and political forces).

Although there are many ways of viewing adolescent gambling, family influence has been established as one of the strongest sources of risk and protection (see McComb & Sabiston, 2010 for a review). Specific family-based risk and protective factors include family relationships such as with siblings and parents and family characteristics such as socio-economic status. Previous studies found that findings concerning the relationship between family socio-demographic characteristics (e.g., family structure and family socioeconomic status) and adolescent problem gambling have been inconsistent. For instance, while some studies have found that family structure is not related to problem gambling (e.g., Hayer, 2012; Langhinrichsen-Rohling et al., 2004), other empirical studies have reported that young people from single parent families (Hayer, 2012) as well as adolescents who lived with unrelated others (e.g., with step-parents or neither natural parent) are at greater risk of being classified as problem gamblers (e.g., Canale et al., 2016). With regard to the socioeconomic status (SES) of the family, although some studies have found a positive relationship between low SES and gambling problems (Fisher, 1993; Schissel, 2001), other studies also reveal a more complex relationship between SES and youth gambling problems (Auger et al., 2010).

With regard to general family climate, youth problem gamblers reported feeling a lack of social support from their families (Hardoon et al., 2004), having bad relationships with their parents (Skokauskas & Satkeviciute, 2007), and experiencing lower levels of parental trust and communication (Magoon & Ingersoll, 2006). Hardoon and colleagues (2004) showed that non-gamblers and social gamblers had significantly higher mean scores on family support (emotional, informational, feedback and reciprocal support) compared with risk and pathological gamblers. Moreover, parental care expressed as empathy, closeness, emotional warmth, and affection was associated with lower scores in the gambling outcomes (Floros et al., 2013). Besides the importance of parental warmth, during adolescence parenting behaviours more focused on autonomy development, gain greater relevance (Barber et al., 2006). Parental knowledge, for example, including the use of behavioural control strategies such as setting rules (Crouter & Head, 2002) and monitoring of behaviour (Vieno et al., 2009), has been found to be one of the strongest protective factor for adolescent gambling (for a review, see McComb & Sabiston, 2010). On the opposite, inadequate disciplinary practices, such as hostile parenting, have been related to heightened levels of adolescent gambling problems (Vachon, Vitaro, Wanner, & Tremblay, 2004).

Besides proximal contexts such as family environment, various macro-level factors may shape addictive behaviours, as well as gambling behaviours. Previous work of Messerlian et al. (2005) provided detailed guidelines and served as a starting point for addressing youth gambling issues from a public health perspective. More specifically, public policies are an important factor in shaping gambling behaviour. Public policy factors related to gambling intersect a number of different domains including social, educational, health, economic, legislative and judicial. It's possible that public policy factors, such as policies and laws that regulate, support, or constrain healthy actions and practices can determine one's propensity to develop a gambling-related problem (Messerlian et al., 2005).

Among the country-level characteristics influencing adolescent health behaviours, social determinants of health with a key feature of the ecological context were considered: socio-economic

indicators of welfare. Previous studies showed that youth from countries with lower welfare benefits (e.g., lower social protection expenditure) have worse subjective and objective health outcomes (Holstein et al., 2009; Richter et al., 2012; Sarti et al., 2006). In addition, higher national wealth was strongly associated with lower mortality, HIV, teenage births and bullying, while national health spending per person was not related to any outcomes after adjustment for national wealth (Viner et al., 2012). To date, no study has examined the association between socioeconomic indicators of welfare state and adolescent gambling. In addition, population-based studies are scarce (Raisamo, Halme, Murto, & Lintonen, 2013). The study of gambling in a cohort, which is representative of a defined population, could offer some additional advantage. It could allow the estimation of distributions and prevalence rates of gambling in the reference population, the investigation of unbiased evaluations of relations (e.g., between confounders and exposures/outcomes).

Therefore, cross-national variations in adolescent problem gambling may be attributable to systematic differences in public expenditures on health and social protection (family benefits). Indeed, public health expenditure may provide more funding to gambling prevention and intervention programs, and family/children benefits may support families, thus making youth less likely to engage in gambling activities.

3.2. The present study

The present study aimed to examine the role of family and socio-economic indicators of welfare state in explaining probable problem gambling during adolescence. The main research question therefore reads: to what extent is cross-national variation in adolescent probable problem gambling explained by governmental expenditure in health and social protection, above and beyond family characteristics? It is hypothesised that adolescents perceiving more parental caring and parents' monitoring-regulation are less problematic gamblers (Chalmers & Willoughby, 2006; Floros et al., 2013; Vachon et al., 2004). It is also expected that national wealth (GDP), national expenditure in

health and benefits in kind for children and family show a negative association with probable problem gambling (Sarti et al., 2013; Viner et al., 2012). In addition, few studies have considered how the social context of early gambling behaviour may interact with factors such as social and environmental networks (Reith & Dobbie, 2011). Therefore, another purpose of the current study is to explore possible interactions between the family characteristics and the country level variables. It is hypothesised that lower benefit in kind for families/children may also affect the way that families deploy social and economic resources such as the need to earn income, which, in turn might limit parents' ability to support and protect young people (Viner et al., 2012), including less parental caring, and less parents' monitoring – regulation.

In this study, Hierarchical Linear Modeling (Raudenbush & Bryk, 2002) was used to evaluate the impact of the parenting (regulation, caring and monitoring; individual level) and country (GDP, expenditure on public health, family/children benefits; country level) influences on adolescent probable problem gambling.

3.3. Method

3.3.1. Participants and procedure

The present study used data from the 2011 European School Survey Project on Alcohol and Other Drugs (ESPAD), a cross-national survey performed in 39 European countries, representative of the student population (aged 16 years) in each country. The European countries collected data on school students according to common methodological guidelines. The target population consisted of students aged 15–16 years at the time of the survey. Data were collected using standard questionnaires, filled in on a voluntary basis in the school classroom. Details of sampling and survey methods in each country, and other information including response rates, can be found in Hibell et al. (2012). The nine countries included in the present study, with a total dataset of 31,236 students, were those who chose to administer the optional items aimed to investigate probable

problem gambling: Albania, Cyprus, Denmark, Finland, Italy, Lithuania, Romania, Serbia, United Kingdom. Of 31,236 participants, 29,952 (n= 14136 males, n =15816 females) consistently responded to the optional questions.

3.3.2. Measures

Problem gambling severity. Probable problem gambling was assessed using a screening instrument, the LIE-Bet Questionnaire (Johnson et al., 1988). This one includes two items: “Have you ever lied to family and friends about how much money you have spent on gambling?” and “Have you ever felt that you needed to gamble for more and more money?” both with the response categories “Yes” and “No”. Responses were given the value 1 for “Yes” and 0 for “No”, and the Lie/Bet sumscore thus ranged from 0 to 2. According to the previous studies (Carneiro et al., 2014; Rossow & Hansen, 2003), students who scored 0 or 1 were considered to be non-possible problem gamblers (coded 0), students with scores 2 were considered to be possible problem gamblers (coded 1). The internal consistency of the LIE-Bet Questionnaire was .69 (CI=.68-69).

Individual-level variables. Parental regulation was measured by two questions: “My parent(s) set definite rules about what I can do at home” and “My parent(s) set definite rules about what I can do outside the home” (responses on 5-point scale from “almost never” to “almost always”). On the basis of $\alpha = .79$ (CI = .78/.79), responses were averaged to obtain a synthetic measure. Parental caring was measured by two questions: “I can easily get warmth and caring from my mother and/or father” and “I can easily get emotional support from my mother and/or father” (responses on 5-point scale from “almost never” to “almost always”). On the basis of $\alpha = .88$ (CI = .88/.89), responses were averaged to obtain a synthetic measure. Parental monitoring was measured by three questions: “My parent(s) know whom I am with in the evenings”, “My parent(s) know where I am in the evenings” (responses on 5-point scale from “almost never” to “almost always”) and ‘Do your parents know where you spend Saturday evenings?’ (response on 4-point scale from

“usually don’t know” to “know always”). On the basis of $\alpha = .81$ (CI = .80/.81), responses were averaged to obtain a synthetic measure.

Control variables. Several control variables were included. Participants’ gender was coded 1 for males and 2 for females. Level of parental education was measured by the question: “What is the highest level of schooling your father/mother completed?”. The coding was: “completed primary school or less”, “some secondary school”, “completed secondary school”, “some college or university”, “completed college or university”. On the basis of $\alpha = .74$ (CI = .73/.74), responses were averaged to obtain a synthetic measure. Family structure was obtained by recoding the responses to the question “Which of the following people live in the same household with you?” to indicate living with both parents (0= “no”/1= “yes”).

Country level variables. Three country level variables were included in the analysis: (a) GDP per capita, that is, the gross domestic product converted to international dollars using purchasing power parity rates; (b) expenditure on public health (% of GDP), the current and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and non-governmental organizations), and social (or compulsory) health insurance funds, expressed as a percentage of GDP; (c) benefit in kind for families/children (% of GDP). A secondary analysis on the World Bank data 2012 was performed (Retrieved from: <http://www.worldbank.org/>), complemented with country level data from the United Nations Development Programme 2012. Additionally, country-level information on families/children benefits from other sources was obtained: EUROSTAT 2010 (Retrieved from: <http://ec.europa.eu/eurostat>) and Albania Institute of Statistics 2010 (Retrieved from: <http://www.instat.gov.al/al/home.aspx>).

3.3.3. Statistical analyses

These data were analysed using the multilevel logistic regression analysis through HLM6 (Raudenbush & Bryk, 2002) with students at the first level and countries at the second level. In model i (empty model), no explanatory variables were included. In model ii (within country model), the links between the individual variables and probable problematic gambling for individual i in country j were estimated. In model iii (between country model), the influence of the country variables on country level probable problematic gambling was estimated. In order to study the determinants of probable problem gambling, odds ratio (ORs) and 95% confidence intervals through the two-level logistic regression models were calculated. The random-effect factor (country) was needed in all models to allow possible heterogeneity.

The final model was defined as follows:

$$\text{Probable Problematic gambling} = \gamma_{0j} + \gamma_{1j}(\text{Gender}) + \gamma_{2j}(\text{Parental Education}) + \gamma_{3j}(\text{Family Structure}) + \gamma_{4j}(\text{Parental Regulation}) + \gamma_{5j}(\text{Parental Caring}) + \gamma_{6j}(\text{Parental Monitoring})$$
$$\gamma_{0j} = \beta_{00} + \beta_{01}(\text{Expenditure on health public}) + \beta_{02}(\text{GDP per capita}) + \beta_{03}(\text{Family/Children Benefit})$$

3.4. Results

Preliminary analyses

The overall reported levels of probable problematic gambling were 3.7% (total sample prevalence). In particular, Danish adolescents were the least involved in probable problem gambling (1.6%) whereas Albanian youth had the highest prevalence (5.3%) (see Figure 4). This comparison also showed that in Italy the prevalence of probable problem gambling was 2.6%.

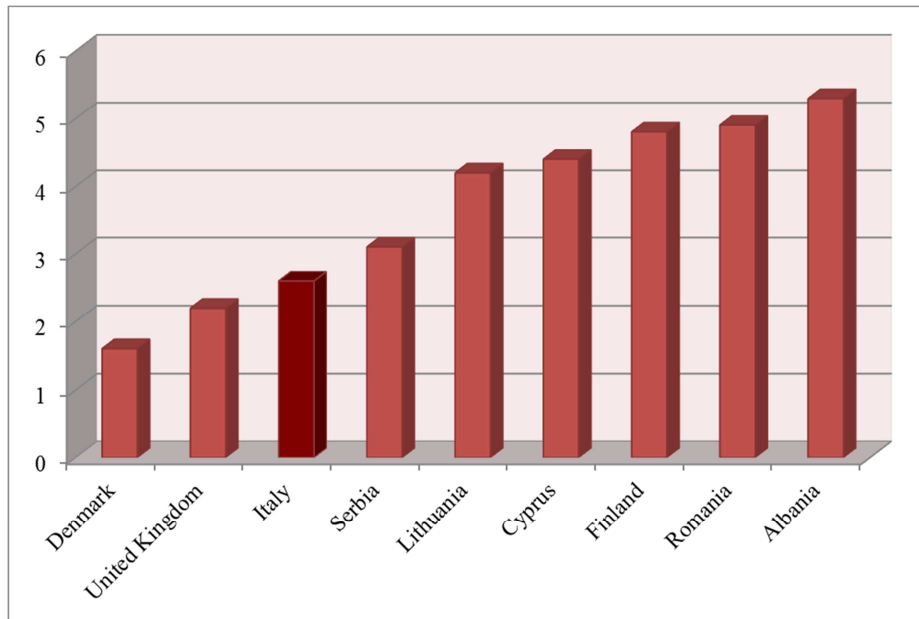


Figure 4. Life-time prevalence of probable problematic gambling in the countries under study

Descriptive statistics for the individual and country variables are tabulated (Table 2). For instance, in relation to family structure, 37.6% of possible problem gamblers in Cyprus did not live with both parents.

Country	Level 1 Individual												Level 2 Country Level		
	Male (%)		Level of parents' schooling #		Living with both parents (%)		Parental Regulation		Parental Caring		Parental Monitoring		Expenditure on public health (% GDP)	Benefit family/ children (% GDP)	GDP per capita
	Nppg	Ppg	Nppg	Ppg	Nppg	Ppg	Nppg	Ppg	Nppg	Ppg	Nppg	Ppg			
United Kingdom	48.9	83.3	3.42(.88)	2.94(.84)	64.2	63.9	3.33(1.11)	3.20(1.44)	4.18(1.05)	3.77(1.29)	3.72(.94)	3.28(1.13)	8,1	1.80	35 299
Denmark	44.3	88.2	3.31(.95)	3.31(.97)	73.7	70.6	2.77(.90)	3.00(1.12)	4.57(.77)	4.04(1.11)	4.19(.64)	3.74(.80)	9,7	4.30	40 600
Finland	46.6	83.7	3.26(.94)	3.20(.99)	70.9	66.5	3.49(.97)	3.53(.96)	4.20(.85)	3.82(.92)	3.85(.76)	3.30(.90)	6,7	3.30	36 030
Lithuania	47.8	89.4	4.05(1.02)	3.88(1.03)	68.6	76.9	3.08(1.12)	3.27(1.19)	4.28(.94)	4.08(.97)	3.75(.90)	3.13(1.00)	5,2	2.20	18 022
Romania	44.2	76.5	3.06(1.08)	3.04(1.11)	77.2	74.2	2.51(1.24)	2.63(1.33)	4.17(1.04)	4.02(1.19)	3.83(.97)	3.33(1.19)	4,4	1.70	14 531
Serbia	44.5	86.4	3.51(.98)	3.56(.95)	84.3	85.2	2.85(1.22)	2.96(1.31)	4.45(.89)	4.07(1.10)	4.15(.79)	3.41(1.11)	6,4	1.30	11 421
Italy	49.1	89.0	4.04(.94)	4.03(1.0)	83.8	74.8	3.45(1.07)	3.11(1.25)	4.34(.91)	3.85(1.16)	3.98(.84)	3.21(1.21)	7,4	1.30	32 110
Albania	42.1	83.3	3.21(1.03)	3.23(1.16)	92.6	91.9	3.40(1.15)	3.26(1.18)	4.50(.84)	4.09(1.08)	4.13(.79)	3.45(1.08)	2,6	.20	8 631
Cyprus	44.8	85.1	3.58(1.12)	3.43(1.23)	82.8	63.4	3.11(1.18)	3.15(1.23)	4.29(1.01)	3.70(1.24)	4.10(.79)	3.38(.99)	2,5	2.10	30 307
N	13191	945	26388	987	22802	835	28636	1106	28588	1107	28747	1113	9	9	9
Tot	45.8	84.7	3.53(1.05)	3.42(1.11)	79.4	75.6	3.12(1.17)	3.14(1.23)	4.34(.93)	3.94(1.11)	4.00(.83)	3.34(1.06)	5.89(2.44)	2.02(1.19)	25216.78 (12041.64)

#1= "completed primary school or less", 2= "some secondary school", 3= "completed secondary school", 4= "some college or university", 5= "completed college or university"

Table 2. Descriptive statistics for the individual and country variables by gambling status (Nppg: non-possible problem gambler = 28836; Ppg: possible problem gambler = 1116).

Indicator variables of probable problem gambling at the individual and national level

The HLM models are shown in Table 3. A preliminary step in HLM involves fitting an unconditional model (model i) and comparing the empty model at one level with the empty model at two levels. This comparison showed a significant main effect of the countries, with a random coefficient reliability of .93. The γ_{00} represented the average log odd of probable problem gambling in a country. The population-average estimate $\gamma_{00} = -3.26$, means that for a country with a random effect $u_{00} = 0$, the expected odd of being involved in form of probable problem gambling is .04. Given the estimate of $\tau_{00} = .16$, it was expected that 95% of the countries have a probability of probable problem gambling between .02-.08.

The within country model (model ii) includes the family variables and the demographic variable. In the total sample model, females were less likely to be problematic gamblers. Among family variables, students who perceive more parental caring and monitoring reported less involvement in probable problem gambling. Moreover, students who perceive a stronger parental regulation were more likely to be possible problematic gamblers. Finally, there were no associations of probable problem gambling with the level of parental education and family structure.

The between country model (model iii) includes the country variables. In those 9 European countries, the expenditure on public health was negatively associated with probable problem gambling. Thus, students who live in a country in which the expenditure on health is higher have a lower likelihood of being involved in probable problem gambling. However, GDP per capita and the benefits in kind for families/children showed no association with probable problem gambling. Various parallel multilevel regression models (performed with health expenditure as a fixed variable and entering our two country variables one step at a time) showed that our results have been pretty stable. Finally, in order to verify the possible different effects of family characteristics among youth living in different countries, a parallel analysis at an exploratory level by verifying the variability of those effects was performed. Only in the case of family structure [$X^2_{(8)}=21.86$, $p=.005$] was variability verified, but none of the country level predictors explained this variability.

Variables	Model i (empty model)			Model ii			Model iii#		
	Coeff. (SE)	p-value	OR (95% CI)	Coeff. (SE)	p-value	OR (95% CI)	β (SE)	p-value	Exp (β) (95% CI)
<i>Fixed Effect</i>									
Intercept				1.24 (.25)	.002		1.20 (.27)	.003	
<i>Individual Level</i>									
Gender (1=male)				-1.77 (.09)	.001	.17 (.14-.20)	-1.77 (.09)	.001	.17 (.14-.20)
Level of parents' schooling				-.04 (.03)	.06	.96 (.90-1.02)	-.04 (.02)	.06	.96 (.92-.99)
Family Structure				-.15 (.08)	.27	.85 (.73-1)	-.16 (.14)	.27	.85 (.64-1.13)
Parental Regulation				.15 (.03)	.001	1.16 (1.09-1.23)	.15 (.09)	.001	1.16 (1.09-1.23)
Parental Caring				-.08 (.03)	.02	.92 (.85-.98)	-.08 (.07)	.02	.92 (.85-.98)
Parental Monitoring				-.55 (.04)	.001	.57 (.53-.62)	-.55 (.07)	.001	.57 (.54-.60)
<i>Country level (N=9)</i>									
Expenditure on public health (% of GDP)							-.13 (.04)	.02	.87 (.78-.97)
GDP per capita							-.00(.00)	.14	1.00 (1.00-1.00)
Benefit family/children (% of GDP)							.15 (.10)	.20	1.16 (.89, 1.51)
<i>Random Effect</i>									
Variance components	.15(.39)	$X^2(8)=119.44, p<.001$.18(.42)	$X^2(8)=125.57, p<.001$.04(.20)	$X^2(5)=29.06, p<.001$	

df=5; SE = standard error; GDP = gross domestic product; OR = odds ratio; CI = confidence interval.

