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Behavioural Addictions in Adolescents and Young Adults: Results from a Prevalence Study

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Abstract Our study aims to assess the prevalence of behavioural addictions in an adolescent population, evaluating the effects of gender and age, and to assess the correlations among different behavioural addictions. 2853 high school students were assessed in order to evaluate the prevalence of behavioural addictions such as Pathological Gambling (PG), Compulsive Buying (CB), Exercise Addiction (EA), Internet Addiction (IA), and Work Addiction (WA), in a population of Italian adolescents. The South Oaks Gambling Screen-Revised Adolescent (SOGS-RA), the Compulsive Buying Scale (CBS), the Exercise Addiction Inventory (EAI), the Internet Addiction Test (IAT), and the Work Addiction Risk Test (WART), were compiled anonymously by the students. Overall prevalence was 7.0% for PG, 11.3% for CB, 1.2% for IA, 7.6% for WA, 8.5% for EA. PG and EA were more common among boys, while gender had no effect on the other conditions. CB was more common among younger (<18 years old) students. The scores of all of these scales were significantly correlated. The strong correlation among different addictive behaviours is in line with the hypothesis of a common psychopathological dimension underlying these phenomena. Further studies are needed to assess personality traits and other clinical disorders associated with these problems behaviours.

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Introduction

Behavioural addictions are clinical entities—not classified in the DSM-IV-TR—in which repetitive impulsive behaviours occur, with negative effects on the patients' and their relatives' lives; according to Brown's (1993) paradigm the prominent features of such conditions are: cognitive salience, as the activity dominates the person's thoughts and behaviours; conflict with other persons or activities; euphoria or relief, a feeling of short term pleasure from engaging in the behaviour; tolerance or loss of control over the behaviour; withdrawal, as experiencing unpleasant feelings when unable to engage in the behaviour; relapse and reinstatement, indicated when people unsuccessfully attempt to cut down on the behaviour, subsequently engaging in similar or higher levels than previously.

Pathological Gambling could be considered as an example of this behavioural addictions (Petry 2006; Potenza 2006); it is the only condition of these to be classified in the DSM-IV-TR, as an Impulse Control Disorder (American Psychiatric Association 2000). In the fifth edition of this Manual, Pathological Gambling will be probably re-classified, together with most of the Substance Related Disorders, in the Section Addiction and Related Disorders, and other addiction-like behavioural disorders could be considered for inclusion if sufficient data accumulate (American Psychiatric Association 2010). This reflects a shift in attention from substance-induced physical dependence to other elements of the addiction process.

The core elements of addictions are: craving state prior to behavioural engagement, or a compulsive engagement; impaired control over behavioural engagement and continued behavioural engagement despite adverse consequences (Potenza 2006); Behavioural addictions may share clinical features with substance addictions, and similar phases seem to occur for behavioural and substance addictions, with physiological and emotional arousal before the act; pleasure, high, or gratification associated with the act; a decrease in arousal and feelings of guilt afterward, and the possible development of tolerance and physiological withdrawal (Hollander and Allen 2006). The reward circuits are implicated in the development of both substance and behavioural addictions, and common genetic vulnerabilities have been described (Grant et al. 2006), and common neuropsychological features have been reported across these diagnostic categories (Goudriaan et al. 2006).

The definition of behavioural addictions remains however somewhat controversial, as clinical associations have been described between these phenomena and mood disorders (Kim et al. 2006; Di Nicola et al. 2010), obsessive–compulsive disorder (Dell'Osso et al. 2006), but the strongest associations remain those with substance use disorders (Petry et al. 2005).

Data from adult population have demonstrated the co-occurrence of different impulse control disorders in pathological gamblers (Black and Moyer 1998), and in adult psychiatric inpatients (Grant et al. 2005), a correlation between different behavioural addictions in patient suffering from bipolar disorder (Di Nicola et al. 2010), and an association between exercise dependence and compulsive buying (Koran et al. 2006; Lejoyeux et al. 2007, 2008). Surveys in populations of college students have indicated correlations between the use of multiple legal substances and gambling, exercising, and the usage of the internet and television (Greenberg et al. 1999).

Pathological Gambling has been the most studied of these conditions, but the others may be of clinical relevance as well: Koran et al. (2006) found a point prevalence of 5.8% for Compulsive Buying in the adult population of the U.S. with compulsive buyers being younger and having lower incomes than non-compulsive buyers; compulsive buying is associated with mood disorders, especially major depression, and with a family history of depression, alcoholism and substance use disorders, and both compulsive buyers and their relatives are at risk for other psychiatric conditions (Black et al. 1998). Magee (1994), Hassay and Smith (1996), and Roberts (1998) in their early works demonstrated impaired control in the buying behaviours in these subjects, compared with non-compulsive buyers.

