Original article

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Internet use among Italian students: usefulness of Internet Addiction Test

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Summary

In the last years, scientific interest has grown towards new types of addiction, especially the Internet Addiction (IA). The IA is characterized by the continuous and compulsive use of the internet, causing significant consequences to everyday life. The IA is not included in the latest Diagnostic and Statistical Manual of Mental Disorders (DSM-5).

An excessive use of the internet can have major consequences: loss of sleep time, worse working or school outcomes, progressive detachment from real relationships, isolation, loss of interest and irritability. The most widely used instrument to assess IA is the Internet Addiction Test (IAT), introduced by Kimberly Young; however, different factor structures were reported for the instrument.

The aim of this study was to analyse the prevalence of IA among 200 Italian university students (F = 100, M = 100; aged 19-40) using the IAT. Our findings indicate that the 9% (18 subjects) has a moderate risk to develop the IA, but no subjects obtained a test score between 80 and 100. The correct use of internet is present in the 23% of the sample (46 subjects), whereas the 68% (136 subjects) spend great amounts of time online. The collected data were analysed using the Italian two-factor structure model, according to Servidio et al. Our results confirm higher levels of problematic internet use in male than in female subjects and among young compared to older people. According to our results, however, the youth age is stronger than male gender in determining the level of problematic internet use. In addition, higher rates of problematic Internet use are present in young girls compared to old girls, while in male subjects the problematic internet use is independent from youth age or adulthood. As far as we are aware no previous studies analysed the relationship between the IAT factors (interpersonal, emotional and obsessive conflict, online time management and compromised personal wellbeing), age and gender.

Key words
Internet Addiction • Internet Addiction Test • IA • IAT • Addiction

Introduction

In the last years, scientific interest has grown towards new types of addiction, especially the Internet Addiction (IA). Nowadays, the Internet use has grown globally and it is a founding element to carry out a huge number of activities: work, study, research, social, gaming etc. [1]. It is available in any time and in any place.

The IA is characterised by the continuous and compulsive use of the internet, causing significant consequences to everyday life [2]. The IA is not included in the latest Diagnostic and Statistical Manual of Mental Disorders (DSM-5) [3].

An excessive use of the internet can have major consequences: loss of sleep time, worse working or school outcomes, progressive detachment from real relationships privileging virtual ones, isolation, loss of interest, irritability, eating disorders and incorrect postures [4 5]. The IA is, also, associated with several psychiatric disorders such as substance use disorder, attention-deficit hyperactivity disorder, depression, hostility, and social anxiety disorder [6].

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Although the Internet use doesn't appear among the causes of the social retirement, it is present in most young people and it can be assumed that it contributes to favouring and maintaining this condition, suspending the perception of the time spent and ensuring a minimum but necessary relationship with the outside [7 8].
The IA prevalence is ranged between 0.3% and 38% [9]. Recent studies reported that 12.4% of adolescents use internet in an addictive way and other studies estimated that 3-13% of all the university students are internet abusers [10 11]. It seems that those most at risk for developing this addiction are people aged 15 to 40 with psychological or psychiatric problems [12 13].
A wide range of diagnostic tools have been developed and used in previous researches examining pathological Internet use; however, most of the questionnaires used to assess potentially problematic or addictive behaviours have been based on national surveys or ad hoc questionnaires that have not been previously validated. The most widely used and validated instrument is the one introduced by Kimberly Young (Internet Addiction Test, IAT).
The IAT was originally developed as a single-scale instrument, most studies, based on the IAT, used the total-scale score and its corresponding cut-offs. Some researches based on the IAT reported significant interfactor correlations, implying the possibility of a unidimensional scale that would justify the use of the total score to assess the Internet addiction [14 15]. Other studies, however, did not report such correlations [16].
The noticeable inconsistency of various studies related to the factor structure, in fact, is not always a result of the different scales used. Even in studies where the IAT was used, different factor structures were reported. The growing knowledge about the IA, it is leading to more complex and multidimensional conceptualizations [14].
The aim of the current study is to analyse the prevalence of IA among Italian university students using the IAT applying the Italian 2-factor structure model, according to Servidio et al. [17] and to analyse the relationship between the IAT factors (interpersonal, emotional and obsessive conflict, online time management and compromised personal wellbeing), age and gender.