Table 3. Correlates of probable problem gambling (0=no probable problem gambling, 1= probable problem gambling)

3.5. Discussion

The present study investigated the role of family and socio-economic indicators of welfare state in explaining probable problem gambling during adolescence in a representative sample of students living in 9 European countries. The principal aim was to examine adolescent probable problem gambling as a function of individual and contextual characteristics, using multilevel analysis. The present study provides new insight into the possible social environmental factors contributing to the development of problem gambling. More specifically, two main results came out from our study.

First, parents' level of schooling and family structure were not related to probable problem gambling. These findings are in line with previous results reported in the literature that found no relationships between family socio-demographic characteristics and adolescent gambling behaviours (Langhinrichsen-Rohling et al., 2004; Vitaro, Ferland, Jacques, & Ladouceur, 1998). Similarly to what has been found on substance abuse, family structural characteristics may be less influential in affecting problem gambling compared to family relational characteristics (Coombs & Paulson, 1988; Velleman, Templeton, & Copello, 2005). In this respect, our analyses showed that living in a family environment where parents are supportive and monitor their children's behaviours is negatively related to probable problem gambling. In line with previous studies, family support displayed a negative association with probable gambling problem (Hardoon et al., 2004), because students may have more social resources to turn to when they get in trouble. In addition, have parents who are more aware of how and with whom their children spend free time is negatively associated with gambling activities (Chalmers & Willoughby, 2006; Magoon & Ingersoll, 2006). Finally, high levels of disciplinary parental-rules (i.e. external-rules), were related to higher levels of adolescent probable problem gambling. Our findings are consistent with the psychological and communicational literature pointing out the importance and effectiveness

of self-regulation in the identification, assessment and treatment of behavioural excesses (Bandura, Caprara, Barbaranelli, Gerbino, & Pastorelli, 2003).

Regarding cross-country comparisons, the reported levels of probable problematic gambling behaviour shown a variation, ranging from 1.6% (Denmark) to 5.3% (Albania). However, our findings pointed out that part of the variation in adolescent probable problem gambling can be attributed to country-level characteristics. The results from the between country model explain the cross-national variation in adolescent probable problem gambling in two ways. On the one side, higher health expenditure was related to lower levels of gambling problems even after controlling for the influence of the gross domestic product (GDP). Interestingly, the effect of health expenditure on probable problem gambling was net of the effect of GDP. In line with Richter et al. (2012) and Bartlett (2013), it may be possible that living in southern, eastern and Balkan countries - where health service provisions and benefits are limited - has a negative impact on gambling behaviours. Therefore, welfare regimes with less substantial welfare services and less redistributive welfare provision seem to have a negative effect on young people health (Holstein et al., 2009; Richter et al., 2012; Zambon et al., 2006). It may be reasonable to assume that not only individual characteristics but also macrolevel factors (e.g., socioeconomic indicators of welfare) influence adolescent health and wellbeing (Zambon et al. 2006, Ravens-Sieberer et al. 2008, Holstein et al. 2009). These welfare provisions (e.g., health expenditure) are likely to work through and beside the social and income inequalities to affect intermediary determinants such as material circumstances, parental characteristics or health behaviours (Beckfield & Krieger, 2009). Thus, in addition to a direct link between macrolevel determinants and health behaviour, socioeconomic indicators of welfare could act indirectly as a stratifying mechanism through other determinants of health (Torsheim et al., 2004). Indeed, research has shown that countries with

stronger redistributive welfare policies are more effective in weakening the association between socioeconomic position and health (Zambon et al., 2006).

On the other side, adolescent probable problem gambling was not associated with countries' expenditure on benefits in kind for children and family. Thus, greater family spending was not related to a decreased rate of probable problem gambling. Contemporary public health practice should act on multi-level responses, focusing on upstream interventions based on structural response, including appropriate legislative frameworks addressing on health and wellbeing issues such as expenditure on health. However it seems that, addressing expenditure on health should probably not necessarily mean to give benefit family/children: those benefits show no association with probable problem gambling. It is noted that family income and increased wellbeing do not follow the same track: increase benefit income, while taking no other proactive action, could further push the family into dependency, increasing the chance that young people will follow the same path as adults.

Finally, unlike what was expected, no cross-level interaction between benefit in kind for families/children and the parental characteristics in participant countries was found. Future multilevel research explaining the conditional link between family characteristics and others socioeconomic indicators of Welfare concerning adolescent gambling would be considered.

This study presented some limitations. Firstly, all data were self-report and therefore subject to the standard limitations of this type of data (e.g., social desirability biases, memory recall biases, etc.). Secondly, our assessment of problem gambling was not completely satisfactory, mainly because it consisted of two items. Although the two-item Lie/Bet questionnaire may be useful to classify possible problem gamblers (Rossow & Molde, 2006), other extensive instruments are most frequently used and can better capture the phenomenon. Otherwise, a screening test such as Lie/Bet is more appropriate when referring to youth

because it is focused on less severe gambling problems. In this perspective, regarding validity assessment of the Lie/Bet screen, comparisons have been made with DSM-IV criteria. Götestam et al. (2004) found that in an adolescent sample the Lie/Bet screen, compared to the use of the full DSM-IV, is pretty close. It is concluded that the Lie/Bet Screen may function as a good screening device for probable gambling problems, in normal community samples. Although the Lie/Bet test, having a lifetime frame, may yield a higher prevalence estimate of gambling problems if compared to others instruments such as SOGS-RA and DSM-IV-MR-J (Fisher, 2000), analysing this behaviour among students aged 16 years, there is confidence that the lifetime prevalence was quite similar to the recent ones. Thirdly, a relatively small number of countries in the sample was included, with respect to existing studies employing hierarchical linear model. Research performed with a large number of countries is needed in order to better explain the cross-national variations in adolescent problem gambling (i.e., clustering of countries in different welfare state regimes). Finally, our study focused on individual and country level characteristics, but other settings (i.e., peers, school and community) impacting addictive behaviours may also influence problem gambling. Moreover, at the country level, some other characteristics may play a role in shaping adolescent gambling (i.e., education and training).

Despite these limitations, our multilevel study deepened understanding of the complex set of determinants of probable problem gambling. Results of this study have potentially important implications for developing prevention and intervention programs for adolescents. According to our findings, prevention efforts should target parents' awareness of the impact on their children of their parenting practices, while future social welfare policies should introduce or maintain stronger health insurance funds, thus decreasing adolescent gambling and other risk behaviours.

3.6. Conclusions

In conclusion, the results from the current study provide an important addition to the literature on adolescent gambling. To our knowledge, the present study is likely to be the first that has sought to clarify the additive (i.e., risk or compensatory) or moderating (i.e., protective or exacerbating) role of environmental risk (e.g., family) and macro-level factors (e.g., macroeconomic indicators of welfare) related to youth gambling problems. These findings give support to the idea that family characteristics and expenditure on public health may play a key role in explaining probable problem gambling among adolescents in Europe. In particular, the findings underline that: (i) while country wealth is not protecting from gambling, gambling indeed is influenced by the way countries decide to allocate public resources; (ii) parents have a fundamental role in buffering gambling behaviour.

The present study extends gambling research by demonstrating that the social determinants of health approach (WHO, 2008) can be applied to the study of adolescent gambling.

Future research should investigate the mechanisms through which family characteristics (e.g., parental knowledge) exert their effects on adolescents' gambling. An attempt to explain these mechanisms is examined in the next study (Chapter 4).

Chapter 4

Study 2. How parental knowledge can reduce gambling frequency rates: The role of adolescent gambling-oriented attitudes

4.1. Introduction

Recently, gambling disorder was classified as an addictive disorder in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders, representing a new category of behavioural addictions similar to substance use disorders in terms of aetiology, symptoms, course, correlates, and treatment approaches (Hasin et al., 2013). Problem gambling, similar to many other antisocial behaviours, has been shown to have multiple related risk factors (Shead, Derevensky, & Gupta, 2010). It should also be noted that many of the identified risk factors are similarly associated with other mental health and/or addictive disorders; one of the reasons disordered gambling is now classified as a Behavioural Addiction. Therefore, given the similarity between gambling and other addictive behaviours, especially substance abuse, it is important to test the degree to which gambling disorder shares the same risks and protective factors as alcohol and drug use. Understanding these similarities more precisely could help advance future research on gambling, by suggesting, for example, that verified models for substance abuse could also be useful in explaining problem gambling (Leeman & Potenza, 2012). As described in Chapter 2, in the conceptual framework for the development of gambling and alcohol use in youth (Barnes et al., 1999), youth learn social behaviours, as gambling, during the socialization process by ongoing interactions with significant others,

firstly with parents and subsequently with adolescent peers, who become gradually more influential during later adolescence. In addition, individual-personality characteristics may be shaped and acted on by socialization influences (in particular by parental knowledge). Therefore, personal (e.g., attitudes) and environmental (e.g., parental practices) factors can operate in a cumulative (i.e., additive) manner in regard to youth gambling problems (Lussier et al., 2014). For instance, adolescents may be more likely to develop rejecting attitudes toward gambling if they come from homes where parents are more aware of upcoming youth activities.

Parental monitoring is defined as “a set of correlated parenting behaviours involving attention to and tracking of the child’s whereabouts, activities, and adaptations” (Dishion & McMahon, 1998, p.61). The current view about parental knowledge is that it is the outcome of a family process that may include parental monitoring behaviours, but which is more proximally determined by adolescents’ disclosure of their whereabouts and activities (Stattin & Kerr, 2000). The seminal work of Stattin and Kerr (2000) reinterpreted the construct of parental monitoring by arguing that previous authors had in fact examined parental knowledge instead of parental monitoring. However, even after this important reconceptualization, researchers continue to label the construct “parental monitoring” when their measure may represent “parental knowledge” (e.g., Dillon, Pantin, Robbins, & Szapocznik, 2008). In a recent review published by Racz and McMahon (2011), 26 studies, out of the 47 reviewed, examined parental knowledge (and approximately half of them used the term “parental monitoring” to describe their measures of parental knowledge). The lack of specificity in these constructs has made it difficult to distinguish the effects of knowledge alone on youth behaviours from those of parental efforts to monitor, as well as of other behaviours, such as youth disclosure of information (Lippold, Greenberg, Graham, & Feinberg, 2014). In this context, the present study is precisely aimed at assessing whether a

relation exists between parental knowledge and youth gambling. It was decided that there should be a focus on the role of parental knowledge, rather than of parental monitoring, because knowledge is a central construct that links adolescent outcomes to other monitoring-related behaviours. Several studies show that the effects of both parental efforts to monitor and children's disclosure on youth outcomes depend on whether or not they lead to an increase in parental knowledge (e.g., Vieno et al., 2009).

A broad and growing body of literature suggests that family practices, such as parental knowledge and monitoring, are related to adolescent behaviour via both direct and indirect paths (Halgunseth, Perkins, Lippold, & Nixet, 2013; Kim & Neff, 2010; Lac, Alvaro, Crano, & Siegel, 2009). It is important to understand the mechanisms through which these family characteristics exert their effects on adolescents' behaviour. Adolescent attitudes, such as disapproval and perception of a specific risk behaviour, and their (negative) evaluation of peers' risky behaviours, have been found to mediate between family factors and risk behaviours (e.g., Walker, Neighbors, Rodriguez, Stephens, & Roffman, 2011). For instance, in the context of antisocial behaviours, parents who were inconsistent in their discipline were more likely to have adolescent offspring with more accepting attitudes toward delinquent behaviours. In turn, these accepting attitudes were related to less socially competent behaviours (Halgunseth et al., 2013). Interestingly, the mediating role of adolescent attitudes (i.e., disapproval of behaviours, awareness of the behaviours' harmfulness, and estimate of how often their friends engage in such behaviours) has been examined for alcohol and marijuana use and antisocial behaviours (e.g., Halgunseth et al., 2013), but no studies have considered how gambling-oriented attitudes may mediate the relation between parental knowledge and gambling participation. The present study aims to address this gap in the literature.

4.1.1. Pathways from parental knowledge and monitoring to adolescent gambling

Social learning theory suggests that youth learn behaviours by experiencing, observing, and interacting with individuals in their environment. Parents serve as important socializing agents for adolescents, particularly in their function as disciplinarians (Bandura, 1999). Parental knowledge and parental monitoring have often been conceptualized as important parenting practices buffering adolescent gambling behaviours (for a review, see McComb & Sabiston, 2010). Parental monitoring has been found to reduce adolescent gambling (Molinaro et al., 2014). A longitudinal study tracking children into young adulthood found that low and/or declining parental monitoring of children between the ages of 11 and 14 was associated with problem gambling when those children reached adulthood (Lee, Stuart, Ialongo, & Martins, 2014). In the model it was therefore predicted that there would be a direct and negative association between parental knowledge and gambling frequency.

4.1.2. Adolescent attitudes toward gambling

The theory of reasoned action (TRA, Aizen & Fishbein, 1980) suggests that the intention to perform a behaviour is influenced by attitudes and perceived subjective norms regarding that behaviour. According to Patel and Fromme (2010), individual attitudes towards whether or not it is wrong to use substances, as well as perceptions of substance use norms among peers are important in adolescents' decisions on whether or not to use alcohol and other substances.

It is well recognized that attitudes toward gambling are a good predictor of problem gambling during adolescence. Overall, adolescents' attitudes toward gambling were slightly negative (Hanss, Mentzoni, Delfabbro, Myrseth, & Pallesen, 2014). Previous studies found

that more favourable attitudes towards gambling were associated with greater time and money spent on gambling (Orford et al., 2009), while Tao et al. (2011) found that the perception of gambling carrying negative consequences was associated with less gambling involvement. Regarding descriptive norms, adolescents who perceived their friends as gamblers, were more likely to participate in gambling activities (Wickwire et al., 2007). Martin et al. (2010) highlighted that gambling frequency among college students was associated with friends' norms and attitudes. Thus, a body of research has addressed these relations among college students and adult gamblers, but it is still unclear how subjective norms and attitudes, as well as perception of peer behaviours, operate among adolescents. Few studies have examined the relationship between attitudes and subjective norms on adolescent gamblers (Orford et al., 2009; Wickwire et al., 2007). In addition, a recent review (Spurrier & Blaszczynski, 2014) reported that, despite an extensive focus in gambling studies on cognitive biases and errors associated with gambling, few studies addressed gamblers' perception of potential risk and harms related to gambling.

Given the paucity of existing research and the need for potential applicability of findings in prevention and intervention efforts, the present study focuses on the gambling-oriented attitudes (self-approval, risk perception and descriptive norms) in a sample of Italian adolescents.

4.1.3. Adolescent attitudes as mediators of the family-adolescent behaviour relationship

Social learning theory also proposes that social influences, such as parents and peers, operate through psychological mechanisms to produce behaviour effects (Bandura, 1997). Parents may seek to positively sway their children's drug attitudes and beliefs (Lac et al., 2009). Thus, adolescents who perceived higher levels of parental monitoring were more likely to disapprove of problem drinking and be aware of the risks linked to excessive

drinking, which were, in turn, negatively related to alcohol use. Additionally, parental monitoring was negatively associated with individuals' estimate of their friend's drinking, which was, in turn, positively related to alcohol use (Kim & Neff, 2010). Lac and colleagues (2009) found that high parental knowledge predicted lower pro-marijuana attitudes and subjective norms in adolescents, which in turn were positively related to the behavioural intentions to use marijuana in the future.

Therefore, while the results of Kim et al. (2010), Lac et al. (2009) and Halgunseth et al. (2013) provide an interesting frame of how attitudes and subjective norms mediate the relationship between parents' influence and child's outcomes, no study has examined the pathways of indirect influence on adolescent gambling. A recent review on adolescent problem gambling suggested that future research should examine the impact of family influence on gamblers' perceptions and attitudes, which in turn have an influence on gambling behaviours (Ariyabuddhiphongs, 2013). This review shows that studies on adolescent gambling were guided by the hypotheses of person-gambling (cognitive bias, incentives, excitement seeking, and impulsivity) and environment-gambling relationships (parents and peers). Mediation effects of person and environmental variables should be included in future studies in order to reach a more comprehensive analysis of the existing relationships between person and environment characteristics and problem gambling in adolescence (Ariyabuddhiphongs, 2013).

4.2. The present study

Consistent with the theoretical backgrounds reviewed, the primary aim of the present study was to test an integrative model linking the influence of parental knowledge on adolescent gambling, taking into account the role of gambling-oriented attitudes as a mediating variable in a sample of Italian high school students (see Figure 5). The study's aim

is grounded in social learning theory, proposing that adolescent behaviour is influenced by the observation and internalization of other's behaviours and their associated outcomes in the proximal environment (Bandura, 1999). Thus, adolescents use these observations as sources of information to help them abstract rules, develop their own standards of conduct, and set personal goals by observing which behaviours in their environment lead to reinforcement and punishment (Bandura, 1986). They then generalize these rules to other areas of their lives that govern their behaviour (Bandura, 1999; Bandura et al., 1996; Bandura, Caprara, Barbaranelli, Pastorelli, & Regalia, 2001). Since parents are frequently responsible for establishing and enforcing behavioural norms in the family, it follows that adolescents' personal standards of conduct may be influenced by observations and interactions with their parents. As suggested by such past research on alcohol (e.g., Kim & Neff, 2010) and marijuana (e.g., Lac et al., 2009), in the context of parenting practices (e.g., parental knowledge) it is possible that adolescents may be more likely to develop rejecting attitudes toward gambling, if at home guidelines for appropriate behaviours are consistently reinforced.

In the present study, it is hypothesised that parents being aware of upcoming youth activities may be more likely to discuss their views on whether or not gambling is morally acceptable (and also a safe activity) for their children. Hence, adolescents would learn that there are consequences for gambling, which, in turn, could bring to avoid or reduce gambling participation. In addition, parental knowledge should limit adolescent opportunities for experiencing "passive" social pressure (Wood, Read, Palfai, & Stevenson, 2001), such as overestimation of friend gamblers, which, in turn, could reduce gambling frequency. More specifically, it is hypothesises that adolescents who perceive higher levels of parental knowledge are: 1) more likely to disapprove of gambling and show higher awareness of gambling harmfulness which, in turn, negatively relate to gambling frequency; 2) less likely to perceive their friends as gamblers, which is also negatively related to gambling frequency;

and 3) less likely to participate in gambling activities. Therefore, the primary aim of this study is to investigate both direct and indirect effects of parental knowledge on adolescent gambling.

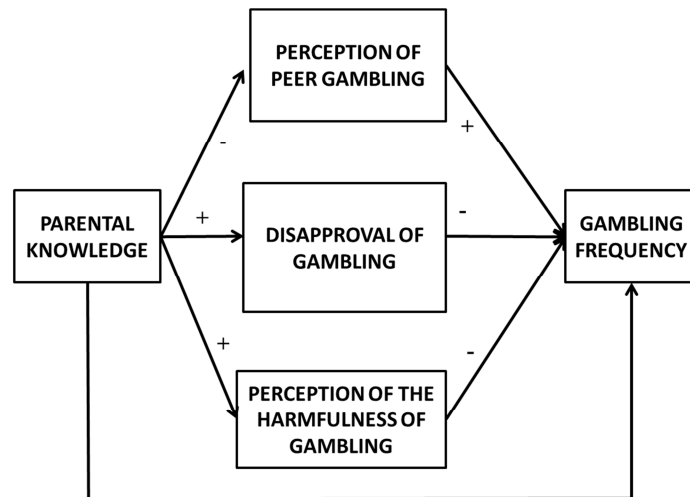


Figure 5. Theoretical model predicting gambling frequency from parental knowledge, with the mediation of gambling oriented attitudes.

