Personality profiles and problematic Internet use: a study with a sample of Italian adolescents

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PERSONALITY PROFILES AND PROBLEMATIC INTERNET USE IN A SAMPLE OF ITALIAN ADOLESCENTS

Fanny Guglielmucci, Marta Saroldi, Giuseppina Zullo, Donato Munno, Antonella Granieri

Abstract

Objective: The aim of the present study was to investigate the relationship between specific personality profiles and Internet use in a sample of Italian adolescents.

Method: Four hundred thirty-two adolescents (58.3% males) with an average age of 14.41 years (*SD*=.95) were enrolled in the study. Participants were administered the Internet Addiction Test (IAT) and the Minnesota Multiphasic Inventory – Adolescent Form (MMPI-A). A two-step cluster analysis was relied according to IAT items' scores.

Results: Participants were grouped into three clusters labeled "Regulated Internet users" (n=180), "Involved with Internet activities" (n=105), and "At risk for problematic Internet use" (n=147). Consistently, the group at-risk for problematic Internet use showed higher IAT score and MMPI-A scores than the other groups, while no differences emerged between the group of regulated Internet users and the group of those involved with Internet activities. For the group at risk for problematic Internet use, the MMPI-A Clinical Scales on Paranoia (Pa) and Schizophrenia (Sc) showed the highest elevation, indicating a MMPI-A codetype 6-8/8-6 which describes adolescents with ego immaturity, dysregulated affects and behaviors, and reduced reality testing.

Conclusions: Adolescents at risk for developing a dysfunctional use of the Internet may have little insight, bizarre beliefs, grandiose thought, and a persecutory view of the external world that may limit their capacity to counteract feelings of hopelessness and anguish. They could perceive the Internet as safe environment where it is possible to express such dysregulated feelings and behaviors, and to cope with emotional distress.

Keywords: problematic Internet use, personality, MMPI-A, adolescence, Internet addiction

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Introduction

In recent years the Internet has gained an increasingly important place in our society and its use has enlarged significantly. According to the World Health Organization the popularity of online activities and the implications of an excessive use of the Internet is a growing concern for public health (WHO 2014). Similarly, the same concern has reached also the scientific community, which has stressed the importance to investigate the negative impact of an excessive use of the Internet on psychological health (Ho et al. 2014, Kuss et al. 2014, Kuss and Lopez-Fernandez 2016), without overpathologizing everyday online behaviors (Billieux et al. 2015a, Griffiths et al. 2016).

A large amount of studies has underlined the importance of both normal and pathological personality dimensions in understanding the onset of a problematic involvement in online activities. During adolescence, the excessive use of the Internet has been found strongly associated with high levels of neuroticism (Dong et al. 2012, Kuss et al. 2014, Tsai et al. 2009, Wu et al. 2015) and psychoticism (Adalier and Balkan 2012; Dong et al. 2011, 2012; Kuss et al. 2014), revealing

on one hand anxieties, sensitivity to threat and a poor response to stressors, on the other hand impulsivity and sensation seeking traits among adolescents who are excessively involved with the Internet. Moreover, adolescents and late adolescents with dysfunctional and dysregulated Internet use seem to be characterized by low conscientiousness (Kuss et al. 2013, 2014; van der Aa et al. 2009), low resourcefulness (Kuss et al. 2014), high emotion instability and social introversion (Kuss et al. 2013, 2014; van der Aa et al. 2009; Xiuqin et al. 2010). In this context, Munno et al. (2015) have suggested that a problematic involvement in online activities is associated with emotion instability, impulsivity and aggressiveness which facilitate the expression of dysregulated, unintegrated, and even violent reaction to stressful situations.

It has been advanced the hypothesis that the excessive involvement in virtual environments might constitute a "compensatory strategy" (Kardefelt-Winther 2014) or a "dissociative strategy" (Schimmenti and Caretti 2010) to cope with stressful events and negative feelings. Following this conceptual model, an excessive use of the Internet among adolescents could be considered as a dysfunctional coping strategy

which is secondary to other psychological problems (e.g., depression, personality disorders, difficulties with processing traumatic experiences) and which may underpin an emotional vulnerability and a reduced ability in regulating disturbing affects, rather than an addictive behavior (Gentile et al. 2011, Billieux et al. 2015b, Burnay et al. 2015, Tang et al. 2014).