Most research has focused on adult population or on college students so far, but little is known about epidemiology of these behavioural addictions in adolescence. Adolescence is a period at great risk for the development of addictive behaviours: nearly 60% of individuals who initiate drug use and 80% of those who start drinking alcohol (Johnston et al. 2005) or smoking cigarettes (Department of Health and Human Services 1994) do so at or before 18 years of age, and problem and Pathological Gambling are highly prevalent in adolescent populations (Shaffer et al. 1999). This susceptibility depends on both neurobiological (Schepis et al. 2008) and psychological processes (Marcelli and Braconnier 2004) taking place in this age of life.

Epidemiological studies on this field indicate that the prevalence of problem and Pathological Gambling in adolescents is reported to be higher than in adults, maybe for some interaction of adolescence and the current social setting. Approximately 4–8% of adolescents have a serious gambling problem, and 10–14% may be at risk for developing problems (Shaffer et al. 1999; Jacobs 2000).

Other epidemiological studies were conducted in Italy about behavioural addictions in adolescence: Pallanti et al. (2006) enrolled 275 Students in Florence who were administered the Shorter PROMIS Questionnaire, Internet Addiction Scale, and the Sheehan Disability Scale. Di Martino et al. (2006), conducted an epidemiological survey on a larger sample, but this study had a strong limitation as the authors did not use the scales that are most commonly used to assess the presence of behavioural addictions, so their results are not easily comparable with others.

In order to ameliorate the previous studies we planned to involve all of the schools in an average Italian city, aiming to obtain a representative sample of Italian adolescent population, enrolling a large number of students, and we selected assessment scales which had already been used by previous studies.

An accurate prevalence estimate would help indicate the impact of these conditions on public mental health and develop adequate prevention and treatment strategies.

Our study aims to assess the prevalence of behavioural addictions in an adolescent population—selecting the conditions which had been most commonly described and those which could be screened for with reliable and valid self-report questionnaires—evaluating the effects of gender and age, and to assess the correlations among different behavioural addictions in order to test the hypothesis which proposes a common psychopathological dimension underlying these phenomena.

The behavioural addictions considered in this study were:

Pathological Gambling (PG), classified in the DSM-IV TR as an impulse control disorder and defined as a persistent and recurrent maladaptive gambling behaviour as indicated by at least five criteria, and not better accounted for by a manic episode (APA 2000);

Compulsive Buying (CB), defined by the presence of repetitive impulsive and excessive buying episodes leading to personal and familiar distress. [Mc Elroy et al. \(1994\)](#) proposed diagnostic criteria for compulsive buying such as: Maladaptive preoccupations with buying or shopping, or maladaptive buying or shopping impulses or behaviour, as indicated by at least one of the following: Frequent preoccupation with buying or impulses to buy that are experienced as irresistible, intrusive and/or senseless; frequent buying of more than can be afforded, frequent buying of items that are not needed, or shopping for longer periods of time than intended: the buying preoccupations, impulses or behaviours cause marked distress, are time-consuming, significantly interfere with social or occupational functioning, or result in financial problems (e.g. indebtedness or bankruptcy); the excessive buying or shopping behaviour does not occur exclusively during periods of hypomania or mania;

Exercise Addiction (EA), an inadequate pattern of exercise leading to clinically significant impairment or distress, as manifested by three or more of the following: (1) tolerance, which is defined as either a need for significantly increased amounts of exercise to achieve the desired effect or a diminished effect with continued use of the same amount of exercise; (2) withdrawal as manifested by anxiety and fatigue when the amount of exercise decreases; (3) exercise is often taken in larger amounts or over a longer period than it was intended; (4) loss of control of the sportive or physical activity; (5) excessive time spent in activities necessary to obtain or prepare exercise; (6) conflicts: social, occupational or recreational activities are given up because of exercise; and (7) continuance: exercise is continued despite knowledge of a physical problem caused by exercise ([Hausenblas and Giacobbi 2004](#));