4.3. Method

4.3.1. Participants and procedure

Data were drawn from the ESPAD@Italia2012 (European School Survey Project on Alcohol and Other Drugs) study, a national school survey conducted annually by the Institute of Clinical Physiology of the Italian National Research Council. Data were collected using standard questionnaires, completed in school classrooms. Sampled schools are divided into three groups: upper secondary general schools (classical, scientific, linguistic, pedagogic), art institutes, and upper secondary vocational schools (professional, technical). Schools are both public and private. Private schools not legally recognized are not included in the sample

(0.3% of total schools). The sampling method applied is the multi stage stratified sample, which takes into account the type of school and other variables, such as geographical area (North, Centre, South and Islands) and population density. Students are sampled in proportion to the size of each stratum. More detailed information about the sampling procedures are available in Hibell et al. (2012). Of the total sampled schools, 92% participated in the survey, and only less than 0,5% of the students refused to fill in the questionnaire. Non-participating schools are equally distributed as to location and type of school. Sampled schools were contacted asking teachers responsible for health education to present the research project to the school board. The authorization by the school director was required to allow students fill in the Italian ESPAD questionnaire. The survey was included in each school's annual Teaching Programme (Decree of the President of the Italian Republic n.275/1999, Art. 8), edited, agreed and approved by Collegial Bodies comprised teachers, parents and students (Legislative Decree n.297/1994). Parents were informed via passive consent. Students were informed that participation is anonymous and voluntary. Questionnaires were self-administered to a representative sample of high school students aged 15-19 years, according to the ESPAD methodology (Hibell et al., 2012). In a sub-sample, additional questions about gambling behaviours were asked within a special section, and the theoretical model was tested on a sample of 19,573 students (8958 boys and 10615 girls). Participants' age ranged from 15 to 19 years old, with a mean of 17.11 (SD=1.43). Considering its size, the sample was randomly split into three partitions and analysed for different purposes.

4.3.2. Measures

Modules and optional questions were added to the 2011 ESPAD standardized questionnaire (Hibell et al., 2012) in order to investigate additional specific areas of interest

(i.e., gambling). Questionnaires were composed of measures drawn from standardized questionnaires of the ESPAD project. The validity of items in the country surveys (e.g, Italy) is similarly high. Each country translated the questionnaire into its own language and thereby adjusted the wordings to make questions as appropriate as possible to the cultural context (details can be found in Hibell et al. 2012). Given the high correlation among several variables, in order to use all the available information, some measures were considered as a composite numerical variable. For these measures, internal reliability was tested using Cronbach's alpha, and a value equal to 0.7 or higher indicated good reliability (Nunnally & Bernstein, 1994).

Gambling frequency. Students responded to eight items structured to assess how frequently (number of occasions) they participated in different gambling activities (instant scratch tickets, lottery tickets, football pools, new slot machines and VLT, sport betting, other events betting, poker, and card games) in the past year, with a 7-point response scale ranging from 1= "0 times" to 7= "every day". Responses to these items were also used to classify respondents into four groups reflecting the intensity/ frequency of being involved in gambling activities in the past year: (1) non-gamblers, (2) occasional gamblers who gamble less than once a month, (3) monthly gamblers who take part in only 1 or 2 gambling activities at least once a month, and (4) frequent gamblers who are involved in more than two gambling activities monthly (Kessler et al., 2008). Categorical definitions of gamblers by gambling frequency can facilitate comparison across studies. The eight questions had adequate internal reliability ($\alpha = .84$; 95% CI=.84-.85).

Perception of the harmfulness of gambling. Perception of the harmfulness of gambling was measured with two questions: "How much do you think people risk harming themselves (physically or in other ways), if they gamble: less than once a week (item 1) and once a week or more (item 2)". Students answered each question using a 4-point scale

ranging from 1= “no risk” to 4= “great risk”. The two questions had adequate internal reliability ($\alpha = .84$; 95% CI=.83-.84).

Disapproval of gambling. Self-disapproval of gambling was assessed with two questions: “Do you disapprove of people gambling: less than once a week (item 1) and once a week or more (item 2)”. Students answered each question using a 3-point scale ranging from 1= “don’t disapprove” to 3= “strongly disapprove”. Both items had adequate internal reliability ($\alpha = .84$; 95% CI=.83-.84).

Perceived descriptive norms. Students’ estimate of their friend’s gambling was assessed with a single item: “How many of your friends would you estimate gamble” with a 5-point scale ranging from 1= “none” to 5= “all”. This measure is similar to that used by Wickwire et al. (2007).

Parental knowledge. Parental knowledge was measured by three questions: “1. Do your parents know where you spend Saturday nights”, (response on 4 point scale from “usually don’t know” to “know always”); “2. My parent(s) know who I am with in the evenings” and ‘3. My parent(s) know where I am in the evenings’ (responses on 5 point scale from “almost never” to “almost always”). Only the first two items were considered in the analysis because the factor structure with the first two items was better than the factor structure with three items (see the section “Psychometric properties of the measures” in the results). The Cronbach’s alpha for the 2-item scale was .78 (95% CI=.77-.79).

Demographic variables. The participants reported their age and gender. Since the minimum legal age for gambling in Italy is 18, the age of students was grouped in two levels: students under the age of 18 (15-17 years), and students aged 18 or over (18-19 years).

4.3.3. Statistical Analyses

The R (R Core Team, 2013) Package Lavaan was used to analyze models and to estimate parameters. A cross validation with a three-step analytic approach was carried out. The original sample was randomly split into three partitions, all containing 1/3 of the data (see Table 4).

	Partition1 (measures) <i>n</i> =6525	Partition2 (calibration) <i>n</i> =6525	Partition3 (validation) <i>n</i> =6523
Gender			
Males <i>n</i> (%)	2958 (45%)	2998 (46%)	3002 (46%)
Females <i>n</i> (%)	3567 (55%)	3527 (54%)	3521 (54%)
Age			
<i>M</i> (SD)	17.13 (1.42)	17.11 (1.41)	17.08 (1.43)

Table 4. Descriptive characteristics of the partitions

In the first step (partition 1), the factorial properties of measures were evaluated. After the factor solution was confirmed, factor scores were calculated for each factor using the diagonally weighted least squares, and were used in the follow-up analyses to investigate the model. Factor scores were modelled as observed variables. According to Cudeck and Brown (1983), a cross-validation strategy was used in which the observed-variables model was developed (second step) using a calibration data sample (partition 2) and then confirmed (third step) using an independent validation sample (partition 3). The pattern of relationships specified by the conceptual model proposed was examined through path analysis, using a single factor score for each construct tested in the model. Parameters of the observed-variable

models (partition 2, partition 3) were estimated using the maximum likelihood method. To evaluate the overall goodness of fit of the model, the R^2 of each endogenous variable and the total coefficient of determination was considered (CD, Bollen, 1989; Jöreskog & Sörbom, 1996). The CD shows the joined effect of the predictor variables on all dependent variables: the higher the CD, the more the variance is explained. The CD is defined as:

$$1 - \frac{|\hat{\Psi}|}{|\hat{\Sigma}_{yy}|}$$

here, $|\hat{\Psi}|$ is the determinant of the covariance matrix among the errors and $|\hat{\Sigma}_{yy}|$ is the determinant of the fitted covariance matrix among endogenous variables.

For the mediation effect, Laavan uses the normal approximation method, and is based on the delta method, or the so-called Sobel method (Casella & Berger, 2002).

4.4. Results

Factorial properties of the measures

The first step of the analysis was to evaluate the factorial properties of measures. Since the type of Likert scale was discrete and ordinal, the factorial properties were evaluated with a polychoric correlation (for the measures with two items) and a confirmatory factor analysis (CFA for the measures with 3 or more items). Fit indices and R^2 from the gambling frequency CFA were as follows: [$X^2_{(20)}=1368$, $p<.001$, CFI=.97, RMSEA=.10; R^2 : item 1=.52; item 2=.56; item 3=.70; item 4=.60; item 5=.69; item 6=.71; item 7=.73; item 8=.62]. The size of the polychoric correlation coefficient for the two items concerning perception of the harmfulness of gambling ($r_{Polychoric}=.87$) and disapproval of gambling ($r_{Polychoric}=.88$) indicates a large effect. Results from the parental knowledge CFA suggested that the factor structure with three items was not confirmed due to the item “my parent(s) know where I am

in the evenings” that does not perform well on the basis of criteria. Thus, the factor structure with the first two items was considered ($r_{Polychoric}=.64$).

Gambling behaviour and descriptive statistics

In the total sample, 49% were non-gamblers, 24% occasional gamblers, 18% monthly gamblers and 9% frequent gamblers. More girls than boys were non gamblers (respectively 58% and 39%) and occasional gamblers (respectively 26% and 23%), while boys showed higher rates of monthly gamblers (23%) and frequent gamblers (15%) than girls (13% and 2% respectively) [see Figure 6].

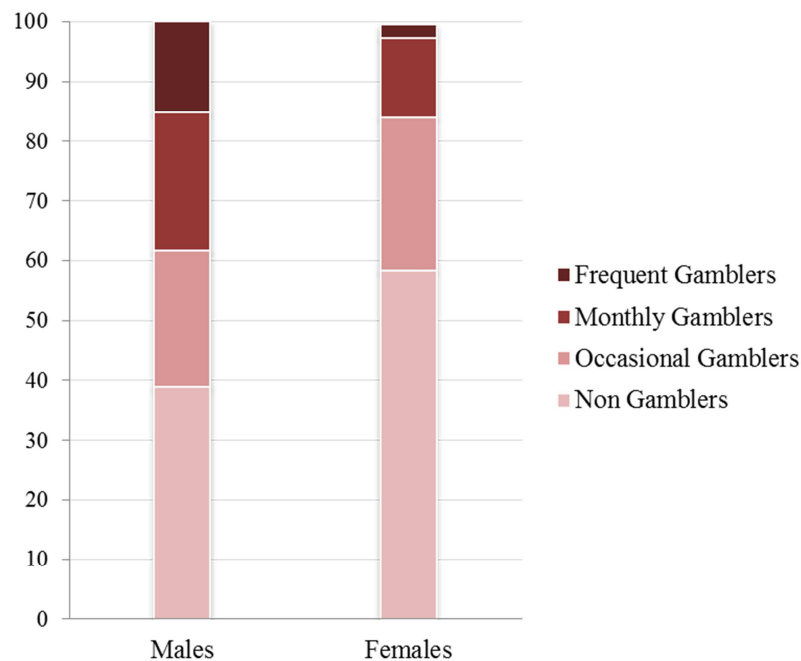


Figure 6. Percentage of gamblers in males and females

Regarding age differences, the high school students included in the study are quite homogeneous in terms of gamblers categories. For 15-17 years old students, 52% were non-gamblers, 23% occasional gamblers, 17% monthly gamblers and 8% frequent gamblers. For 18-19 years old students, 46% were non-gamblers, 26% occasional gamblers, 19% monthly gamblers and 9% frequent gamblers (see Figure 7).

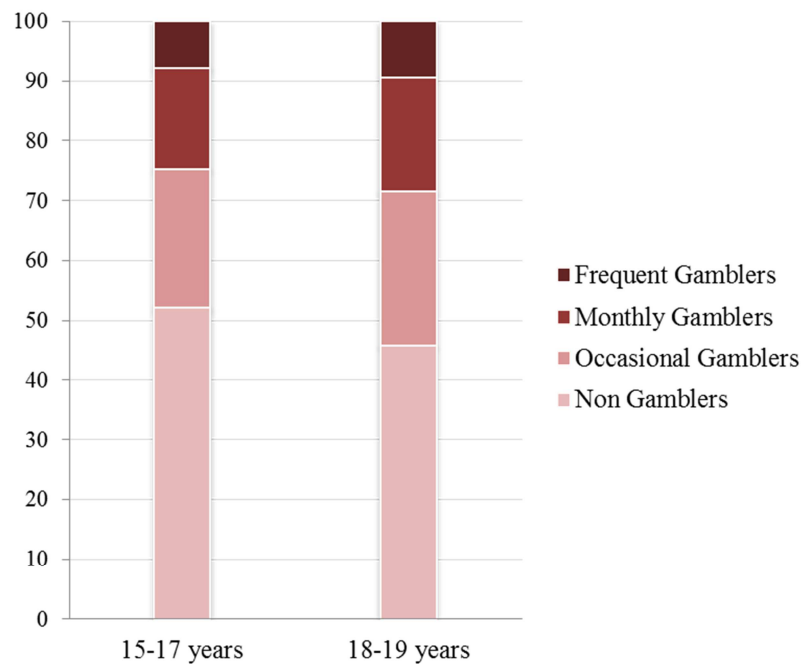


Figure 7. Percentage of gamblers in 15-17 years old students and 18-19 years students

In Table 5, means, standard deviations and bivariate correlations between the study variables are presented. All bivariate correlations among study variables were in the expected direction. The magnitude of correlation coefficients was relatively modest, ranging from $-.36$ to $.50$. In particular, there was a negative correlation between parental knowledge and gambling frequency ($r = -.19$). Regarding gambling-oriented attitudes, there was a negative correlation among disapproval ($r = -.34$) and harmfulness perception of gambling ($r = -.29$), and gambling frequency. Moreover, there was a positive correlation between perception of peer gambling and gambling frequency ($r = .38$). Finally, parental knowledge was positively correlated to disapproval ($r = .15$) and risk perception of gambling ($r = .10$), and negatively correlated to perception of peer gambling ($r = -.15$).

	1	2	3	4	5	<i>M</i> (SD)
1. Parental knowledge	-					3.96(.73)
2. Perception of the harmfulness of gambling	.10**	-				3.30(.81)
3. Perception of peer gambling	-.15**	-.32**	-			1.52(.50)
4. Disapproval of gambling	.15**	.50**	-.36**	-		2.39(.67)
5. Gambling Frequency	-.19**	-.29**	.38**	-.34**	-	1.32(.62)

**p<.001

Table 5. Means, Standard Deviations, and correlations between variables for the total sample (n=19573)

Testing the theoretical model

The second step of the analysis was to test the proposed model. Results obtained from the path analysis validated the hypothesised theoretical model. Figure 8 represents the empirical estimation on the *calibration sample* of the proposed model (estimated parameters are reported). Higher levels of parental knowledge were associated with lower levels of gambling frequency; the association was fully mediated by gambling-oriented attitudes. The squared multiple correlations indicate that the model accounts for a modest portion of the variance in study variables, that is: 4% of the variance in perception of peer gambling, 8% in disapproval of gambling, 3% in perception of the harmfulness of gambling, 36% in gambling frequency. Moreover, the total coefficient of determination (CD) was .18. As shown in Figure 7, adolescents who perceived higher levels of parental knowledge were more likely to disapprove of gambling and showed higher awareness of the harmfulness of gambling, which were, in turn, negatively related to gambling frequency. They were also less likely to perceive their friends as gamblers, which, in turn, was also negatively related to gambling frequency.

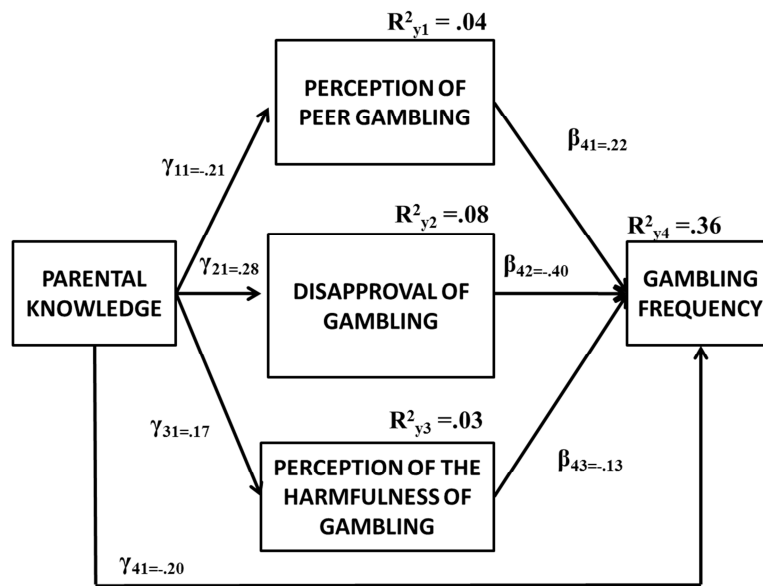


Figure 8. Standardized parameters and R^2 for the proposed model
(calibration sample, $n=6525$)

Along with the direct effects shown in Figure 8, some significant indirect relationships emerged. Table 5 shows the decomposition of effects of parental knowledge on gambling frequency. The direct effect of parental knowledge on gambling frequency was significant and negative (-.20). Along with direct effects, parental knowledge had also an indirect relationship with gambling frequency (-.18) through its effect on perception of peer gambling (-.04), disapproval of gambling (-.11) and perception of the harmfulness of gambling (-.03).

Validation of the model

Retesting the model on the *validation sample* (partition 3) showed that the standardized parameters, R^2 of each endogenous variable and the total coefficient of determination, as well as the direct and indirect effects of parental knowledge on gambling frequency (Table 6) were largely in accordance with the development sample (partition 2).

Direct Effects	Indirect Effects (through)	Partition 2 (calibration) <i>n</i> =6525		Partition 3 (validation) <i>n</i> =6523	
		Estimated	SE	Estimated	SE
Parental knowledge - Perception of peer gambling		-.21	.03	-.18	.02
Parental knowledge - Disapproval of gambling		.28	.01	.27	.01
Parental knowledge - Perception of the harmfulness of gambling		.17	.01	.20	.01
Parental knowledge - Gambling frequency		-.20	.01	-.24	.01
	Perception of peer gambling	-.04	.003	-.04	.002
	Disapproval of gambling	-.11	.005	-.09	.004
	Perception of the harmfulness of gambling	-.03	.002	-.03	.002
Perception of peer gambling - Gambling frequency		.22	.01	.20	.01
Disapproval of gambling - Gambling frequency		-.40	.01	-.35	.01
Perception of the harmfulness of gambling - Gambling frequency		-.13	.01	-.16	.01
R ² Perception of peer gambling		.04		.04	
R ² Disapproval of gambling		.08		.07	
R ² Perception of the harmfulness of gambling		.03		.04	
R ² Gambling frequency		.36		.34	
CD		.18		.19	

All parameters estimated are significant ($p < .001$)

Table 6: Estimated parameters and R², standard errors for the total sample
(Partition 2 and Partition 3)

4.5. Discussion

The primary purpose of this study was to evaluate an integrative model linking the influence of parental knowledge and adolescent gambling, evaluating the mediating effects of adolescent attitudes. The validity of the model is confirmed by the analyses conducted on several subsamples. To test the proposed model, three independent samples were created according to sex and age in order to maximize the likelihood of randomly drawing three representative samples of students. In addition, following Cudeck and Brown (1983), a cross-validation strategy was applied in which an integrative model was first tested on the calibration sample, and then re-tested on the validation sample (Jöreskog & Sörbom, 1996). This strategy is described in literature as an effective method for testing new theoretical

models (e.g., Yuan, Marshall, & Weston, 2002). Results suggest that parental knowledge has both direct and indirect effects on adolescent gambling. Findings are consistent with the social learning theory, which proposes that parents serve as important socializing agents for adolescents, particularly in their function as disciplinarians (Bandura, 1999), and operate through socio-psychological mechanisms to produce behaviour effects (Bandura, 1997). The results are also consistent with previous studies on other youth problem behaviours such as alcohol use (Kim & Neff, 2010) and marijuana use (Lac et al., 2009). Similarities could indicate that substance use and problem gambling are characterized by overlapping risk/protective factors (Leeman & Potenza, 2012), which suggest that theoretical models for substance abuse could also be useful for problem gambling.