Materials and methods

The research was conducted on a sample of 200 undergraduate and graduate students (F = 100, M = 100; aged 19-40) at the University of L'Aquila. Informed consent was obtained from each student. The confidentiality of all the information provided was guaranteed.
All subjects were invited to answer demographic questions and to take the IAT.
The IAT is the most common tool to assess mild, moderate, and severe levels of IA. It is formulated to assess the level of psychopathological risk associated with the internet use. The subject has to answer 20 multiple-choice questions giving a score on this scale: 1 = never; 2 = rarely; 3 = sometimes; 4 = often; 5 = always. Questions are aimed to identify those who make excessive internet use until they overlook the family, work, study, and social problems, insomnia, anxiety, psychomotor agitation, depression etc. Only item 6 (Q2 on IAT scale) – "How often do you neglect course- work/assignments to spend more time online?" was modified into "How often do you neglect your course/home work to spend more time online?". We used the Italian validated version of the IAT [18-22].
The presence of IA was evaluated using the method introduced by Fisoun et al. [23] according to which a total IAT score between 0 and 19 points is considered below the average, score between 20 and 49 points suggests an average use of the Internet, score between 50 and 79 points is above the average and indicates that the person already has several issues due to the Internet and should reflect on the impact these problems have on his life and at last, score between 80 and 100 suggests that the use of the Internet is intense and it is causing considerable problems.
All the statistical analyses were performed with IBM SPSS Statistics for Windows, Version 20.0. (IBM Corp, Armonk, NY, USA).
The sample was divided in subgroups, according to these variables: gender [Male/Female (M/F)], occupation [Non-Worker Students (NWS)/Worker Students (WS)] and age ranges (18-25 years/26-46 years).
Student's t-test was used to show possible differences in total IAT scores and factors mean values both in the total sample and in each group. Fisher's test or χ^2 test was used to show possible differences in the score of each item.
The sample was divided into subgroups, based on the level of Internet use. The χ^2 test was used to highlight possible differences in the distribution of gender, occupation and age ranges. The Mann-Whitney test was used for the variable age. Bivariate correlations were performed using Pearson or Spearman rho correlation coefficient to highlight the possible association between age, total IAT score and factors mean values both in the total sample and in each subgroup. The homogeneity of the two groups, relative to age, gender, occupation and age range, was verified through the Mann-Whitney test and the χ^2 test. The agreed statistical significance was $p \leq 0.05$.

Results

The distribution of each subgroup in the first three levels of the Internet use, according to Fisoun et al., is the following: in the age group 18-25 years 15 students (12.9%) total IAT score between 0-19 points, 88 (75.9%)

between 20-49 points and 13 (11.2%) between 50-79 points, while in the age group 26-46 years 31 students (36.9%) obtained total IAT score between 0-19 points, 48 (57.1%) between 20-49 points and 5 (6%) between 50-79 points. 23 male students (23%) scored between 0-19 points, 65 (65%) between 20-49 and 12 (12%) between 50-79 points, while 23 (23%) female students scored between 0-19 points, 71 (71%) between 20-49 and 6(6%) between 50-79 points.

No one obtained a test score between 80 and 100 points corresponding to "the use of the Internet is intense and is causing the person considerable problems".

No statistically significant difference was detected between women and men relative to these variables: age [F = 25.47 *vs* M = 25.38; U = 4.856, z = -0.352, p = 0.725], occupation [F (NWS = 64/WS = 36) *vs* M (NWS = 60/WS = 40); χ^2 = 0,340, p = 0.560] and age range [F (18-25 = 61/26-46 = 39) *vs* M (18-25 = 56/26-46 = 44); χ^2 = 0,515, p = 0.473].

A statistically significant difference was observed between NWS and WS relative to the age ($p < 0.001$) and age range ($p < 0.001$).

Male subjects obtained statistically higher scores than female in the total IAT scores [F = 36.36 *vs* M = 38.98; t = -2.027; p = 0.044; (sized effect = 0.287)]. Subjects in the age range of 18-25 obtained higher scores, compared to those aged 26-46 [18-25 = 38.97 *vs* 26-45 = 35.84; t = 2.390; p = 0.018; (sized effect = 0.34)].

Statistically significant differences were highlighted between M and F groups in the answers to the following items: Item 2 (do you neglect the household chores to stay connected more time?) [M (never = 22, rarely = 31, sometimes = 25, often = 22, always = 0)/F (never = 19, rarely = 26, sometimes = 43, often = 10, always = 2); p = 0.014]; Item 19 (do you choose to spend more time online rather than going out with others?) [M (never = 68, rarely = 25, sometimes = 6, often = 1, always = 0)/F (never = 84, rarely = 13, sometimes = 3, often = 0, always = 0); p = 0.038]; Item 20 (Do you feel depressed, irritable or nervous when you are not connected, while you are fine when you are back in front of the computer?) [M (never = 78, rarely = 18, sometimes = 3, often = 1, always = 0)/F (never = 92, rarely = 8, sometimes = 0, often = 0, always = 0); p = 0.011].