Internet Addiction (IA), characterized by excessive or poorly controlled preoccupations, urges or behaviours regarding computer use and internet access that lead to impairment or distress. Its features are: excessive use, often associated with a loss of sense of time or a neglect of basic drives; withdrawal, including feelings of anger, tension and/or depression when the computer is inaccessible; tolerance, including the need for better computer equipment, more software, or more hours of use; negative repercussions, including arguments, lying, poor achievement, social isolation and fatigue ([Beard and Wolf 2001](#); [Block 2008](#); [Shaw and Black 2008](#));

Work Addiction (WA), defined by Robinson as an obsessive–compulsive disorder which manifests itself through self-imposed demands, an inability to regulate work habits, and an overindulgence in work to the exclusion of most other life activities. It is associated with an impairment in familiar relationships, and difficulties for spouse and children of workaholics ([Robinson 2001](#); [Bakker et al. 2009](#)).

Methods

Participants

2853 students were evaluated during an information program about behavioural dependencies held in the upper intermediate schools in Barletta, a town with around 100,000 inhabitants in Southern Italy.

All the upper intermediate schools in town were invited to take part. All the schools joined the project except one, which was under renovation at the time of assessments.

Procedures

The program was designed by the Institute of Psychiatry of the Catholic University of Rome together with the Addictive Disorders Service of the Local Health Unit. The study protocol complied fully with the guidelines of the Ethics Committee of the Catholic University of Rome, and was approved by the Institutional Review Boards in accordance with local requirements. It was conducted in accordance with Good Clinical Practice guidelines and the Declaration of Helsinki (World Medical Association 2009). The students were informed about the aims of the study, their participation was voluntary and free. The questionnaires were anonymous and they were administered at school, in the presence of the teachers.

Assessments

Pathological Gambling was evaluated with the South Oaks Gambling Screen-Revised Adolescent (SOGS-RA), a screening tool for problem gambling in Adolescence (Winters et al. 1993a, b, 1995), derived from the South Oaks Gambling Screen (SOGS) (Lesieur and Blume 1987); Compulsive buying was evaluated with the Compulsive Buying Scale (CBS) (Faber and O'Guinn 1992), Exercise Addiction with the Exercise Addiction Inventory (EAI) (Terry et al. 2004; Griffiths et al. 2005), Work Addiction with the Work Addiction Risk Test (WART) (Robinson 1989), Internet Addiction with the Internet Addiction Test (IAT) (Young 1996, 1998).

All of these scales were self-administered by the students. The scales used are shortly described below:

South Oaks Gambling Screen-Revised Adolescent

It is a 19-item questionnaire derived from the South Oaks Gambling Screen (Lesieur and Blume 1987). It varies from the original SOGS by a decrease of one in the number of the scoring items, minor changes in some response options and minor changes in the wording of some items. It has an internal reliability of 0.80. Poulin (2002) produced further evidence of its reliability and validity. Following indications from Ladouceur et al. (2000), in the present study a cut-off score of 5 or higher was chosen to identify probable pathological gamblers.

Compulsive Buying Scale

It contains 13 items derived from previous research and theoretical models of compulsive buying. Subjects are asked to rate how true each item was for them on a scale ranging from 1 (not at all) to 7 (very much). The scale has a negative cut-off score of -1.34 , identifying compulsive buyers. Faber and O'Guinn (1992) found the scale to be highly reliable ($\alpha = 0.95$), one dimensional, and valid, and has been previously used in several studies in adults and college students (Koran et al. 2006; Roberts 1998).

Internet Addiction Test

It is a 20-item questionnaire on which respondents are asked to rate each item on a five-point Likert scale, according to how Internet use affects their daily routine, social life, productivity, sleeping patterns and feelings. Young suggests that a score of 70 or more

means that the internet use is causing significant problems. Widyanto and McMurrin (2004) supported the reliability and validity of this test.

Work Addiction Risk Test

The WART is a 25 item self report inventory, assessing the respondents' work habits; each item is scored on a 4-point Likert scale. Scores ≥ 70 identify work-addict individuals (Robinson 1989). Several studies have determined its reliability and validity (Flowers and Robinson 2002; Robinson 1996; Robinson 1999; Robinson and Post 1994; Robinson et al. 1992).

Exercise Addiction Inventory

It consists of six statements based on a modified version of the components of behavioural addiction (Griffiths 1996). Each statement had a five point Likert response option coded so that high scores reflected attributes of addictive exercise behaviour. A cut-off score of 24 or more identifies individuals considered at risk for exercise addiction. The scale has been demonstrated to have construct and content validity, and it has an internal reliability of 0.84 and a test-retest reliability of 0.85 (Terry et al. 2004; Griffiths et al. 2005).