In developing this model, the focus was on the protective effect that parents who are knowledgeable about youth activities can have in preventing or hindering youth gambling, with the aim of elucidating some of the pathways responsible for this association. As hypothesised in the model, adolescents who perceive higher levels of parental knowledge are less likely to participate in gambling activities. Through knowledge of their adolescent offspring's whereabouts and activities, parents have a fundamental role in buffering different types of risk behaviours, be it substance use (Kiesner et al., 2010) or gambling behaviour (Molinaro et al., 2014). This might be due to the fact that parents who are knowledgeable about youth activities may have the information necessary to provide the supervision, structure and discipline indispensable for monitoring peer relationships and, subsequently, for reducing youth deviant behaviour (Crouter & Head, 2002).

Although substantial research exists supporting the association between parental practices and adolescent gambling, less is known about the role played by adolescent attitudes in this relationship. This study found that adolescents' gambling-oriented attitudes mediated the relationship between parental knowledge and adolescent gambling. Specifically,

adolescents who perceive higher levels of parental knowledge are more likely to disapprove of gambling and show higher awareness of the harmfulness of gambling, which are, in turn, negatively related to gambling frequency. An initial explanation for this protective effect may be that parents who are aware of upcoming youth activities may be more likely to discuss their views on whether or not substance use is morally acceptable for their child (Lippold, Coffman, & Greenberg, 2013). Moreover, it is possible that when parental practices (i.e. involvement, monitoring/supervision, discipline) are consistently applied, adolescents learn that there are consequences for misbehaviour. When these parental practices are not consistently applied, however, children may begin to perceive their standard of conduct as ambiguous (Pfiffner, Mcburnett, Rathouz, & Judice, 2005). Adolescents who perceive higher levels of parental knowledge are less likely to perceive their friends as gamblers, which, in turn, is also negatively related to gambling frequency. Results confirm that a positive family environment (i.e. involving parental monitoring/knowledge) could attenuate the potentially negative impact of peers on adolescents' risk behaviours (e.g., Lac et al., 2009). Perhaps, monitoring efforts work by limiting adolescent opportunities for experiencing “passive” (social modelling and overestimation of friends' use) and “active” (explicit drug offers) social pressure (Wood et al., 2001).

The proposed theoretical model included a link between adolescent attitudes and gambling frequency. The study attempted to explore how adolescents' attitudes (self-approval, risk perception and descriptive norms) relate to their gambling behaviours within a representative sample of Italian adolescents. Few studies have examined the relationship between attitudes and subjective norms on adolescent gamblers (Orford et al., 2009; Wickwire et al., 2007; Hanss et al., 2014). However, despite these studies have already been conducted in some countries, such as the UK and the US, there is a need for additional studies in other contexts, such as Italy, where the liberalization of the gambling sector and the

evolution in access to and practice of gambling (many tobacco shops and bars now look like small casinos with a wide variety of instant lottery and slot machines) may cause greater “approval” of gambling (Bastiani et al., 2013). Gambling in Italy is an 84.4 billion-euro business (Agenzia delle Dogane e dei Monopoli, 2014), with for example 2200 apps for slot machine and one slot machine every 143 residents, compared to 6333 in Sweden, 857 in Austria, 372 in USA and 261 in Germany.

Regarding descriptive norms, adolescents who perceived their friends as gamblers were more likely to participate in gambling activities. Thus, friend models displayed a significant positive relation to gambling frequency, which is consistent with previous research on adolescent risk behaviors, including problem gambling (e.g. Wickwire et al., 2007). These results are consistent with a false consensus effect or normative fallacy, according to which people believe that others behave as they do (Henry, Kobus, & Schoeny, 2011). Although previous studies produced mixed findings regarding the relationship between risk perception and behaviours (for reviews see Millstein & Halpern-Felsher, 2002), interestingly it was found that adolescents who perceive higher levels of harmfulness of gambling are less likely to participate in gambling activities. This result confirms (Tao, Wu, Cheung, & Tong, 2011) that the perception of gambling carrying negative consequences is associated with less gambling. For this reason risk perception may be considered as an important protective factor to be promoted. Regarding self-approval of gambling, our analysis confirms that disapproval of a behaviour is negatively related to the specific behaviour (Kim & Neff, 2010).

Findings from this study have several implications for researchers and health professionals with an interest in promoting responsible gambling by hindering gambling frequency, which is positively correlated with disordered gambling (i.e. Kessler et al., 2008). Firstly, although there is an age limit of 18 years for gambling in Italy, the present study

estimated that 51% of students (aged between 15 and 19 years) reported having engaged in some form of gambling during the past year. Thus, it is recommended that researchers pay greater attention to the development of gambling habits in Italy. Specific interventions, such as limiting access to gambling opportunities and monitoring of youth activities (e.g., Lee et al., 2014) warrant consideration.

The results also indicate that parental knowledge is negatively related to gambling frequency, and gambling-oriented attitudes mediate the relationship between parental knowledge and gambling frequency. Thus, preventive intervention programs may seek to identify adolescents with accepting gambling-oriented attitudes and target parenting resources with their families. The present findings suggest that targeting parental knowledge in family-based interventions is likely to reduce the risk of gambling involvement during adolescence, a critical time for prevention efforts. It also suggests that increasing parental knowledge is likely to be linked to gambling-oriented attitudes, that have been identified as important intermediary steps in youth decisions to use alcohol and other substances (Patel & Fromme, 2010). Knowledge may be a salient intervention target because intervention studies have shown that it is possible to increase parents' monitoring efforts (Stanton et al., 2004). The present findings suggest that prevention programs for problem behaviour that address key determinants, such as parental knowledge, may prevent gambling problems among high school students. Counselors, for example, may focus on increasing the use of parental knowledge in the homes of these families. This may include role-playing or providing active strategies that foster parents' regular enforcement of reasonable rules and routines (perhaps concrete strategies included spending time in activities with the youth or encouraging their offspring to more willingly confide in them).

The results may also have implications for policy and practice, suggesting that actions should focus on societal factors that predict family connectedness and resilience, as well as

on more traditional aims of improving parenting and family functioning. For example, higher expenditure on benefits in kind for families/children may affect the way in which families deploy social and economic resources, such as the need to earn income. This, in turn, might increase parents' ability to protect and support young people (Viner et al., 2012), including, for example, more parental caring and knowledge.

Finally, regarding the effects of gambling-oriented attitudes, the results of the present study indicate that intervention efforts should work to adjust the misperceptions of peer gambling and to reinforce negative attitudes about gambling on high-school students. Further efforts are needed to increase public awareness to the potential risks of gambling. Recently, Internet-based interventions (e.g., Canale et al., 2016; Danielsson, Eriksson, & Allebeck, 2014) have been launched specifically for adolescents and young adults in an attempt to reduce gambling related harms and gambling frequency. Given the efficacy of similar programs, gambling online services may be effective in growing youth awareness of their potentially problematic gambling behaviour and assist adolescents and young adults in retaining control and minimizing and reducing gambling related problems (e.g., Griffiths & Cooper, 2003; Monaghan & Wood, 2010).

The findings of this study should be interpreted considering a number of limitations. Although the findings demonstrated that each type of gambling-oriented attitudes contributed significantly to mediate the relationship between parental knowledge and gambling frequency, it is true that much of the variance in gambling-oriented attitudes remained unexplained. In explaining the potential effect of gambling-oriented attitudes on gambling involvement, most studies posit numerous causal factors, only one of which is parental knowledge. Other unconsidered factors associated with parents (i.e. parental warmth; Lac et al., 2009) or community (availability and opportunity; Kim & Neff, 2010) may also predict beliefs about substance use. Although it is known that both parental practices and gambling

are often shaped by culture (e.g., Raylu & Oei, 2004), in the present study it is not possible to directly investigate the validity of the model across cultures and different social groups. As Claes et al. (2005) reported that links between parental practices and deviant behaviours are invariant across three countries (Canada, France and Italy), findings from the present study may be generalizable to adolescents in other countries, where the effect of parenting style on risk behaviours is robust (Claes et al., 2005). However, this needs to be examined in future studies. In addition, following the “social learning” theory, future models should consider not only parental knowledge, but also relevant parental characteristics, including parental permissiveness toward gambling (Leeman et al., 2014), parents’ attitudes toward gambling, as well as parental gambling misuse, such as teaching children to keep a budget, save money, and take care of their finances (Delfabbro & Thrupp, 2003). A further limitation is the large sample size used for the study. The larger the sample is, the more likely a hypothesis test will detect a small difference. Thus it is especially important to consider practical significance when sample size is large. The present cross-sectional design does not allow us to determine the stability of the effects or to study how the relations between these variables change over time. Longitudinal studies of parental knowledge and gambling-oriented attitudes are needed to determine the causal relations with gambling frequency. Another issue of note is the source of parental knowledge data. Although several studies used only adolescent self-reports of this measure (i.e. Lac et al., 2009), the inclusion of parents’ perspectives on their own knowledge would help to test the generalizability of our findings. Finally, most measures are only based on one of few items. Notwithstanding these limitations, the strengths of the study include the use of a large sample representative of the Italian high school population.

4.6. Conclusions

In conclusion, the current study provides an important addition to the literature on adolescent gambling. More specifically, the results of the present study hold promise for future research directions about the possible mechanisms that underlie the relationships between parental practices and adolescent gambling. As our review of the literature suggests, the present study is likely to be the first seeking to clarify the mediating effects of adolescent attitudes on the relationship between parental knowledge and gambling frequency. In particular, our findings support the idea that adolescents who perceive higher levels of parental knowledge are: more likely to disapprove of gambling and show higher awareness of the harmfulness of gambling, which are, in turn, negatively related to gambling frequency; and less likely to perceive their friends as gamblers, which, in turn, is also negatively related to gambling frequency. The study examined the model in several samples, separately for the development and validation sample. There were no significant differences for this division. These results strengthen the generalizability of the proposed model by showing that the cross-validation strategy is a useful method for testing new theoretical models. Thus, those interested in promoting responsible gambling (i.e., decreasing gambling frequency) might want to consider our model's variables, including the attenuating effects of parental knowledge on pro-gambling beliefs.

Despite these interesting results, important questions remain open about how gambling oriented attitude/perceptions may influence gambling outcomes. The third study (Chapter 5) represents an attempt to answer the question by studying the psychological mechanisms that underlie the influence of impulsivity on problem gambling

Chapter 5

Study 3. Impulsivity traits, gambling motives and gambling problems: What role for perceived gambling risk and benefits?

5.1. Introduction

Recently, pathological gambling was classified as an addictive disorder, representing a new category of behavioural addictions (Hasin et al., 2013). There are potential advantages from this conclusion (Petry, 2006): one benefit could result in a substantial increase in the study of gambling disorder from a variety of perspectives, including an examination of gambling disorder's personality correlates (Miller et al., 2013). Among the diverse aetiological contributions of the personality correlates, impulsivity is one of the most robust characteristics associated with addictions (including gambling disorder). A broad and growing body of literature suggests that: (i) impulsivity is not a unitary construct, but reflects multiple facets of personality that each contribute to rash and potentially dangerous behaviour, such as problem gambling (Cyders & Smith, 2008); (ii) proximal mechanisms, for example motivations, have been found to mediate the relationships between impulsivity traits and various forms of substance use (e.g. Adams et al., 2012); (iii) perceptions about the benefits of alcohol could be a viable factor in explaining the different associations between impulsivity, motives and behaviours (Coskunpinar & Cyders, 2012). Interestingly, the mediating role of motives has been examined in detail for alcohol use, but no studies have considered how gambling motives, may mediate the relationship between impulsivity traits

and gambling problems, and how these relationships may differ in subgroups of young people in accordance with their levels of perceived gambling risk and benefits. The current study aimed to address this gap in the literature. Understanding the links between impulsivity traits, gambling motives, and gambling-related outcomes related to individual levels of perceived gambling risk/benefits may help in developing appropriate evidence-based treatment and prevention strategies. For example, it is therefore possible that young people who perceived higher gambling benefits showed stronger indirect effects of impulsivity traits on problematic gambling through gambling motives.

5.1.1. Multiple personality pathways to impulsive/risky behaviour

Previous studies demonstrated that specific personality characteristics are associated with problem gambling. Arguably, impulsivity (i.e., the tendency to act rashly or without adequate forethought) has received the most attention, and has been found to increase the likelihood of gambling onset and predict subsequent problem gambling (see MacLaren & colleagues 2011, for a recent review). Early conceptualizations of impulsivity focused on unidimensional definitions (e.g., Eysenck & Eysenck, 1978), but successive refinement of these aspects of personality has revealed several related but nonetheless putatively distinct dimensions (Patton, Stanford, & Barratt, 1995; Whiteside & Lynam, 2001). For example, the UPPS-P Impulsive Behavior Scale (Cyders et al., 2007; Whiteside & Lynam, 2001) is one of the most widely used measures of the impulsivity construct. Specifically, five impulsivity-related constructs have been identified (Cyders et al., 2007): negative urgency, lack of persistence, lack of planning, sensation seeking and positive urgency. Negative urgency is associated with impulsive behaviour under conditions of negative affect (e.g., anger, anxiety); (lack of) persistence is the inability to remain focused on a task while distracted; (lack of) planning is the tendency to act without thinking ahead, sensation seeking is the tendency to

seek out novel and thrilling experiences; and positive urgency is expressed under conditions of positive affect (e.g., joy, elation).

Although numerous studies have examined the relationship between impulsivity traits and addiction behaviours, such as alcohol use in adolescents and adults (e.g., Coskunpinar, Dir, & Cyders, 2013) and illicit substance use in adolescents and young adults (e.g., Kaiser, Milich, Lynam, & Charnigo, 2012; Stautz & Cooper, 2014; Zapolski, Cyders, & Smith, 2009) relatively few studies have investigated this relationship in the case of gambling. Among the dimensions of trait impulsivity: negative urgency was related to pathological gambling in a clinical sample (Torres et al., 2013) and problem gambling in a sample of college students (Fischer & Smith, 2008); whereas sensation seeking and positive urgency were related to frequency of gambling among college students (Cyders & Smith, 2008; Fischer & Smith, 2008). Taken together, these findings indicate that impulsivity-related constructs play a fundamental role in explaining different types of risk behaviours, such as substance use or gambling behaviour. In the model, it is predicted there will be a direct association between impulsivity facets and gambling problems.

5.1.2. Motives as mediators of the personality-behaviour relationship

The Acquired Preparedness model of alcoholism risk suggests that individual differences in key personality traits influence drinking behaviour by influencing alcohol-related learning, such as drinking motives (Smith & Anderson, 2001; Settles, Cyders, & Smith, 2010). Thus, a possible mechanism through which personality traits may nurture drinking behaviour is through drinking motives. The differing characteristics of the impulsivity-related traits suggest that each may operate via distinct proximal mechanisms to influence behaviour (Adams et al., 2012). Considering individual motives for engaging in

substance use (e.g., alcohol use) may allow for a better understanding of how certain personality traits put individuals at risk for problematic drinking (Cooper, 1994). Research supports the possibility that multiple facets of impulsivity (i.e., positive and negative urgency, sensation-seeking) contribute to rash and potentially dangerous behaviour, such as problematic drinking (e.g., King, Karyadi, Luk, & Patock-Peckham, 2011), through, in part, drinking motives (e.g., Adams et al., 2012).

With respect to gambling, previous findings indicate that probable pathological gamblers score higher on some gambling motives (i.e., coping, enhancement, and social) than the non-pathological gamblers (e.g. Stewart & Zack, 2008). While all three motives are positively correlated with problem gambling in non-clinical populations (e.g., college students), only high enhancement motives for gambling were particularly predictive of problem gambling (Lambe, Mackinnon & Stewart, 2014). Although previous research supports the direct effects of gambling motives on gambling behaviour, to date, no studies have investigated the possibility that motives mediate the relations between personality traits and gambling behaviour.

5.1.3. Risk/Benefit perception as moderators of the personality-motives-behaviour relationship

One important mechanism that may explain the association between drinking motives and alcohol outcomes involves individuals' perception of how beneficial or risky alcohol use is. A recent study (Coskunpinar & Cyders, 2012) found that young people who perceived higher levels of benefits showed stronger indirect effects of urgency (positive and negative) on problematic alcohol consumption through enhancement motives and coping motives, while the perception of risk was unable to moderate the relationship between these variables.

These findings suggested that perceptions about the benefits of alcohol could be a viable factor in explaining the different associations between impulsivity, motives and behaviours. In addition, a recent review on risk perception of gambling echoes this direction, and suggested that future research could examine the influence of individual differences on risk perception of gambling (Spurrier & Blaszczynski, 2014). Interestingly, previous studies have suggested that attitudes and perceptions towards gambling may influence gambling behaviour (e.g., Hanss et al., 2014; Orford et al., 2009; Wood & Griffiths, 2004), but no studies have investigated how gambling-oriented perceptions influence the effects of impulsivity traits and gambling motives on gambling behaviours.

5.2. The present study

Consistent with the theoretical backgrounds reviewed, the current study considers the potential mediating role of gambling motives in the association between impulsivity traits and gambling problems in a sample of young Italian people. It is hypothesised that two traits – sensation-seeking and positive urgency – will relate to problem gambling through unique mediation pathways. More specifically, consistent with the previous studies on problematic alcohol use, it is hypothesised that: (i) the relationship between positive urgency and gambling problems is mediated by enhancement motives (Coskunpinar & Cyders, 2012), and (ii) the relationship between sensation-seeking and gambling problems is mediated by enhancement motives (Adams et al., 2012).

These relationships are tested in different subgroups of young people in accordance with their levels of perceived gambling risk and benefits. Therefore, the present study examines the potential differences and similarities between four groups of young people with

(i) lower perceived gambling risk, (ii) higher perceived gambling risk, (iii) lower perceived gambling benefits, and (iv) higher perceived gambling benefits.

5.3. Method

5.3.1. Participants and procedure

Participants were recruited from high schools and universities located in three midsize cities in the north of Italy. All 4th and 5th grade of secondary school students or those in the first years of college attending those schools/universities were eligible to take part in this research project. To our knowledge, none of the schools had implemented an anti-gambling program during the school year in which data were collected.

A total of 1,070 young people participated in the study. Since gambling motives were not applicable among abstainers, only individuals who endorsed gambling activity in year prior to the study were included in the analysis (53.4%). There were no differences in terms of age between non past-year gamblers ($M=19.76$, $SD=2.97$) and past-year gamblers ($M=19.90$, $SD=2.92$), $F(1,1069) = .60$, $p=.43$, although there was a difference in term of gender, $\chi^2(1, N=1070) = 46.33$, $p<.001$, with more past-year gamblers being male (73.4%) than non past-year gamblers (53.4%). The model was tested on a final sample of 594 students (73% male; mean age =19.92 years; $SD=2.91$) attending 4th and 5th grade of secondary school ($n=385$) or those in the first years of college ($n=209$). Although information on ethnic origin was not collected from participants, participants were all Italians and predominately White.