Moreover, our results highlighted statistically significant differences between subjects aged 18-25 compared to those aged 26-46 in the answers to the following items: Item 5 (does people around you complain about the amount of time to pass on line?) [18-25 (never = 37, rarely = 45, sometimes = 25, often = 10, always = 0)/26-46 (never = 25, rarely = 24, sometimes = 19, often = 2, always = 3); p = 0.039]; Item 6 (do your studies negatively affect the amount of time you spend online?) [18-25 (never = 34, rarely = 37, sometimes = 37, often = 9, always = 0)/26-46 (never = 33, rarely = 35, sometimes = 10, often = 5, always = 0); p = 0.010]; Item 7 (do you check your email before doing something else important?) [18-25 (never = 22, rarely = 16, sometimes = 42, often = 27, always = 10)/26-46 (never = 11, rarely = 18, sometimes = 18, often = 14, always = 22); p = 0.002]; Item 8 (are your job yield or your productivity negatively affected by the Internet?) [18-25 (never = 43, rarely = 42, sometimes = 25, often = 7, always = 0)/26-46 (never = 38, rarely = 36, sometimes = 7, often = 0, always = 2); p = 0.003]; Item 12 (do you fear that life without internet is boring, empty and without joyous? [18-25 (never = 62, rarely = 38, sometimes = 12, often = 5, always = 0)/ 26-46 (never = 61, rarely = 18, sometimes = 0, often = 3, always = 1); p = 0.001].

In the total sample, a statistically significant trend was highlighted in the correlation analysis between age and total IAT score (Spearman rho = -0.135; p = 0.056).

A negative correlation was highlighted, but only in F subjects, between the age and the total IAT score (Spearman's rho = -0.232; p = 0.020).

There is no statistically significant difference of this distribution between males and females (χ^2 = 2.265; p = 0.322), on the other hand the difference between < 25 and 26-40 age groups is statistically significant (χ^2 = 16.180; p = 0.000).

Numerous studies have dealt with the analysis of the IAT factor structure with very heterogeneous results.

These variations may be explained by differences in language versions (culture or translation), population studied (online sample or college students), and methods of factor extraction.

In the last years Italian studies have proposed some examples of 2-factors structure.

We used the factor structure model by Servidio et al. In this model, the finding of 2 factors is in line with common elements in the instruments measuring internet addiction: Factor 1 encompasses 11 items and indicates the subject's motivation for using internet in terms of "interpersonal, emotional and obsessive conflict as a result of internet use." Factor 2 involves 7 items about the role of "online time management and compromised personal wellbeing".

The mean values of the factor score in each different group of the sample are reported in Table I.

In Table II there are the differences between groups and the coefficients of correlation between the variables analyzed with their significance. (Tab. II)

Discussion

Our findings indicate that in our sample the 9% (18 subjects) has a moderate risk to develop the IA, but no subjects obtained a test score between 80 and 100. The correct use of the internet is present in the 23% of the

TABLE I. *Mean values with standard deviation of factor score in each different group and in total sample.*

Age groups	Factors	M	F	Total sample (M + F)
< 25 years	F1 – interpersonal, emotional and obsessive conflict F2 – online time management and compromised personal wellbeing	17.745 ± 5.545 17.309 ± 3.985	16.442 ± 4.353 16, 672 ± 4.628	17.060 ± 4.975 16.974 ± 4.328
25-40 years	F1 – interpersonal, emotional and obsessive conflict F2 – online time management and compromised personal wellbeing	16, 155 ± 5.838 15.977 ± 4.668	14.589 ± 3.431 14.153 ± 4.094	15.428 ± 4.907 15.131 ± 4.479
Total sample	F1 – interpersonal, emotional and obsessive conflict F2 – online time management and compromised personal wellbeing	17.030 ± 5.705 16.710 ± 4.335	15.720 ± 4.102 15.690 ± 4.576	16.375 ± 4.999 16.200 ± 4.475

TABLE II. *Differences between groups and coefficients of correlation between the variables with their significance.*

Variables	F1 interpersonal, emotional and obsessive conflict	F2 online time management and compromised personal wellbeing
Gender	t = 1.864 p = 0.064	t = 1.618 p = 0.107
Age	r = - 0.095 p = 0.182	r = - 0.164 p = 0.020
F1		r = 0.610 p = 0.000
Age groups	t = 2.302 p = 0.022	t = 2.929 p = 0.004
Age groups in male sample	t = 1.393 p = 0.167	t = 1.538 p = 0.127
Age groups in female sample	t = 2.248 p = 0.027	t = 2.849 p = 0.007

sample (46 subjects), whereas the 68% (136 subjects) spend great amounts of time online.