Data Analysis

Statistical analysis was conducted with by SPSS 12.0 for Windows.

We computed the total prevalence of behavioural dependences on the basis of cut-off value defined by literature, and prevalence by gender and by age group (<18 and ≥ 18 years).

Data were non-normally distributed; univariate analyses were made using Mann–Whitney's test, in order to assess the effect of gender on the scores of the specific scales.

ANOVA F test was used to evaluate multiple linear regression analyses, which were conducted considering the scores from the different scales as dependent variables, age and gender as independent variables.

A multiple logistic regression model was used considering age and gender as independent variables and the occurrence of a behavioural addiction, as revealed by the self-report measures, as dependent variables. Results are expressed as Odds Ratio (95% Confidence Intervals).

Spearman's correlation coefficient was used to assess correlations among the different scales.

The statistical significance was set at $P < 0.05$.

Results

Of the 3249 students attending the schools involved, 2853 (87.8%) decided to take part in the study.

The population was made of 1142 girls (40%) and 1711 boys (60%). The age range was 13–20; the mean age was 16.7, with a standard deviation of 1.9.

Prevalence rates are shown in Table 1. Compulsive Buying is the most prevalent disorder (11.3%), followed by Exercise Addiction (8.5%), Work Addiction (7.6%), Pathological Gambling (7.0%), and Internet Addiction (1.2%).

Table 1 Prevalence (%)

	Pathological Gambling	Compulsive Buying	Internet Addiction	Work Addiction	Exercise Addiction
Males	9.7	12.7	1.3	7.8	10.1
Females	2.9	9.3	1.0	7.3	6.3
Total	7.0	11.3	1.2	7.6	8.5
<i>P</i>	<0.001	0.006	0.474	0.642	0.001
<18 years	7.6	14.5	1.4	7.6	8.7
≥18 years	6.0	6.3	0.7	7.5	8.3
<i>P</i>	0.092	<0.001	0.107	0.928	0.677

Bold values were used for *p* values < 0.05, indicating statistical significance

Males had higher scores than females on the SOGS-RA, with no effect for age on this variable (ANOVA *F* test = 59.95, *P* < 0.001).

Gender had no effect on the CBS scores, while age is correlated in a positively proportional way with CBS scores (*F* test = 11.32, *P* < 0.001), indicating a lower risk for Compulsive Buying among older students.

For Internet Addiction, the *F* test scored 19.84 (*P* < 0.001), with a higher risk for males compared to females, and no effect of age on the IAT scores.

No correlation was found for WART scores with gender nor age (*F* test = 0.35, *P* = 0.704).

EAI scores are higher among males, with no effect of age (*F* test = 46.14, *P* < 0.001).

Males have a higher risk for developing Pathological Gambling, and exercise addiction. Gender has no effect on the other variables. Younger students (less than 18 years old) are at higher risk for Compulsive Buying, while age has no effect on other behaviours.

As shown in Table 2, the scores of all scales are positively correlated, except for the Compulsive Buying Scale, which is negatively correlated to all the other scales; all of these correlations show a high statistical significance, with *P* values < 0.001.

Discussion

In line with previous studies, both in the U.S. and in Italy (Shaffer et al. 1999; Di Martino et al. 2006; Pallanti et al. 2006) our results indicate that behavioural addictions are quite common among adolescents.

The scores of all of the scales are positively correlated among each other, except CBS scores which show a negative correlation with the scores from all the other scales. By the

Table 2 Correlation analysis (Spearman’s correlation coefficient)

	SOGS-RA	CBS	IAT	WART	EAI
SOGS-RA	–	–0.297*	0.252*	0.215*	0.218*
CBS	–0.297*	–	–0.226*	–0.268*	–0.142*
IAT	0.252*	–0.226*	–	0.245*	0.208*
WART	0.215*	–0.268*	0.245*	–	0.255*
Ex Dep	0.218*	–0.142*	0.208*	0.255*	–

* *P* < 0.001

way, lower scores in the CBS indicate a more problematic buying behaviour, so the negative correlation between the scores of the scales reflects a positive correlation between compulsive buying and other behavioural addictions. These correlations suggest the presence of a common psychopathological dimension underlying different problematic addictive behaviours. This is in line with previous research from Black and Moyer (1998), Greenberg et al. (1999), Grant et al. (2005), and Di Nicola et al. (2010). As supposed for alcohol use (Brown et al. 2008), adolescent problem behaviour may both reflect an underlying disposition toward under controlled behaviour and alter the course of adolescent behaviour in a way that increases the likelihood of untoward outcomes. Behavioural dependences are correlated with social disability (Pallanti et al. 2006) and they may sometimes reflect, as for Internet Addiction, a difficulty in social interactions (Allison et al. 2006).