The institutional review committee at University of Padova gave ethical approval for the study. With regard to high school students, headmasters and teachers were asked for consent. Parental permission to participate and informed consent for everyone were obtained. All participants (students and parents) were informed that all data would be treated

confidentially. All students were recruited to participate by the school during class periods. Research assistants attended classes to explain the research opportunity and invited students with parental consent to participate. The data were collected using standard questionnaires, completed on a voluntary basis in the school classroom. Regarding college students, informed consent for everyone was obtained. The data were collected using standard questionnaires, completed on a voluntary basis during lecture breaks or class hours.

5.3.2. Measures

Impulsivity. In the present study, impulsivity was assessed using the short UPPS-P (Billieux et al., 2012; Italian version: D'Orta et al., 2015). The UPPS-P is a 20-item scale that evaluates five different impulsivity facets (four items per dimensions) labeled as negative urgency (tendency to experience strong impulses under conditions of negative affect), positive urgency (tendency toward rash action in response to very positive mood), lack of premeditation (tendency to fail to think and reflect on the consequences of an act before engaging in that act), perseverance (difficulties remaining focused on a task that may be long, boring, or difficult), and sensation-seeking (the tendency to enjoy and pursue exciting activities and an openness to trying new experiences that may or may not be dangerous). All items are scored on a Likert scale from 1 (“I agree strongly”) to 4 (“I disagree strongly”). Average scores were calculated for each scale. All scales demonstrated adequate internal consistency in the present sample: negative urgency ($\alpha=.77$, $CI=.73/.79$); positive urgency ($\alpha=.74$, $CI=.70/.77$); premeditation ($\alpha=.82$, $CI=.79/.84$); perseverance ($\alpha=.85$, $CI=.83/.87$); and sensation seeking ($\alpha=.82$, $CI=.79/.84$).

Gambling motives. The Gambling Motives Questionnaire (GMQ; Stewart & Zack, 2008) was translated into Italian by the authors following procedures recommended by

Geisinger (1994). This 15-item scale is specifically designed to assess individuals' reasons for engaging in gambling. There are five items in each of three subscales: Social (e.g., "because it's what most of your friends do when you get together"), Coping (e.g., "to forget your worried") and Enhancement (e.g., "because it's exciting"). Relatively frequency of gambling was rated from 1 to 4 (1= "almost never/never"; 2= "sometimes"; 3= "often"; 4= "almost always"). Average scores were calculated for each scale. Internal consistency for each scale was adequate in the present sample: enhancement ($\alpha=.83$, $CI=.81/.85$); coping ($\alpha=.83$, $CI=.81/.85$); and social ($\alpha=.70$, $CI=.65/.74$).

Perceived risk and benefit. The modified perception of risk and benefit questionnaire was based on a scale by Siegel et al. (1994, 19 items) and a subscale of the Domain-Specific Risk-Taking [DOSPERT] (gambling, 3 items) scale (Weber, Blais & Betz, 2002). The items depict risk behaviours in the areas of driving, health, drugs, law-breaking and gambling. Two assessments are obtained: perception of extent of risk for each behaviour; and perception of extent of benefit from each risk behaviour. Internal reliabilities were .86 ($CI=.84/.88$) and .89 ($CI=.88/.90$), respectively. The original items were translated into Italian by the authors following procedures recommended by Geisinger (1994). The final list included 22 items – 19 from the Siegel et al. (1994) inventory and three from the DOSPERT gambling subscale (Weber et al., 2002). Items are answered using a 5-point Likert Scale from 1 ("Not at all") to 5 ("Extremely"). To test the hypothesis, only the three items from the DOSPERT scale measuring perceived risk/benefits of gambling were considered for the analysis. The three-item gambling-risk-perception scale resulted in a Cronbach's alpha of .76 ($CI=.72/.79$). The three-item gambling-benefits-perception scale resulted in a Cronbach's alpha of .71 ($CI=.67/.75$).

Gambling Behaviour. Gambling behaviour was assessed using the South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA; Winters et al., 1993; Italian version:

Chiesi, Donati, Galli, & Primi, 2013). Participants were initially asked to indicate the frequency of gambling in a list of gambling activities (e.g., cards for money, bets on sports teams). Following this they were presented with twelve “yes-no” items assess negative feelings and behaviours associated with gambling and are score 1 or 0, respectively. The sum of these items is the total SOGS–RA score, referred to as the “narrow” criteria (Winters et al., 1995). There is a lack of consensus regarding appropriate cutoff scores for determining the problem gambling status of adolescents (e.g., Derevensky, Gupta, & Winters, 2003; Ladouceur et al., 2005). Hence, total SOGS–RA score (gambling problems) served as the primary dependent variable. To counteract skewness, the data were log-transformed according to procedures recommended by Tabachnick and Fidell (2001). One gambling problem was added before taking the logarithms [e.g., gambling problems $\ln = \ln(\text{gambling problems} + 1)$], because the logarithm naturalis of zero is not defined. After adding one gambling problem, the minimum useful value of the logarithmic transformation reverts to zero. Nonetheless, categorical definitions of adolescent problem gambling facilitate comparison across studies. In reporting past-year prevalence rates, Winters et al.’s (1993) original scoring system was used. A SOGS–RA score of 0-1 is labeled “no problem,” 2-3 merits an “at-risk” label, and 4 or more indicates “problem” gambling. The internal consistency of the SOGS–RA was .72 (CI=.69/.75). Following the standardized questionnaires of the European School Survey Project on Alcohol and Other Drugs project (Hibell et al. 2012), questions regarding gambling occasions [“On how many occasions (if any) have you bet money? – In your life and in the last 12 months”] were also included.

5.3.3 Statistical Analyses

Separate regression analyses and a path analysis were used to test the primary hypothesis. The R (R Development Core Team, 2012) Package Lavaan (Rosseel, 2012) was used to analyze the models and to estimate parameters. It was utilized a single observed score

for each construct examined in the model. The final structural model was constructed in a stepwise fashion. At the first step, direct associations were considered from each personality trait to the gambling problems outcome variable to determine which traits were related to gambling problems and therefore candidates for mediation. The second step examined relations between personality traits identified at the first step and gambling motives. The third step tested for significant effects of gambling motives on gambling problems, controlling for impulsivity. Thus, standardized parameters were estimated using the maximum likelihood method (Satorra & Bentler, 1988). To evaluate the adequacy of the model the R^2 of each endogenous variable and the total coefficient of determination (CD, Bollen, 1989; Jöreskog & Sörbom, 1996) were considered. As described in Chapter 4, the CD shows the joined effect of the predictor variables on all dependent variables (i.e., the higher the CD the more is the variance explained).

For the mediation effect, Laavan uses the normal approximation method, and is based on the delta method, or the so-called Sobel method (Casella & Berger, 2002). The stepwise fashion of the model (described above) pays respect to Baron and Kenny's (1986) three prerequisite conditions for testing mediation effects: (a) the predictor variable must be linked to the mediating variable, (b) the mediating variable must be linked to the outcome variable, and (c) the predictor variable must be linked to the outcome variable.

Finally, to test the model on the different groups the multi-group approach was used (Jöreskog & Sörbom, 1996; see, e.g., Byrne, 1989). The analyses were performed on four samples, using a median split into low and high subgroups on values of perceived gambling risk/benefits. The model was tested separately in the different subgroups according to their level of gambling risk/benefit perception:

1. Lower perceived gambling risk (n= 346);
2. Higher perceived gambling risk (n= 248);
3. Lower perceived gambling benefits (n= 380);
4. Higher perceived gambling benefits (n= 214).

This approach allows one to estimate the parameters simultaneously on different subgroups. To more adequately evaluate multi-group comparisons, a series of more restrictive models to compare the final model with other alternative models was conducted within a nested model comparison framework (Widaman & Reise, 1997). Testing for invariance was examined through the traditional perspective (Byrne & Stewart, 2006) that examines the change in chi-square values ($\Delta\chi^2$) across nested models. If the $\Delta\chi^2$ values do not change significantly as the models grow more restrictive, it indicates that the more restrictive model fits the data as well as the less restrictive model. Each model represents a different hypothesis of invariance to be tested. The following hypotheses were compared:

- configural invariance (the same model is fitted in all groups without any equality constraints on the model parameters);
- invariance of the regressions (constraining regression parameters to be equal across groups);

- partial invariance of regression parameters (constraining regression parameters to be equal with the exception of the parameters that are more different between lower and higher perceived gambling risk/benefits).

5.4. Results

In the past-year gamblers sample, 443 (74.6%) had no gambling problem; 99 (16.7%) were at-risk gamblers, and 52 (8.8%) were problem gamblers. The mean score on the gambling problems was .50 (SD=.62). Descriptive statistics of all the variables considered for inclusion in the model are outlined in Table 7.

	1	2	3	4	5	6	7	8	9	10	11	M	SD
1.Negative Urgency	1											2.33	.64
2.Positive Urgency	.58***	1										2.37	.60
3.Lack of Premeditation	.30***	.41***	1									1.93	.56
4.Lack of Perseverance	.15***	.21***	.35***	1								1.89	.58
5.Sensation-seeking	.24***	.36***	.23***	-.01	1							2.60	.65
6.Enhancmetn motives	.07	.22***	.12**	.13**	.16***	1						1.53	.59
7.Coping motives	.08*	.19***	.09*	.08*	.07	.55***	1					1.12	.33
8.Social motives	.10*	.15***	.10*	.08*	.10**	.56***	.58***	1				1.35	.47
9.Perceived gambling risk	-.04	-.08*	-.13**	-.10*	-.14**	-.24***	-.17***	-.13***	1			2.90	1.01
10.Perceived gambling benefits	.10*	.22**	.14**	.08*	.18**	.37***	.41***	.32***	-.29***	1		1.54	.77
11.Gambling problems (ln)	.21***	.28***	.17***	.15***	.23***	.46***	.44***	.36***	-.16***	.36**	1	.50	.62

*p<.05; **p<.01; ***p<.001

Table 7. Means, Standard Deviations and correlations between variables

Step 1: Personality to gambling problems

Throughout the results, β is used to represent the estimated standardized direct effect. In the first step, positive urgency ($\beta=.15$, $p=.003$) and sensation-seeking ($\beta=.15$, $p<.001$) were significantly and positive associated with gambling problems. Negative urgency, perseverance, and premeditation were not significantly related to gambling problems. Given these results, positive urgency and sensation-seeking were identified as candidates for mediation effects in subsequent analyses.

Step 2: Personality to gambling motives

In the second step, associations were investigated simultaneously from the two personality traits identified in the first step to gambling motives. Positive urgency was significantly related to enhancement motives ($\beta=.19$, $p<.001$) and social motives ($\beta=.20$, $p<.001$). Additionally, positive urgency was also significantly related to coping motives ($\beta=.13$, $p=.004$). Sensation seeking was also significantly related to enhancement motives ($\beta=.10$, $p=.020$). Significant relationships were retained for the next step.

Step 3: Personality, gambling motives, and gambling problems

In the third step, the direct relationships from personality to gambling problems that were found to be significant in Step 1 were reintroduced into the model along with significant associations from personality to motives and from motives to gambling problems. The direct relationships for both positive urgency and sensation seeking remained statistically significant. Figure 9 shows the estimated standardized parameters. The squared multiple correlations indicate that the model accounts for a modest portion of the variance in study variables, more specifically: 6%

of the variance in enhancement motives, 4% in coping motives, 3% in social motives, and 23% in gambling problems. Moreover, the total coefficient of determination (CD) was .16.

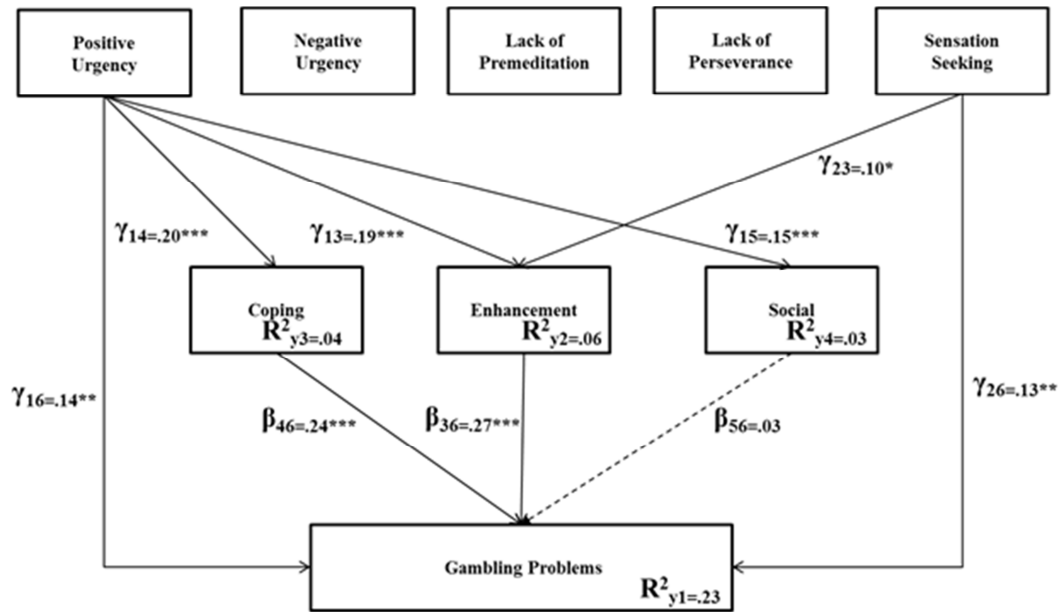


Figure 9. Standardized parameters and R^2 for the model

Table 8 shows the decomposition of effects of impulsivity traits on gambling problems. The direct effect of positive urgency on gambling problems was significant and positive (.14). Along with the direct effects, positive urgency also has an indirect relationship with gambling problems (.10) through its effect on coping motives (.05) and enhancement motives (.05). Higher levels of positive urgency were associated with stronger endorsement of both coping motives and enhancement motives, which, in turn, were associated with higher gambling problems scores. The direct effect of sensation-seeking on problem gambling was significant and positive (.13). Along with the direct effects, sensation-seeking also has an indirect relationship with problem gambling through its effect on enhancement motives (.03). Higher levels of sensation-seeking were associated

with stronger endorsement of enhancement motives, which was associated with higher gambling problems scores.

	Total Effect	Direct Effect	Indirect Effect	Indirect effects through:		
				Coping	Enhancement	Social
Positive Urgency	.24***(.04)	.14**(.02)	.10***(.02)	.05***(.01)	.05***(.01)	-
Sensations-seeking	.16***(.04)	.13***(.02)	.03*(.01)	-	.03*(.01)	-

*p<.05; **p<.01; ***p<.001. Note: - = mediation not tested

Table 8. Decomposition of impulsivity effect on gambling problems: estimated parameters and standard errors

After evaluating the model in the total sample, the model was tested separately in the different sub-groups: perceived gambling risk/benefits (higher and lower). The results of the comparisons across these models are presented in Table 9. In relation to the differences in perceived gambling risk, the values across configural invariance and invariance of the regressions significantly changed ($\Delta\chi^2_{[9]} = 18, p=.03$). It is therefore important to analyse and compare the parameters of the model in the different subgroups. Table 10 presents all the parameters included in the model, the R^2 , and the CD for each of the variables. Following this phase, further analysis allowed for partial invariance of regression parameters (freeing regression parameters that strongly indicated non-invariance across groups). The values across the configural invariance and the partial invariance of regression parameters did not significantly change ($\Delta\chi^2_{[6]} = 8, p=.19$) suggesting that the model described by partial invariance fits the data better than the other model (same model in all groups). Therefore, some of the findings from the comparison of parameters across subgroups are of particular interest. More specifically, positive urgency is more related to social motive, sensation-seeking is more related to gambling problems and enhancement motive in young people who perceive fewer risks of gambling than young people who perceived higher risks of gambling for whom these relationships are not significant (see Figure 10).

	n	χ^2	Df	Model Comparison	$\Delta\chi^2$	ΔDf	Δp	Free Parameters
<i>Perceived Gambling Risk</i>								
Lower	346	492	14					
Higher	248	221	14					
Configural invariance (Model 1)	594	451	10					
Regression invariance (Model 2)	594	469	19	2 vs. 1	18	9	.03	
Partial invariance (Model 3)	594	459	16	3 vs. 1	8	6	.19	$\gamma_{15}, \gamma_{26}, \gamma_{23}$

Table 9. Multigroup models for perceived gambling risk

	Lower perceived Gambling risk <i>n</i> =346		Higher perceived Gambling risk <i>n</i> =248	
	Estimated	SE	Estimated	SE
Positive urgency - Gambling problems	.14**	.05	.13*	.05
Positive urgency - Enhancement	.20***	.06	.15*	.05
Positive urgency - Coping	.20***	.03	.19**	.02
Positive urgency - Social	.19***	.04	.05	.04
Sensation-seeking - Gambling problems	.16**	.05	.07	.05
Sensation-seeking - Enhancement	.12*	.05	.04	.05
Enhancement - Gambling problems	.28***	.04	.22***	.06
Coping - Gambling problems	.23***	.07	.28***	.10
Social - Gambling problems	.01	.05	.04	.07
R^2 Gambling problems	.25		.19	
R^2 Enhancement	.07		.03	
R^2 Cop	.04		.03	
R^2 Social	.04		.01	
CD	.20		.09	

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 10. Estimated parameters and R^2 , standard errors for student's perceived gambling risk

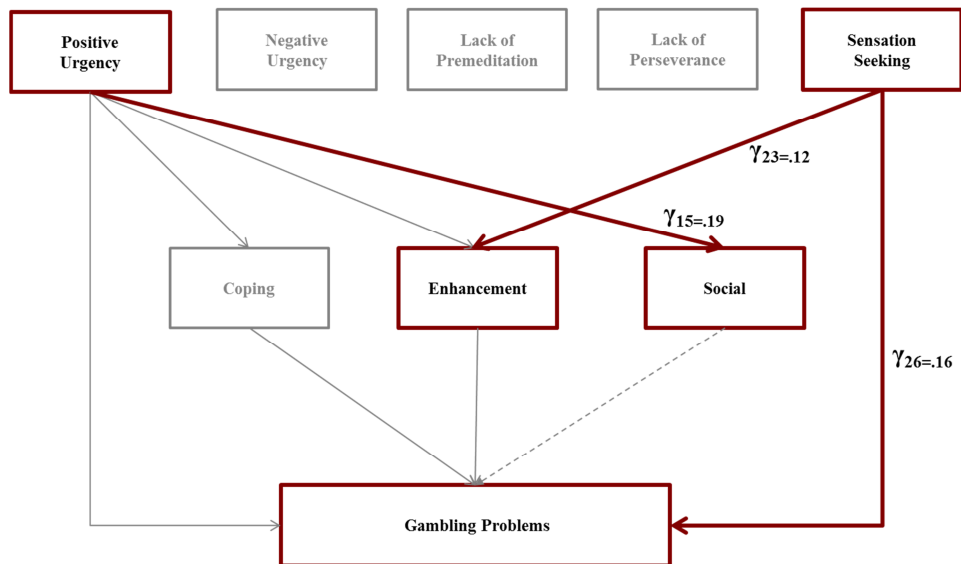


Figure 10. Estimated parameters that are more different between lower (red lines) and higher perceived gambling risk [Lower perceived risk (n=346)]

In relation to the differences in perceived gambling benefits, the results of the comparisons across these models are presented in Table 11. More specifically, the values across configural invariance and invariance of the regressions significantly changed ($\Delta\chi^2_{[9]} = 22, p=.005$). It is therefore important to analyse and compare the parameters of the model in the different subgroups (see Table 12). Following this phase, further analysis allowed for partial invariance of regression parameters (freeing regression parameters that strongly indicated non invariance across groups). The values across the configural invariance and the partial invariance of regression parameters did not significantly change ($\Delta\chi^2_{[4]} = 8, p=.10$) suggesting that the model described by partial invariance fits the data better than the other model (same model in all groups). Therefore, positive urgency is more related to gambling problems and social motive, sensation-seeking is more related to gambling problems, and social motive is more related to gambling problems in young people who perceive greater benefits than young people who perceive fewer benefits of gambling for whom these relationships are not significant. Finally, the relationship between positive urgency and enhancement motive was significantly stronger at higher levels of benefit perception (see Figure 11).