Our results are in line with the literature. Taranto et al. [24] found that the IA prevalence, among a sample of high school students, was 4.7%. In the study of Bianchini et al. [25] the 23% of the total sample showed an internet problematic usage and 8 subjects (the 0.7% of the total sample) were internet abusers. A previous study conducted among medical students of the Turkish University showed an IA prevalence of 9.1% [26].

According to our findings male subjects reach higher total IAT scores than the female subjects. The subgroup M obtained statistically higher scores than the subgroup F; in the subgroup of subjects aged 18-25 the differences are significant. Differences in the single items pointed out that the 43% of female subjects occasionally neglect housework to stay online, while the 22% of males do so often; when asked: "Do you choose to spend more time online instead of going out with others", the 84% of females and the 68% of males answered "never", while the 25% of males chose "rarely"; questioning about feeling irritable or depressed when offline, the 92% of females answered "never" and the 8% chose "rarely", while 78% of male subjects answered "never" and the 18% said "seldom".

No differences have been observed in the distribution of F and M students in the three levels of Internet problematic use, considering the factors mean values. Significant differences have been observed in all the variables analyzed between the subjects aged 18-25 and the subjects aged 26-40: younger subjects obtain higher total IAT scores. Some significant differences were found between the 18-25 subgroup and the 26-46 one for items 5, 6, 7, 8 and 12, highlighting the most problematic web use in the 18-25 age range.

There is significant difference in the distribution of students in the three levels of Internet problematic use: factors mean values are higher in subjects aged 18-25, but only in total sample and among females. The last result is confirmed by the presence of significant negative correlation between age and total IAT score, only in the total sample and in the females' sample. Factor 2 mean values correlates negatively with age, on the other hand Factor 1 values do not.

The current study deals with higher levels of problematic use of the web in male subjects than in female, in line with most of the studies conducted in the field of pathologies related to the excessive use of the Internet [27]. Our findings confirm previous studies, which report the impact of the age variable on the results and the higher prevalence of IA in young people. According to our results, however, the youth age is stronger than male gender in determining the level of problematic internet use. Yen et al. found that old boys had the highest rate of Internet addiction among four subgroups of the sample (young boys, old boys, young girls and old girls),

followed by young boys. Instead, no difference in the rate of Internet addiction was found between old and young girls.

Our findings indicate that higher rates of problematic internet use are present in young girls compared to old girls, while in male subjects the problematic internet use is independent from youth age or adulthood.

As far as we are aware no previous studies analysed the relationship between the IAT factors (interpersonal, emotional and obsessive conflict, online time management and compromised personal wellbeing), age and gender.

We found that the IAT is a valid instrument for assessing the risk of Internet addiction among the Italian sample of university students, as previously reported in other Italian studies.

We recommend, as in the 2-factor structure model by Servidio et al. [17], that "email" in item 7 should be reworded as "the internet" and that item 4 should be deleted or altered to reflect recent changes in the significance of social networks in the medium of the internet; considering also a theoretical explanation based in other studies (today we can see the email in our smartphones many times a day and this behaviour can be considered normal).

There are some limitations to this study; we did not collect other factors associated with Internet as the main location of internet use, sleep disorders, and others; participants in this study were students from a single university who volunteered through school advertisements. Moreover, students who reported an internet problematic use have not been subjected to a diagnostic evaluation of IA [28].

In conclusion, our study confirm that a problematic use of the internet is a common problem also among young Italian students and suggest the need for future studies conducted to determinate clinical and social factors related to IA: this analysis could be useful to an early identification of individuals at risk for the development of IA and to promote structured interventions according to current knowledge in addictive behaviours [29].

Moreover, if IA is a multidimensional construct, in that each individual dimension offers incremental utility in understanding and treating this problematic behaviour, then tools used to assess IA should measure and reproduce reliably this dimensionality [30].

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Conflict of interest

None.

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