In previous studies Lejoyeux et al. (2008) found an association between compulsive buying and exercise dependence, while Lejoyeux et al. (2007) found no correlation between compulsive buying, mobile phone use and time spent on the internet. Both studies were conducted on adult population and involved smaller samples of subjects, so they may lack potency to discover a less apparent correlation.

Our study has some limitations as well: the tests used are screening instruments, as the SOGS-RA, which may overestimate the prevalence rates of Pathological Gambling (Ladouceur et al. 2000; Derevensky et al. 2003), but still it is the most commonly used in epidemiological research.

Furthermore, the SOGS-RA is the only scale among those we used to be specifically designed and validated to be administered to adolescents; the CBS has been used with college students (Roberts 1998), the EAI (Terry et al. 2004; Griffiths et al. 2005) and the IAT (Widyanto and McMurrin 2004) have been validated on University students, but the use of the WART may not be appropriate in adolescent populations. We could not assess the concurrent association with substance-related or other psychiatric disorder, nor we could use any personality assessments, for time limitation, and for privacy reasons as the questionnaires were delivered during school hours, in order to involve a majority of the students.

Further insight in the psychopathology of these conditions is needed in order to draw general implications for treatment; each case needs an accurate evaluation as behavioural addictions can be associated with other severe conditions (Petry et al. 2005; Black and Moyer 1998; Bamber et al. 2000).

At-risk behaviours as gambling, shopping, physical exercise, are often considered as a legitimate form of entertainment and tend to be socially approved or tolerated; but sometimes they can lead to behavioural addictions, which are often under-recognized, by both therapists and patients: Adolescents may be less likely to perceive a gambling problem, with an apparent discrepancy between self perception and objective reports of problem gambling behaviours (Cronce et al. 2007). In spite of this, behavioural addictions should become a main public health issue: The NESARC study found a high comorbidity between Pathological Gambling and substance use, mood, anxiety, and personality disorders, in the adult population of the United States (Petry et al. 2005).

Behavioural addictions can be very dangerous in adolescence, as they could lead to many negative outcomes in adulthood: Early adolescent onset gambling, for instance, compared to adult onset gambling, is associated with higher ASI gambling, psychiatric and medical scores (Burge et al. 2004) and with increased severity of psychiatric, family/social and substance abuse problems, with cognitive problems, suicidal ideation, a history of impatient psychiatric treatment, and less satisfaction with actual living situation (Burge et al. 2006).

Most of the data available focus only on Pathological Gambling, and come from retrospective studies; prospective studies should be designed in order to better evaluate the health and social consequences of behavioural addictions emerging in adolescence.

Little is known about the disruptive effects of other behavioural addictions, but some concerns can be raised: in the study by Koran et al. (2006), compulsive buyers had lower incomes than other respondents, and compulsive buying among college students is associated to irrational credit card use (Roberts 1998), and it can directly lead to financial problems and legal entanglements (Black 2007).

Some of these phenomena, as excessive internet use, have appeared only in the last years; these new media are becoming increasingly common in the Italian adolescent population (Istituto Nazionale di Statistica 2008), with 82% of Italian youth aged 14–17 using the internet. Long-term consequences of their excessive use could become a main social issue in the next decades: Hakala et al. (2006) demonstrated that excessive computer use is a risk factor for orthopaedic problems in adolescence, while Messerlian et al. (2004) has underlined the dangers deriving from the easy accessibility of on-line gambling websites for underage youth; our data indicating a common vulnerability for problematic internet use and gambling support their concerns. Exercise addiction can lead to inadequate patterns of physical activity, which can in turn cause musculoskeletal (Frisch et al. 2009) and cardiovascular (Delise et al. 2005) harms.

Accordingly, behavioural addictions must be viewed as a community/social issue, and research on their epidemiology and psychopathology is strongly needed, in order to develop effective preventive efforts, with an adolescent target, ranging from denormalization, to harm reduction strategies (Messerlian et al. 2005), remembering how, in accordance with Blaszczynski and Nower's hypothesis, a pathway could lead adolescents who experience gambling activities through classical and operant conditioning and habituation to the development of Pathological Gambling (Blaszczynski and Nower 2002).

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