	N	χ^2	Df	Model Comparison	$\Delta\chi^2$	ΔDf	Δp	Free Parameters
<i>Perceived Gambling Benefits</i>								
Lower	380	289	14					
Higher	214	334	14					
Configural invariance (Model 1)	594	410	10					
Regression invariance (Model 2)	594	432	19	2 vs. 1	22	9	.005	
Partial invariance (Model 3)	594	418	14	3 vs. 1	8	4	.10	$\gamma_{16}, \gamma_{15}, \gamma_{26}, \beta_{56}, \gamma_{13}$

Table 11. Multigroup models for perceived gambling benefits

	Lower perceived Gambling benefits <i>n</i> =380		Higher perceived Gambling benefits <i>n</i> =214	
	Estimated	SE	Estimated	SE
Positive urgency - Gambling problems	.10	.04	.19**	.07
Positive urgency - Enhancement	.11*	.04	.21**	.09
Positive urgency - Coping	.16**	.01	.22**	.05
Positive urgency - Social	.09	.03	.16*	.06
Sensation-seeking - Gambling problems	.07	.04	.20**	.06
Sensation-seeking - Enhancement	.04	.03	.09	.07
Enhancement - Gambling problems	.22***	.05	.23***	.05
Coping - Gambling problems	.21***	.12	.21***	.08
Social - Gambling problems	-.01	.06	.13*	.07
R^2 Gambling problems	.13		.30	
R^2 Enhancement	.03		.07	
R^2 Cop	.03		.05	
R^2 Social	.01		.03	
CD	.07		.24	

* $p < .05$; ** $p < .01$; *** $p < .001$

Table 12. Estimated parameters and R^2 , standard errors for the total sample and for student's perceived gambling benefits

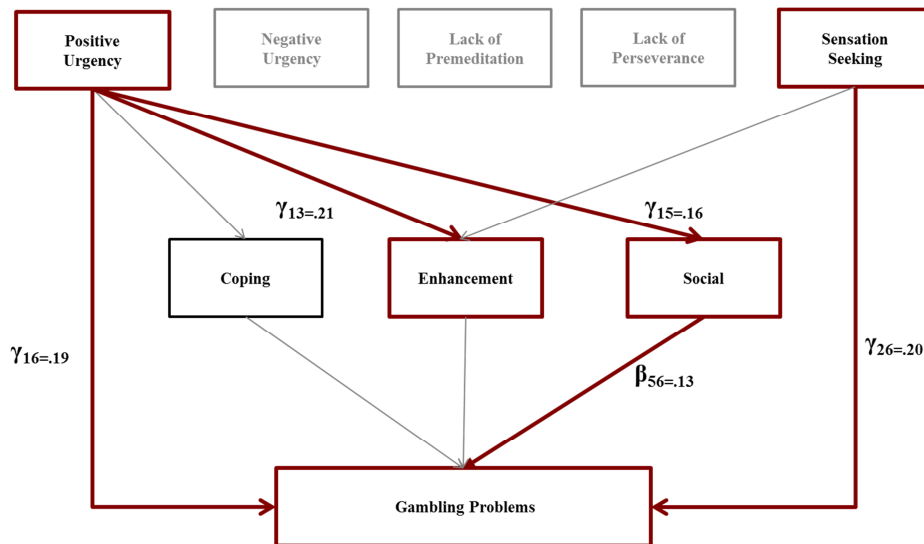


Figure 11. Estimated parameters that are more different between lower and higher (red lines) perceived gambling benefits [Higher perceived benefits (n=214)]

5.5. Discussion

The aim of the present study was to extend gambling research by differentiating the mechanisms of risk for gambling problems associated with impulsivity traits. In doing so, the study also served as a partial replication of some previous research on substance use (e.g., Adams et al., 2012; Conskunpinar & Cyders, 2012) by demonstrating the links between impulsivity traits, gambling motives, and gambling-related outcomes. More specifically, the present study proposed a more integrative model linking the influence of impulsivity traits and gambling problems, evaluating the mediating effects of gambling motives in adolescents and young adults. The results suggest that impulsivity traits have both direct and indirect effects on gambling problems. In developing this model, the study focused on the different effect that impulsivity-related traits could have in hindering gambling problems, trying to more accurately identify some of the pathways responsible for this association. The results showed that in a sample of young Italian people, sensation seeking and positive urgency worked through different pathways to increase gambling-oriented problems, indicating that relationships between different aspects of impulsivity and

gambling problems. As in the case of alcohol-related negative consequences, impulsivity cannot be understood in singular terms (Evenden, 1999; Jones, Chryssanthakis, & Groom, 2014). A discussion of the more specific findings now follows.

The finding that sensation seeking predicts greater numbers of gambling problems supports existing theories of sensation seeking, which suggest that individuals with high levels of sensation seeking are motivated by behaviours that provide stimulation and reward (Brunelle et al., 2004; Zuckerman, 1994). The finding that positive urgency is a significant predictor of gambling-related problems supports the findings of previous research (Cyders & Smith, 2008; Fischer & Smith, 2008). This finding suggests that individual differences in the number of gambling problems are directly associated with positive affect. Variability in young people gambling seems to follow individual differences in rash acts during very positive emotional states, as opposed to rash acts during negative emotional states. Indeed, negative urgency did not significantly predict gambling-related problems in our sample. This result could be considered with the results of a recent study where negative urgency was unique in independently co-varying with gambling severity in a sample of pathological gamblers (Torres et al., 2013). This is also consistent with previous reports that negative urgency is a sign of over-pathologisation in addictive processes (e.g., Michalczuk et al., 2011) rather than a characteristic of non-pathological behaviour (e.g. at-risk, problem gambling).

Finally, lack of premeditation and perseverance did not significantly predict gambling-related problems and suggests that the emotional components of impulsivity (e.g., positive urgency and sensation seeking) may have greater influence on the gambling problems than the non-emotional components of impulsivity (lack of perseverance/premeditation). In this direction, previous studies have shown that automatic affective responses to substance-related stimuli may influence substance use behaviour more strongly than reflective or 'explicit' cognition (Stautz & Cooper, 2014; Wiers & Stacy, 2006).

Whereas sensation seeking and positive urgency were both related to enhancement motives, positive urgency was the only one of the five impulsive personality traits included in the present study that related to coping motives and social motives. These data do not address specific aspects of the hypothesised mechanism by which positive urgency and sensation seeking may influence formation on gambling motives. Rather, this study sought to identify the factors that would be influenced by these individual impulsivity traits.

The finding that the relationship between sensation seeking and gambling problems was partially mediated by enhancement motives is consistent with previous studies, where gamblers with high levels of enhancement motives for gambling, were also characterized by high levels of sensation-seeking and gambled for the 'high' and feelings of excitement that gambling can create (Bonnaire et al., 2009; Stewart et al. 2008; Vachon & Bagby, 2009). In addition, this finding supports the theory that sensation seekers are likely to endorse enhancement motives in an attempt to experience greater thrill and stimulation from their environment (Cooper et al., 2000; Gullo et al., 2010). Consequently, high levels of sensation seeking were associated with high levels of enhancement motives, which in turn were associated with high levels of gambling problems. Individuals elevated by the trait of sensation seeking, experience low basal levels of arousal, and may therefore be motivated to engage in potentially addictive behaviour such as gambling behaviour, to achieve an optimal level of stimulation. Gambling is known to increase positive arousal (for a review, see Baudinet & Blaszczynski, 2013), and therefore, it is not surprising that the present study found enhancement motives were directly related to problem gambling.

The finding that the relationship between positive urgency and gambling problems was partially mediated by enhancement motives, supports Settles and colleagues (2010) research that found positive urgency led to increased alcohol use through expectations that alcohol enhances positive affect. Thus, young people who tend to act rashly in response to extremely positive moods

are more likely to form strong reasons that gambling brings positive and arousing effects, which in turn lead to increased gambling problems.

An additional unpredicted indirect pathway was found through the results relating to coping motives. Generally, negative urgency (not positive urgency) is thought to lead to increased drinking quantity indirectly as well, by leading to increased motives to drink to cope with subjective distress, which in turn lead to increased drinking quantity (Fisher, Anderson, & Smith, 2004; Settles et al., 2010). It seems likely that this inconsistency is due to the result that negative urgency did not predict gambling-related problems in the multivariate analysis.

Inside this integrated perspective, perceived gambling risk/benefit related similarities and differences were also investigated, advancing the paucity of knowledge regarding this issue (Conskunpinar & Cyders, 2012). Results indicated that some regression parameters were significant only in young people who perceive greater benefits and fewer risks of gambling. This reflects previous studies that have found higher participation in risk behaviours were associated with the perception of greater benefits and fewer risks (e.g., Hampson, Severson, Burns, Slovic, & Fisher, 2001). More specifically, as for lower levels of gambling risk and higher levels of gambling benefit similarities, sensation-seeking was positively related to gambling problems in both groups. Previous studies have found that perception of lower risk among gamblers is associated with several factors, such as sensation seeking and self-worth (Derevensky, Sklar, Gupta, & Messerlian, 2010; Orford et al., 2009; Tao et al., 2011). Overall, these findings suggest that particular individual factors (e.g., sensation-seeking) predispose gamblers to develop particular beliefs associated with greater exposure to risk and harm. Positive urgency was positively associated with social motives in young people who perceived lower gambling risk and higher gambling benefits. It is possible that in individuals with more favourable attitudes towards gambling, positive urgency with its emphasis on rash action while experiencing a positive mood, interact with positive and arousing experiences (i.e., drinking makes one more attractive, horny, and social) (Cyders et al., 2007).

As for lower levels of gambling risk and higher levels of gambling benefit differences, sensation-seeking was positively related to enhancement motive in individuals with lower gambling perceived risk. This is consistent with previous research which showed young problem gamblers use gambling as a means of generating excitement that they perceive is missing from their lives (Getty, Watson, & Frisch, 2000; Griffiths, 1995; Gupta & Derevensky, 2000; McCormick, 1994). Positive urgency was positively related to gambling problems and enhancement in individuals who perceived higher levels of gambling benefits. The findings may be interpreted in relation to research by Conskunpinar and Cyders (2012) that found as benefit perception levels increased, the indirect effect of positive urgency on problematic alcohol consumption through enhancement motives changed.

Finally, an interesting result was the positive relation between social motive and gambling problems in young people who perceived higher levels of gambling benefits. Past researchers have found that social motives do not generally predict problem gambling (Dechant & Ellerly, 2011; Lambe et al., 2014; Stewart & Zack, 2008). The results here suggest that gambling for social reasons may be more risky for an individual with higher benefit perception. It is likely that individuals with higher levels of perceived gambling benefits may be considered as extrinsically motivated gamblers who were more likely to do so because of external rewards such as money and social approval (Chantal et al., 1995).

The prospective findings may have implications for prevention and intervention of problem gambling. The different impulsive personality traits that were investigated demonstrate distinct patterns in relations to gambling motives and gambling problems. Therefore, it is useful to consider two specific pathways when addressing impulsivity in problem gambling prevention or intervention. Young people who are high in sensation seeking and positive urgency engage in gambling to increase positive feelings. According to Adams et al. (2012), some potential ways of intervening may involve (i) working with young people on considering not only positive and immediate

consequences of gambling, but also on effects that are less salient in the moment (e.g., economic losses and strained relationships with family members and friends), and (ii) providing alternative behaviours to gambling (e.g., sport) to enhancing positive sensation. On the other hand, positive urgency was also associated with coping motives, which in turn related to gambling problems. Individuals who score high on coping motives may, according to Adams et al. (2012), benefit from a type of intervention, aimed at educating them to focus on the negative social and emotional consequences of engaging in gambling to cope, as well as training in adaptive strategies for coping with negative effect (e.g., yoga).

It is also possible that different strategies may be required for young people as the present study found that specific relationships between impulsivity traits, gambling motives, and gambling problems, were only significant in young people who perceived lower gambling risk and higher gambling benefits. This may help in developing problem gambling treatment and prevention strategies suggesting that if benefit perception can be minimized, the direct effect (of positive urgency on gambling problems, enhancement motive and social motive, positive urgency on social motive, sensation seeking on gambling) could also be minimized. In addition, if risk perception can be maximized, the direct effect (of sensation seeking on enhancement motive and gambling problems; positive urgency on social motive) could also be reduced.

The findings of the present study must be understood in the context of the study's limitations. First, a significant limitation of the current study was the cross-sectional design. Examining these relations in a longitudinal study would allow for a clearer understanding of the relationship among impulsivity traits, gambling motives, and gambling outcomes and how these relations change over time. Secondly the majority of the sample participants were males and students. It is important to investigate this risk model with a more diverse sample. Thirdly, although it was demonstrated that gambling motives contributed significantly to mediate the relationship between impulsivity and problem gambling, the fact remains that much of the variance in gambling

motives remained unexplained. In explaining the potential effect of motives on addictive behaviours, most studies use numerous causal factors, only one of which is impulsivity. Other unconsidered factors associated with youth (i.e. extroversion, neuroticism and anxiety, Kuntsche, Knibbe, Gmel, & Engels, 2006; mood states, Goldstein, Stewart, Hoaken, & Flett, 2014) or the community (different countries; Molinaro et al., 2014) may also predict motives. Fourthly, all data were self-report and are therefore subject to the standard limitations of this type of data (e.g., social desirability biases, memory recall biases, etc.). Lastly, future research should aim to develop and to examine the effectiveness of treatment approaches tailored to specific impulsive personality traits and gambling motives.

5.6. Conclusions

Despite previous limitations, as our review of the literature suggests, the present study is likely to be the first that has sought to clarify the mediating effects of gambling motives on the relationship between impulsivity traits and gambling problems. In particular, the findings give support to the idea that young people who tend to act rashly in response to extremely positive moods show higher enhancement and coping motives, which are, in turn, positively related to gambling problems. Individuals with higher levels of sensation seeking are more likely to have higher levels of enhancement motives, which, in turn, are also positively related to gambling problems. The model was examined in several groups, separately for the level of perceived gambling risk/benefits. There were significant differences between these groups for this division. Therefore, those interested in promoting responsible gambling (and decreasing gambling problems) might want to consider the model's variables, including impulsivity traits and gambling motives, in accordance with individual levels of perceived gambling risk/benefits.

Despite these important advances, other psychological mechanisms (i.e., affective associations) by which heightened impulsivity traits might influence addictive behaviour (Stautz &

Cooper, 2014). Thus, future research should aim to examine how specific aspects of decision-making (e.g., delay discounting) can influence the relationship between impulsivity traits and gambling behaviour. In fact, important questions remain open about how other psychological mechanisms may explain the relationship between urgency and problem gambling. The fourth study (Chapter 6) represents an attempt to answer the question by studying a theoretical model linking urgency with gambling problems, taking into account the mediating role of decision-making processes (operationalized as preference for small/immediate rewards and a lower level of deliberative decision-making).

Chapter 6

Study 4. Trait urgency and gambling problems in young people: The role of decision-making processes

At this point, it is known that gambling motives contributed in mediating the relationship between impulsivity traits and problem gambling in young people (study 3, Chapter 5). In addition, the emotional components of impulsivity (e.g., positive urgency) may have greater influence on the gambling problems than the non-emotional components of impulsivity (lack of perseverance/premeditation). In this direction, it is still unclear how heightened urgency might influence gambling problems. This chapter specifically focuses on the decision-making processes that can help us to better understand why urgency may reflect a disposition toward gambling problems.

6.1. Introduction

Although a growing number of studies have suggested a clear relationship between pathological gambling and high impulsivity (e.g., MacLaren, Fugelsang, Harrigan, & Dixon, 2011 for a meta-analysis), these studies provide a limited understanding of the psychological mechanisms involved, as they have often been conducted with little consideration given to the multiple facets of personality. Early approaches to impulsivity focused on one-dimensional definitions (e.g., Eysenck & Eysenck, 1978), but successive refinement of these aspects of personality has reported several related – but also independent – dimensions (Patton, Stanford, & Barratt, 1995; Whiteside & Lynam, 2001). It has now been established that impulsivity is a multidimensional construct and encompasses a combination of four distinct facets: sensation seeking, lack of premeditation, lack of

perseverance, and urgency defined as the tendency to act impulsively in response to strong emotions (Sharma, Markon, & Clarke, 2014; Whiteside & Lynam, 2001). Studies conducted on gamblers from the community (i.e., non-clinical participants) have shown that gambling problems are predicted by high urgency (Canale et al., 2015a; Fischer & Smith, 2008) and lack of premeditation (Cyders & Smith, 2008). The psychological mechanisms by which heightened urgency might influence gambling disorder are not clearly understood. A previous research study found that young people who tend to act rashly in response to extremely positive moods show higher enhancement and coping motives, which are, in turn, positively related to gambling problems (Canale et al., 2015a). The aim of the present study was to address this gap in the literature by explicitly showing the links between one specific aspect of impulsivity (e.g., urgency), decision-making processes, and gambling-related outcomes.

Young people's gambling behaviour tends to be emotion-based (Cyders & Smith, 2008) with negative emotional mood states increasing the likelihood of gambling engagement (Griffiths, 2011). Both negative and positive urgency is strongly associated with emotional factors (Joseph et al., 2009). More specifically, urgency depends upon inadequate appraisal of (and response to) emotions that precede decisions. Urgency has been related to specific cognitive mechanisms (Bechara & Van der Linden, 2005). Research has shown that poor prepotent response inhibition at least partly underlies urgency (Gay et al., 2008; Billieux et al., 2010). More specifically, it has been shown that the tendency to make disadvantageous choices in a situation of decision-making under risk predicts high urgency that in turn predicts the occurrence of problematic behaviours (Billieux et al., 2010). Furthermore, urgency is related to impaired decision-making (e.g., Kraplin et al., 2014). The results provide evidence for reciprocal causal relationships between the decision-making process and urgency, although the effects of personality traits on psychological mechanisms were causally predominant. A previous longitudinal study (Castellanos - Ryan, Rubia, & Conrod, 2011) found that cognitive/ motivational measures of disinhibition (poor response inhibition, reward

response bias) mediate the longitudinal relationship between personality measures (e.g., impulsivity) and externalizing behaviours in adolescence (e.g., binge drinking and drug use). From this perspective, urgency may reflect a disposition toward gambling problems, depending on the decision-making process.

Consistent with the Reyna and Farley's (2006) work, major explanatory models of risky decision-making can be roughly divided into: (i) those that adhere to a rational behavioural decision-making framework that stresses deliberate, quantitative trading off of risks and benefits; and (ii) those that emphasize unconscious or irrational decision-making that appears to be the source of problems in adolescence (i.e., impulsive or reactive decision-making). Thus, in the present study, deliberative decision-making was considered as a measure of preferences based on conscious, analytical thought (e.g., Beyth-Marom & Fischhoff, 1997). Decision theory defines how individuals should reason in order to choose the behavioural option that would be most beneficial in a given situation (see Beyth-Marom & Fischhoff 1997). From this perspective, and in accordance with the Rangel and colleagues (2008) model of decision-making, value-based decision-making involves thinking through five basic processes: (1) the construction of a representation of the decision problem, that involves identifying internal and external states as well as potential courses of action; (2) the valuation of the different actions under consideration; (3) the selection of one of the actions on the basis of their valuations; (4) after implementing the decision the brain needs to measure the desirability of the outcomes that follow (evaluation); (5) the outcome evaluation is used to update the other processes to improve the quality of future decisions (learning).

In addition, the delayed reward discounting was considered as a behavioural measure of preferences based on impulsive, intuitive, and affective thought (Weafer, Baggott, & de Wit, 2013).

According to Metcalfe and Mischel (1999), an increase of 'hot' system activation based on emotion appraisal and processing decreases the ability to delay gratification. Thus, urgency significantly predicts sensitivity to reward delay in the delay discounting task (Kraplin et al., 2014;

Torres et al., 2013). Furthermore, several studies have shown that individuals with gambling problems discount delayed monetary outcomes at substantially higher rates than non problem-gambling controls (e.g., Albein-Urios, Martinez-González, Lozano, & Verdejo-Garcia, 2014; Clark, 2014; MacKillop et al., 2011 for a meta-analysis). In addition, urgency and lack of premeditation facets of impulsivity (i.e., the tendency to take into account the consequences of an act before engaging in that act) significantly correlate with each other (Whiteside & Lynam, 2001; Van der Linden et al., 2006), suggesting that higher levels of urgency could be related to lower levels of deliberative decision-making. Deliberative decision-making is the tendency to consider options and consequences before making a decision, and a failure to follow a deliberative process is associated with adolescent participation in a number of behaviours including substance use, risky sex, and delinquency (Wolff & Crockett, 2011).

It is therefore possible that among young people with a tendency to act impulsively in response to strong affects (urgency), affect tends to trigger impatience and myopia in inter-temporal choice (resulting in preferences toward smaller but immediate rewards over larger but delayed rewards) and lead to more impulsive and less deliberative decisions, which can increase the likelihood of gambling problems (e.g., betting more money, continuing gambling even when losing money, etc.).

6.2. The present study

Consistent with the theoretical backgrounds reviewed, the current study aimed to test a theoretical model (see Figure 12) linking urgency with gambling problems, taking into account the mediating role of decision-making processes (operationalized as preference for small/immediate rewards and a lower level of deliberative decision-making). It was hypothesised that the relationship between urgency and gambling problems is mediated by higher preference for small/immediate rewards, and a lower level of deliberative decision-making. More specifically, it

was hypothesised that young people who tend to act rashly in response to extreme moods may have more preferences for small/immediate rewards and lower levels of deliberative decision-making, which are, in turn, positively related to gambling problems.

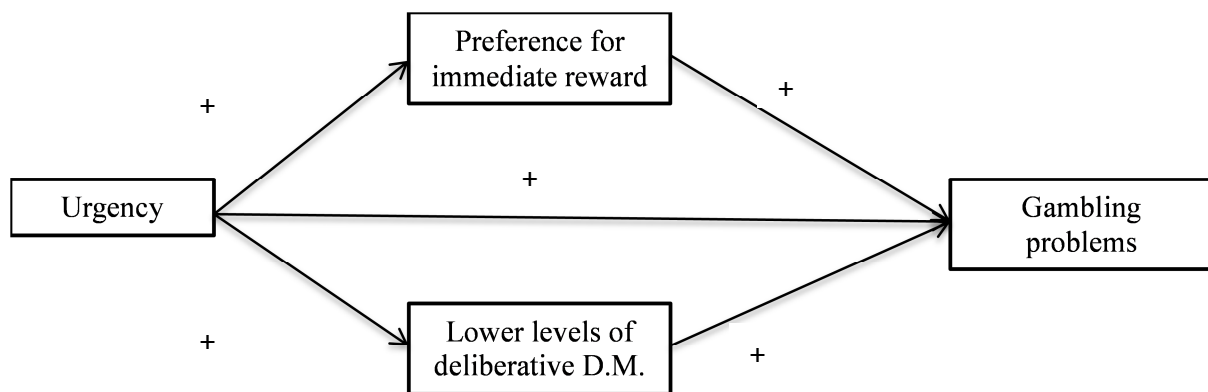


Figure 12. Theoretical model predicting gambling problems from urgency, with the mediation of decision-making processes (operationalized as preference for small/immediate rewards and a lower level of deliberative decision-making)

6.3. Method

6.3.1. Participants and procedure

Data for the present study were drawn from the same research project described in the previous chapter. The final sample comprised 986 participants (64% male) with an age range of 16-25 years ($M= 19.51$, $SD=2.30$), recruited to yield an age distribution designed to compare adolescents with two specific groups of young adults: (a) individuals of traditional college age (who in some studies of decision-making behave in ways similar to adolescents (Gardner & Steinberg, 2005); (b) individuals who are no longer adolescents but who still are at an age during which the brain is continuing to mature, presumably in regions that subserve orientation toward long-term goals (Giedd et al., 1999). Participants were students attending 4th and 5th grade of secondary

school or those in the first years of college. The institutional review committee at University of Padova gave ethical approval for the study. The data were collected using standard questionnaires, completed on a voluntary basis in the school or college classroom. All participants gave informed consent along with parental permission to participate for minor students.

6.3.2. Measures

Urgency. Urgency was assessed using the short UPPS-P (Billieux et al., 2012; Italian version: D'Orta et al., 2015). Cronbach's alpha reliability coefficients in this sample were .77 (CI= .75/.79) for positivity urgency and .76 (CI= .74/.78) for negative urgency. As subscales were highly correlated ($r=.59$, $p<.001$) and correlations between the two urgency traits and outcome variables were very similar (all within .15), a combined score was used, as has been carried out previously (Smith et al., 2013; Stautz & Cooper, 2014). The internal consistency of the urgency was .84 (CI=.82/.85). Higher scores reflect heightened urgency.

Deliberative decision-making. Participants responded to four items regarding the extent to which they thought through and evaluated their decision-making processes. The following items were extracted from the work of Wolff and Crockett (2011): "When you have a problem to solve, one of the first things you do is get as many facts about the problem as possible"; "When you are attempting to find a solution to a problem, you usually try to think of as many different ways to approach the problem as possible"; "When making decisions, you generally use a systematic method of judging and comparing alternatives"; "After carrying out a solution to a problem, you usually try to analyse what went right and what went wrong". These four items relate to key parts of the decision-making process outlined by Beyth-Marom and Fischhoff (1997) and have been used previously (e.g., Wolff & Crockett, 2011). The original items were translated into Italian by the authors following procedures recommended by Geisinger (1994). Items are answered using a 5-point Likert Scale from 1 ("strongly agree") to 5 ("strongly disagree"). Scores were averaged

($\alpha=.69$; CI =.65/.71) and higher scores indicate lower levels of deliberative decision-making. The studies on the relationships between decision-making processes and adolescent risk behaviour have used several operationalisations of (non) deliberative decision-making. For instance, adolescents who follow a systematic, deliberative process when choosing a course of action also report less drunkenness, drug use, delinquency, and risky sex both concurrently and one year later (Wolff & Crockett, 2011). According to: (i) decision theory (see for example Beyth-Marom & Fischhoff 1997) that specifies a systematic, logical process for optimal decision-making; (ii) a previous study that has used the same measure of deliberative decision-making (i.e., Wolff & Crockett, 2011), it was hypothesised that the failure to follow a deliberative process when choosing a course of action would be associated with gambling problems, and may contribute to young people' participation in problem gambling.

Preference for immediate/small reward. Participants responded to nine items from the delay-discounting questionnaire developed by Kirby and colleagues (Kirby, Petry, & Bickel, 1999). This paper-and-pencil task presents participants with hypothetical two-option choices between an immediate small reward, and a delayed larger one (e.g., would you prefer €55 now, or €110 in 15 days?). The values used in the nine items refer to the large delayed reward category. The total number of decisions was computed favouring the immediate reward and used it as a score of discounting ranging between 0 and 9. This measure ($\alpha=.77$; CI=.74/.79) has been previously used by other researchers (Torres et al., 2013).

Gambling problems. Gambling problems was assessed using the South Oaks Gambling Screen-Revised for Adolescents (SOGS-RA; Winters et al., 1993; Italian version: Chiesi et al., 2013). Gambling problems was measured using twelve 'yes-no' items that assessed negative feelings and behaviours associated with gambling (scored 1 or 0 respectively). The sum of these items is the total SOGS-RA score, referred to as the "narrow" criteria (Winters et al., 1995). Hence, total SOGS-RA score served as the primary dependent variable. There is a lack of consensus

regarding appropriate cut-off scores for determining the problem gambling status of adolescents (e.g., Ladouceur et al., 2005; Volberg et al., 2010). However, categorical definitions of adolescent problem gambling facilitate comparison across epidemiological studies. In reporting past-year prevalence rates, Winters et al.'s (1993) original scoring system was used. A SOGS-RA score of 0-1 was labelled "no problem," 2-3 merits an "at-risk" label, and 4 or more indicates "problem" gambling. The internal consistency of the SOGS-RA was .73 (CI=.70/.75). To counteract skewness, the gambling problems variable was log-transformed according to procedures recommended by Tabachnick and Fidell (2001).

6.3.3. Statistical Analyses

The pattern of associations specified by the proposed theoretical model and the mediations were evaluated using path analyses, using R (R Development Core Team, 2012) Package lavaan (Rosseel, 2012) and utilized a single observed score for each construct examined in the model. Standardized parameters were estimated using the maximum likelihood method (Satorra & Bentler, 1988). To evaluate the adequacy of the model the R^2 of each endogenous variable and the total coefficient of determination (CD; Bollen, 1989; Jöreskog & Sörbom, 1996) were considered. For the mediation effect, lavaan uses the normal approximation method, and is based on the delta method, or the so-called Sobel method (Casella & Berger, 2002).

6.4. Results

In the sample, 837 participants (84.6%) had no gambling problems; 104 (10.5%) were at-risk gamblers, and 48 (4.9%) were problem gamblers. Descriptive statistics of all the study variables are presented in Table 13. As expected, all of the study variables were positively correlated with the others. The magnitude of correlation coefficients was relatively modest, ranging from .08 to .20. In particular, higher urgency scores were significantly associated with lower levels of deliberative decision-making ($r = .17$), preference for immediate/small reward ($r = .21$), and

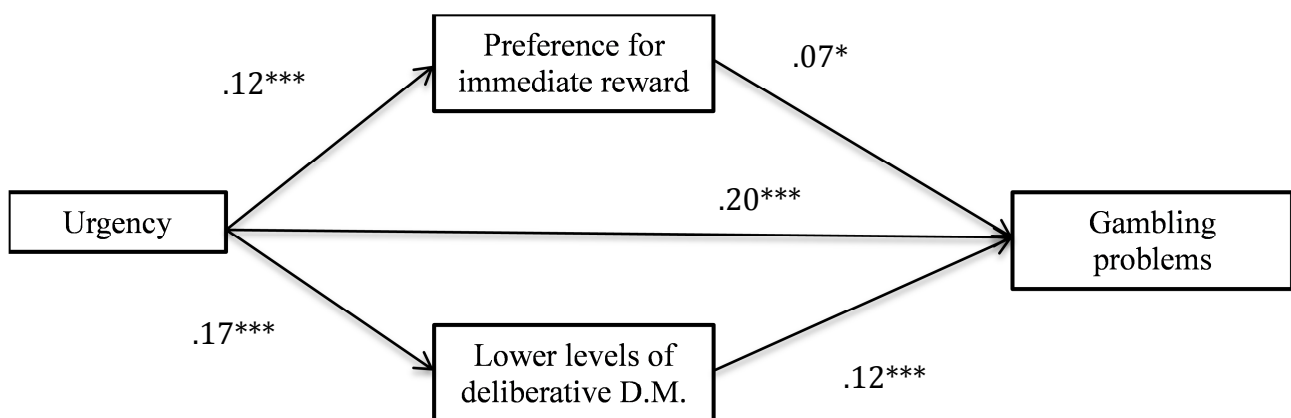
gambling problems ($r = .22$). Moreover, there was a positive correlation between lower levels of deliberative decision-making and gambling problems ($r = .16$). Finally, preference for immediate/small reward was positively correlated to disapproval ($r = .08$).

	1	2	3	4	M(DS)
1.Urgency	-				2.31(.55)
2.Lower deliberative D.M.	.17***	-			2.07(.67)
3.Immediate reward	.21***	-.01	-		5.00(1.93)
4.Gambling Problems (ln)	.22***	.16***	.08***	-	.31(.53)

*** $p < .001$

Table 13. Means, standard deviations, and correlations among study variables

Figure 13 shows the empirical estimation of the proposed model (estimated parameters are reported). Higher levels of urgency were associated with higher levels of gambling problems. The association was mediated by lower levels of deliberative decision-making and preference for immediate/small reward. The squared multiple correlations indicate that the model accounts for a modest portion of the variance in study variables, more specifically: 3% of the variance in lower levels of deliberative decision-making, 2% in immediate reward, and 7% in gambling problems. Moreover, the total coefficient of determination (CD) was .08.



* $p < .05$; *** $p < .001$

Figure 13. Standardized parameters for the model

In addition to the direct effects shown in Figure 12, there was one significant indirect relationship. Urgency had an indirect relationship with gambling problems (.03) through its effect on lower levels of deliberative decision-making (.03). Young people who tend to act rashly in response to extreme moods had lower levels of deliberative decision-making that in turn were positively related to gambling problems.

6.5. Discussion

The aim of the present study was to extend limited understanding of the psychological mechanisms involved in the relationship between impulsivity traits and gambling by demonstrating the links between urgency, decision-making processes, and gambling-related outcomes. The results showed that urgency has both direct and indirect effects on gambling problems in a sample of young Italian people.

The finding that urgency was significantly associated with gambling-related problems supports the findings of previous research (e.g., Canale et al., 2015a; Cyders & Smith, 2008) suggesting that gambling problems in young people are related to individual differences in rash acts during strong emotional states. In addition, urgency was positively related to decision-making processes. More specifically, urgency showed a significantly positive correlation with an immediate reward focus (e.g., delay aversion). This reflects previous studies that have found the involvement of urgency in reward delay sensitivity (Kraplin et al., 2014; Torres et al., 2013). It is possible that among individuals with a tendency to act impulsively in response to strong affects, affect tends to trigger impatience and myopia in inter-temporal choice, resulting in preferences toward smaller but immediate rewards over larger but delayed rewards (see Chang & Pham, 2013 for a review). Urgency was also positively related to lower levels of deliberative decision-making suggesting that

young people (who tend to make poor decisions under conditions of strong affects) are also characterized by tendency not to think of the consequences of an action before engaging in it. It is possible that the experience of extreme emotions can deplete a person's ability to control their behaviours (Muraven & Baumeister, 2000; Tice, Bratslavsky, & Baumeister, 2001), and intense emotions tend to bias decision-making in non-deliberative directions (Bechara, 2004; Driesbach, 2006).

The present study has also found direct effect of decision-making processes on gambling problems. The finding that an immediate reward focus was significantly associated with greater numbers of gambling problems supports numerous studies that have shown as problem gamblers exhibit higher rates of discounting than non-problem gambling controls (e.g., Kertzman et al., 2011; Reynolds, 2006; Robbins & Clark, 2015). This is also consistent with recent models of pathological gambling (Bechara, 2003; Evans & Coventry, 2006; van Holst et al., 2010) that motivational and valuation systems in pathological gamblers may over-estimate the value of immediate short-term rewards. In addition, lower levels of deliberative decision-making were positively associated with gambling problems suggesting as young people who fail to follow deliberative or regulated decision-making have a greater tendency to take risks (Kahneman, 2003; Klaczynski, 2005).

A significant indirect path from urgency to gambling problems via lower levels of deliberative decision-making was also found in the present study. According to Cyders and Smith (2008), it may be that in response to intense emotions, higher levels of urgency may lead to more impulsive and less deliberative decisions, which can increase the likelihood of gambling problems (e.g., betting more money, continuing gambling even when losing money, etc.).

A greater understanding of urgency, delay discounting, and deliberative decision-making differences in gambling problems, might also elucidate important ways to explore in terms of developing and refining problem gambling prevention or intervention. It appears that the experience of extreme emotions can deplete one's impulse control (Tice et al., 2001). Recently, researchers

have developed very successful interventions to help individuals avoid rash actions and decisions when experiencing intense negative and positive affect, such as computer-delivered intervention (Canale et al., 2016) and mindfulness meditation (Shonin, Van Gordon, & Griffiths, 2014).

The present study has some limitations that also need to be considered. Firstly, the cross-sectional nature of the data does not allow the drawing of strong conclusions about the direction of the effects or to interpret the mediation relation in a causal sense. For example, longitudinal studies are needed to clarify the direction of causality between urgency, decision-making processes, and gambling problems. Secondly, participants were asked to reflect on their decision-making process that may not capture their spontaneous strategies 'in the moment'. Additionally, non-rational and intuitive process of decision-making, such as heuristics, can also be useful and accurate tools that make the decision more successful (e.g., Slovic & Peters, 2006). Assessing the heuristics would be a valuable addition to the literature as these measures may be an effective way of improving professional decision-making in the real world (Gigerenzer, 2008). Thirdly, in the present study positive and negative urgency was used as a composite score of urgency. Individual facet score of urgency (positive and negative) should be included in future studies in order to gain a more comprehensive analysis of the relationships between impulsivity traits, decision-making process and gambling problems. Fourthly, although the SOGS (and its variations) is one of the most frequently used measures of problem gambling both in youth and in adults (Wiebe, Cox, & Mehmel, 2000), the SOGS was not created to directly reflect DSM criteria for pathological gambling (e.g., DSM criteria include content regarding tolerance and withdrawal that are absent from the SOGS). Finally, the effects found in this study were modest, suggesting that additional factors are likely to be influential for gambling problems.

6.6. Conclusions

In conclusion, the current study provides an important addition to the literature on adolescent gambling. More specifically, the results of the present study hold promise for future research directions about the possible mechanisms that underlie the relationships between urgency and gambling problems. As our review of the literature suggests, the present study is likely to be the first that has sought to clarify the mediating effects of decision making processes on the relationship between impulsivity traits (e.g., urgency) and gambling problems. Therefore, the present study shows that delay discounting as well as self-reported dimensions concerning the tendency to act rashly in an emotional context (urgency) and the lack of deliberative decision-making may be relevant mechanisms underlying gambling problems. In particular, the findings give support to the idea that young people who tend to act rashly in response to extreme moods had lower levels of deliberative decision making that in turn were positively related to gambling problems. Therefore, those interested in promoting responsible gambling (and decreasing gambling problems) might want to consider the model's variables, including urgency and decision-making processes (operationalized as preference for small/immediate rewards and a lower level of deliberative decision-making).

Chapter 7

General Discussion

7.1. What we may further learn from a social-ecological approach to adolescent gambling?

The present thesis provides new insight into the possible individual and contextual factors contributing to the development of problem gambling. More specifically, three main results came out from this thesis. First, the level of health expenditure characterizing the country where young people live influences the development of problem gambling during adolescence. Second, in some countries such as Italy, where the liberalization of gambling and the evolution in access to and practice of gambling (many tobacco shops and bars now look like small casinos with a wide variety of instant lottery and slot machines) may cause greater “approval” of gambling (Bastiani et al., 2013), parents who are aware of upcoming youth activities can foster a development of rejecting attitudes toward gambling, which are, in turn, negatively related to gambling frequency. Finally, young people who tend to act rashly in response to extreme moods show higher enhancement and coping motives, which are, in turn, positively related to gambling problems. They were also more likely to have lower levels of deliberative decision-making and higher preferences for immediate/small rewards, which in turn were positively related to gambling problems.

According to the conceptual framework for the development of gambling in youth (Barnes et al., 1999) and the conceptual framework of harmful gambling (Abbot et al., 2013), the research work presented in this thesis has been conducted following a logical succession for an in-depth investigation of the youth gambling, as represented by the sequence of the four studies. Factors from four explanatory domains (macroeconomic factors, sociodemographic factors, socializations factors, and individual/psychological factors) were tested for links to gambling frequency and gambling problems in representative samples of high-school students came from international and

national survey (ESPAD) and students recruited from high schools and universities located in three midsize cities in the north of Italy.

With regard to macroeconomic influences on youth gambling, the first study (Chapter 3) has investigated the role of socioeconomic indicators of the welfare state in explaining probable problem gambling during adolescence. This study particularly dealt with methodological issues pertaining to the lack of population-based studies in the gambling literature in adolescence. Theoretical questions concerning the association between socioeconomic indicators of welfare state and adolescent gambling was also taken into account. This study is a big contribution to the youth gambling research with its broad focus on structural issues, such as health expenditure and GDP, because very few studies have investigated the risk factors of adolescent problem gambling relates to macro/social-level or community-level factors (Barmaki & Zangeneh, 2009; Hayer & Griffiths, 2015). However, scholars are moving towards the identification and development of some general theoretical assumptions concerning the social contexts and meanings of gambling that might facilitate a more complete understanding of this phenomenon (Reith & Dobbie, 2011). Sound results emerged from this first study. At the country level, expenditure on public health was negatively associated with possible problem gambling. Higher health expenditure was related to lower levels of gambling problems even after controlling for the influence of the gross domestic product (GDP). Interestingly, the effect of health expenditure on probable problem gambling was net of the effect of GDP. In line with Richter et al. (2012) and Bartlett (2013), it may be possible that living in southern, eastern and Balkan countries - where health service provisions and benefits are limited - has a negative impact on gambling behaviours. The present study extend gambling research by demonstrating that the social determinants of health approach (WHO, 2008) can be applied to the study of adolescent gambling.

With regard to the sociodemographic factors, the first study also examined the association between family sociodemographic factors and probable problem gambling. It was found that parents' level of schooling and family structure were not related to probable problem gambling. These findings are in line with previous results reported in the literature that found no relationships between family socio-demographic characteristics and adolescent gambling behaviours (Langhinrichsen-Rohling et al., 2004; Vitaro et al., 1998). It is possible that family structural characteristics may be less influential in affecting problem gambling compared to family relational characteristics (Coombs & Paulson, 1988; Velleman et al., 2005).

Indeed, with regard to the socialization factors, parents have a fundamental role in buffering gambling behaviour. In particular, in line with the social learning theory (Bandura, 1999), and consistently with recent studies showing a negative association between parental practices and adolescent gambling (see McComb & Sabiston, 2010 for a review), our findings show the critical role of parental knowledge and parental care in reducing the development of probable problem gambling. This study showed that living in a family environment where parents are supportive and monitor their children's behaviours is negatively related to probable problem gambling. Nonetheless, some issues remain unsolved, for example how parents who are knowledgeable about youth activities could hinder youth gambling. The second study (Chapter 4) investigated this research question and, in the logic of this thesis, its findings elucidate some of the processes responsible for the possible protective role of parental knowledge on gambling involvement. The understanding of the mechanisms of influence is a critical issue within gambling research (Ariyabuddhiphongs, 2013), because a shared theoretical model, which is able to explain the association between family influence and adolescent gambling is not available yet. In the current study, a theoretical model linking the influence of parental knowledge and adolescent gambling, taking into account the role of gambling-oriented attitudes as a mediating variable was evaluated by combining the social learning theory (Bandura, 1999) with the theory of reasoned action (Aizen &

Fishbein, 1980). The study is likely to be the first seeking to clarify the mediating effects of adolescent attitudes on the relationship between parental knowledge and gambling frequency.

In particular, the findings support the idea that adolescents who perceived higher levels of parental knowledge are: more likely to disapprove of gambling and show higher awareness of the harmfulness of gambling, which are, in turn, negatively related to gambling frequency; and less likely to perceive their friends as gamblers, which, in turn, is also negatively related to gambling frequency. Findings are consistent with the social learning theory, which proposes that parents serve as important socializing agents for adolescents, particularly in their function as disciplinarians (Bandura, 1999), and operate through socio-psychological mechanisms to produce behaviour effects (Bandura, 1997). The results are also consistent with previous studies on other youth problem behaviours such as alcohol use (Kim & Neff, 2010) and marijuana use (Lac et al., 2009). In sum, gambling oriented attitudes are able to mediate the relationship between parental knowledge and gambling frequency. Nonetheless, important questions remain open about how gambling oriented attitude/perceptions may influence gambling outcomes. The third study (Chapter 5) investigated this research question and, in the logic of this thesis, its findings concern the influence of psychological factors on problem gambling. The understanding of psychological mechanisms that underlie the influence of impulsivity on problem gambling is a critical issue within gambling research (Kraplin et al., 2014), because a shared theoretical model, which is able to explain the influence of impulsivity traits on problem gambling is not available yet. The last two studies have investigated the psychological mechanisms that underlie the influence of impulsivity on problem gambling. More specifically, the role of gambling motives (third study, Chapter 5) and decision-making processes (fourth study, Chapter 6).

The main findings from the third study documented that young people who tend to act rashly in response to extremely positive emotions showed higher coping and enhancement motives, which in turn were positively related to gambling problems. In addition, sensation seekers were

more likely to have higher levels of enhancement motives, which in turn were also positively associated with gambling problems. This finding is consistent with previous studies, where gamblers with high levels of enhancement motives for gambling, were also characterized by high levels of sensation-seeking and gambled for the 'high' and feelings of excitement that gambling can create (Bonnaire et al., 2009; Stewart et al. 2008; Vachon & Bagby, 2009). In addition, this finding supports the theory that sensation seekers are likely to endorse enhancement motives in an attempt to experience greater thrill and stimulation from their environment (Cooper et al., 2000; Gullo et al., 2010). Individuals elevated by the trait of sensation seeking, experience low basal levels of arousal, and may therefore be motivated to engage in gambling behaviours, to achieve an optimal level of stimulation. Specific associations between impulsivity traits, gambling motives and gambling problems were significant only in young people who perceived lower risks and higher benefits of gambling. More specifically, as for lower levels of gambling risk and higher levels of gambling benefit differences, sensation-seeking was positively related to enhancement motive in individuals with lower gambling perceived risk. This is consistent with previous research which showed young problem gamblers use gambling as a means of generating excitement that they perceive is missing from their lives (Getty, Watson, & Frisch, 2000; Griffiths, 1995; Gupta & Derevensky, 2000). Positive urgency was positively related to gambling problems and enhancement in individuals who perceived higher levels of gambling benefits. The findings may be interpreted in relation to research by Conskunpinar and Cyders (2012) that found as benefit perception levels increased, the indirect effect of positive urgency on problematic alcohol consumption through enhancement motives changed. Finally, an interesting result was the positive relation between social motive and gambling problems in young people who perceived higher levels of gambling benefits. Past researchers have found that social motives do not generally predict problem gambling (Dechant & Ellerly 2011; Lambe et al., 2014; Stewart & Zack, 2008). The results here suggest that gambling for social reasons may be more risky for an individual with higher benefit perception. It is likely that individuals with higher levels of perceived gambling benefits may be considered as extrinsically

motivated gamblers who were more likely to do so because of external rewards such as money and social approval (Chantal et al., 1995). Findings are consistent with the acquired preparedness model of alcoholism risk, which suggests that individual differences in key personality traits influence drinking behaviour by influencing alcohol-related learning such as drinking motives (Smith & Anderson, 2001; Settles, Cyders, & Smith, 2010), and previous studies on alcohol use (e.g., Adams et al., 2012; Coskunpinar & Cyders, 2012).

The third study revealed that the emotional components of impulsivity (e.g., positive urgency) might have greater influence on the gambling problems than the non-emotional components of impulsivity (lack of perseverance/premeditation). Nonetheless, some issues remained unexplained, for example how heightened urgency might influence gambling problems. The fourth study (Chapter 6) investigated these research questions by demonstrating the links between impulsivity traits, decision-making processes and gambling-related outcomes. In the current study, a theoretical model linking the influence of urgency and adolescent gambling, taking into account the role of decision making processes as mediating variables was evaluated by combining the major explanatory models of risky decision-making (consistent with the work of Reyna and Farley, 2006). This study revealed that young people who tend to act rashly in response to extreme moods were more likely to have lower levels of deliberative decision-making and higher preferences for immediate/small rewards, which in turn were positively related to gambling problems. It is therefore possible that among young people with a tendency to act impulsively in response to strong affects (urgency), affect tends to trigger impatience and myopia in inter-temporal choice, resulting in preferences toward smaller but immediate rewards over larger but delayed rewards (e.g., Kraplin et al., 2014; Torres et al., 2013), and leads to more impulsive and less deliberative decisions (e.g., Van der Linden et al., 2006), which can increase the likelihood of gambling problems (e.g., betting more money, continuing gambling even when losing money, etc.)

7.1.1. Avenues for further studies

Although the present thesis may be regarded as an original example of how individual characteristics (impulsivity traits, gambling motives, decision making processes, and gambling-oriented attitudes) and social context (e.g., parental knowledge and expenditure on public health) may interact to affect individual behaviour, these issues leave open several other aspects that may to be addressed in further research.

First, studies have shown that problems associated with gambling have a social and geographical gradient, with those living in areas of greater deprivation and less social capital, who are economically inactive and with lower income being more likely to experience harm (Orford et al., 2010; Uphoff et al., 2013; Wardle et al., 2014). In addition, according to the risk-sensitivity theory (Carraco, Martindale, & Whittam, 1980), victims of income inequality engage in greater risk-taking behaviours (Mishra, Barclay, & Lalumiere, 2014) because inequality facilitates the perception of need in that victims of inequality are at distance from the desired or goal state or more privileged others. Socioeconomic inequality has increased in many domains of adolescent health (Elgar et al., 2015) and the first study (Chapter 3) found that socio-economic indicators of welfare (e.g., health expenditure) were associated with lower levels of gambling problems in a representative sample of students living in nine European countries. To date, no studies have yet investigated the relationship between socio-economic indicators of welfare, socioeconomic inequality and problem gambling in Italy, a country characterized by the largest per capita gambling expenditure in Europe, and levels of inequality and poverty that are among the highest measured in wealthy nations (Brandolini, 2009). Thus, future studies are needed: (i) to examine the association between region-and school-level income inequalities and problem gambling; and (ii) to investigate the relationship between socio-economic indicators of welfare (regional level) and problem gambling.

Second, although it was demonstrated that each type of gambling-oriented attitudes contributed significantly to mediate the relationship between parental knowledge and gambling frequency (second study, Chapter 4), it is true that much of the variance in gambling-oriented attitudes remained unexplained. In explaining the potential effect of gambling-oriented attitudes on gambling involvement, most studies posit numerous causal factors, only one of which is parental knowledge. Other unconsidered factors associated with parents (i.e. parent approval of gambling, Hanss et al., 2014; parental warmth, Lac et al., 2009) or the community (availability and opportunity; Kim & Neff, 2010) may also predict beliefs about gambling. Thus, future models should consider not only parental knowledge, but also relevant parental characteristics, including parental permissiveness toward gambling (Leeman et al., 2014), parents' attitudes toward gambling, and parental gambling misuse, such as teaching children to keep a budget, save money, and take care of their finances (Delfabbro & Thrupp, 2003).

Third, the last two studies found that gambling motives and decision-making processes (operationalized as preference for small/immediate rewards and a lower level of deliberative decision-making) have been found to mediate the relationships between impulsivity traits and gambling problems. However, a significant limitation of these studies was the cross-sectional nature of the data that does not allow strong conclusions to be drawn concerning the direction of the effects or allow interpretation of the mediation relation in a causal sense. Longitudinal studies are needed to clarify the direction of causality between impulsivity traits, decision-making processes, gambling motives, and gambling problems. Additionally, non-rational and intuitive processes of decision-making (such as heuristics) can also be useful and accurate tools that make the decision more successful (Slovic, 2010). Assessing the nature of the heuristics would be a valuable addition to the literature as these measures may be an effective way of improving professional decision-making in the real world (D'Astous & Di Gaspero, 2015). Thus, future research should consider the

mediating role of gambling motives and non-rational and intuitive process of decision-making in the longitudinal association between impulsivity traits and gambling problems.

7.2. Implication for intervention, prevention and police of welfare

Results of this thesis provided strong evidences that gambling behaviour of adolescents and young adults is affected by factors at personal, family, and national levels. It was identified that a possible determinants of problem gambling was the health expenditure on public health. According to our findings, future social welfare policies should introduce or maintain stronger health insurance funds, thus decreasing adolescent gambling. Contemporary public health practice should act on multi-level responses, focusing on upstream interventions based on structural response, including appropriate legislative frameworks addressing on health and wellbeing issues such as expenditure on health.

Although there is an age limit of 18 years for gambling in Italy, the present study estimated that one out of two students (aged between 15 and 19 years) reported having engaged in some form of gambling during the past year. Thus, it is recommended that researchers pay greater attention to the development of gambling habits in Italy. Specific interventions, such as limiting access to gambling opportunities and monitoring of youth activities (e.g., Lee et al., 2014) warrant consideration. In this direction, safe and supportive families are crucial in helping young people to develop their full potential and attain the best health in the transition to adulthood. Through knowledge of their adolescent offspring's whereabouts and activities, parents who are knowledgeable about youth activities may have the information necessary to provide the supervision, structure and discipline indispensable for reducing youth gambling. The results also indicate that parents who are aware of upcoming youth activities may be more likely to discuss their views on whether or not gambling is morally acceptable for their children (as also a safe activity) and thus adolescents would learn that there are consequences for gambling, which, in turn, could bring to avoid or reduce gambling participation. The present findings suggest that targeting parental

knowledge in family-based interventions is likely to reduce the risk of gambling involvement during adolescence, a critical time for prevention efforts. It also suggests that increasing parental knowledge is likely to be linked to gambling-oriented attitudes, that have been identified as important intermediary steps in youth decisions to use alcohol and other substances (Patel & Fromme, 2010). Knowledge may be a salient intervention target because intervention studies have shown that it is possible to increase parents' monitoring efforts (Stanton et al., 2004). Prevention efforts should therefore focus on teaching parents to provide structure and to apply appropriate levels of behavioural control and developing trusting and non-intrusive parent-child relationships that encourage honest self-disclosure and that provide parents with accurate monitoring-relevant knowledge (Crouter & Head, 2002). In addition, counselors, may focus on increasing the use of parental knowledge in the homes of these families. This may include role-playing or providing active strategies that foster parents' regular enforcement of reasonable rules and routines (perhaps concrete strategies included spending time in activities with the youth or encouraging their offspring to more willingly confide in them).

The results may also have implications for policy and practice, suggesting that actions should focus on societal factors that predict family connectedness and resilience, as well as the more traditional aims of improving parenting and family functioning. For example, higher expenditure on benefit in kind for families/children may affect the way in which families deploy social and economic resources, such as the need to earn income which, in turn, might increase parents' ability to protect and support young people (Viner et al., 2012), including for example more parental caring and knowledge.

With regard to the effects of gambling-oriented attitudes, the results of the present study indicate that intervention efforts should work to adjust the misperceptions of peer gambling and to reinforce negative attitudes about gambling on high-school students. Further efforts are needed to increase public awareness to the potential risks of gambling. Recently, Internet-based interventions

(e.g., Canale et al., 2016; Danielsson et al., 2014) have been launched specifically for adolescents and young adults in an attempt to reduce gambling related harms and gambling frequency. Given the efficacy of similar programs, gambling online services may be effective in growing youth awareness of their potentially problematic gambling behaviour and assist adolescents and young adults in retaining control and minimizing and reducing gambling related problems (e.g., Griffiths & Cooper, 2003; Monaghan & Wood, 2010).

Finally, the last two studies may have implications for prevention and intervention of problem gambling. The different impulsive personality traits that were investigated demonstrate distinct patterns in relations to gambling motives/decision making processes and gambling problems. Therefore, it is useful to consider three specific pathways when addressing impulsivity in problem gambling prevention or intervention.

First, young people who tend to act rashly in response to extremely positive emotions and sensation seekers engage in gambling to increase positive feelings. According to Adams et al. (2012), some potential ways of intervening may involve (i) working with young people on considering not only positive and immediate consequences of gambling, but also on effects that are less salient in the moment (e.g., economic losses and strained relationships with family members and friends), and (ii) providing alternative behaviours to gambling (e.g., sport) to enhancing positive sensation.

Second, young people with a tendency to act impulsively in response to extremely positive emotions engage in gambling to decrease negative feelings (coping motives). Individuals who score high on coping motives may, according to Adams et al. (2012), benefit from a type of intervention, aimed at educating them to focus on the negative social and emotional consequences of engaging in gambling to cope, as well as training in adaptive strategies for coping with negative effect (e.g., yoga).

Finally, young people who tend to make poor decisions under conditions of strong affects have higher preferences toward smaller but immediate rewards over larger but delayed rewards and are also characterized by tendency not to think of the consequences of an action before engaging in it. Recently, researchers have developed very successful interventions to help individuals avoid rash actions and decisions when experiencing intense negative and positive affect, such as computer-delivered intervention (Canale et al., 2016) and mindfulness meditation (Shonin et al., 2014). Selected important recommendations to stakeholders (e.g., researchers, treatment providers and policy makers) around adolescent problem gambling are summarized in Table 14.

Researchers

- ❖ Carry out studies with longitudinal designs to determine causal risk factors preceding problem gambling and highlight distinct developmental pathways;
- ❖ Carry out further studies to confirm study findings with other unconsidered factors (e.g., non-rational and intuitive processes of decision making, income inequalities, and parental permissiveness toward gambling);
- ❖ Extend research to include a larger number of countries, across cultures and different social groups;

Education and Treatment Providers

- ❖ Teach parents to provide structure and to apply appropriate levels of behavioural control and developing trusting and non-intrusive parent–child relationships that encourage honest self-disclosure and that provide parents with accurate monitoring-relevant knowledge;
- ❖ Educate and adjust the misperceptions of peer gambling;
- ❖ Reinforce more realistic attitudes concerning gambling;
- ❖ Work with young people on considering effects that are less salient in the moment (e.g., economic losses);
- ❖ Develop interventions to help young people avoid rash actions and decisions when experiencing intense negative and positive affect, such as computer-delivered intervention and mindfulness meditation;

Policy-makers

- ❖ Introduce and/or maintain stronger health insurance funds;
- ❖ Limit access to gambling opportunities and impose stricter penalties for gambling operators allowing adolescents to gamble illegally;
- ❖ Encourage structural changes to improve young people’s daily lives with families;
- ❖ Increase public awareness to the potential risks of gambling.

Table 14. Main Recommendations to stakeholders about what they should do differently based on the findings/implications of the present thesis.

In conclusion, gambling has cultural, social and economic roots, so that efforts to reduce it cannot be really efficacious if they don't take into account the interactive role of psychological characteristics and social contexts in which the individual is embedded.

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