Notably, recent findings have also stressed the relationship between an excessive use of the Internet and narcissistic and alexithymic traits. Research has shown that narcissistic traits (both vulnerable and grandiose subtypes) are consistently associated with a problematic use of the Internet (Wu et al. 2016), especially of social networks (Ahn et al. 2015, Andreassen et al. 2016, Casale et al. 2016), laying emphasis on the idea that online environments allow adolescents to feel safer and to engage in relationships besides social and emotional difficulties. Similarly, alexithymia has been associated with a problematic use of the Internet (Dalbudak et al. 2013, Kandri et al. 2014, Scimeca et al. 2014, Schimmenti et al. 2015). For example, Schimmenti et al. (2015) have found in a sample of 358 high school students that alexithymic traits moderate the relationship between traumatic experiences and Internet addiction symptoms, increasing the impact of traumatic life events on the severity of symptoms. These data are in line with the dysfunctional coping strategy hypothesis, suggesting that in presence of certain conditions of psychological difficulties the Internet could become a psychic retreat and a source of self-medication (Schimmenti and Caretti 2010). Thus, it is possible that adolescents characterized by a vulnerable personality may feel that the emotional conflicts and relational problems can be resolved by escaping in virtual worlds, rather than by facing them in real life (Castiglione 2008).

Present study

Starcevic and Billieux (*this issue*) have emphasized the existence of important differences between various addictive online activities. In line with previous research, we hypothesize that specific behaviors (e.g., sexual activities, gambling, playing video games) are rooted in different personality profiles which may represent important risk factors for developing a dysregulated use of the Internet during adolescence.

Surprisingly, to the best of our knowledge no studies have explored the relationships between Internet addiction symptoms and personality profiles, as investigated by the Minnesota Multiphasic Personality Inventory measures (i.e. MMPI-2; MMPI-2-RF; MMPI-A; MMPI-A-RF), which have a relevant clinical history and are among the most used measures for assessing personality. Thus, the aim of the present study was to investigate the relationship between Internet use and personality profiles (assessed by the Minnesota Multiphasic Personality Inventory – Adolescent Form) in adolescence, in order to identify specific groups of Internet users who could be at greater risk for developing a problematic use of the Internet.

We hypothesized that different groups of Internet users (e.g., pathological *versus* not pathological) would prefer different types of online activities (Starcevic and Billieux, *this issue*). Moreover, in line with the compensatory hypothesis of problematic Internet use (Kardefelt-Winther 2014, Schimmenti and Caretti 2010), we speculated that different levels of involvement with the Internet among adolescents (e.g., normal use *versus* excessive use) would be related with specific personality profiles (e.g., neurotic *versus* psychotic profiles) and with specific online activities (e.g., online games, social network, cybersex).

Table1. *Socio-demographic characteristic of the full sample and differentiated by gender*

	Full sample (*N*=432)			Males (*N*=252)		Females (*N*=180)		Statistics	*p*
	M	*SD*	*Range*	*M*	*SD*	*M*	*SD*		
Age	14.41	.95	13–16	14.47	.99	14.37	.91	$t_{(430)}$=.611	.542
Time spent online (min/day)	113.43	80.49	10–480	116.69	62.72	111.13	91.23	$t_{(430)}$=.432	.666
	n	*%*		*n*	*%*	*n*	*%*	Statistics	*p*
Family Status								$\chi^2_{(3)}$=7.208	.161
Married	357	82.6		195	77.4	144	80.0		
Divorced	51	11.8		39	15.5	31	17.2		
Widowed	3	.7		0	0	2	1.1		
Live-in partner	21	4.9		18	7.1	3	1.7		
School performance impairment	186	43.1		99	39.3	87	48.3	$\chi^1_{(1)}$=1.764	.346
Preferred online activity								$\chi^2_{(4)}$=12.710	.038
Studying	185	42.8		97	38.5	85	47.2		
Gaming (i.e. video games, MUDs, MMORPGs)	111	25.7		87	34.5	24	13.3		
Internet activity (i.e. dowload, browsing, mail)	43	10.0		23	9.1	20	11.1		
Relational activity (i.e. chatting, blog, social network)	90	20.8		42	16.7	51	28.3		
Sexual activity (e.g., watching porn)	3	0.7		3	1.2	0	0		

Materials and method

Participants

Participants were recruited in Turin (Italy) through the Local School Office (Ufficio Scolastico Regionale Piemonte – Ambito territoriale Torino). In order to obtain a representative sample, we randomly selected 10 public high schools. After ethical clearance by the University Institutional Review Board for psychological research, we contacted the head teachers of these schools in Turin and described to them the procedures and aims of our study. The Teachers' Council of 7 schools approved the research. Participants were recruited by randomly selecting three classes (9th, 10th, 11th grade in Italy) from each school. Out of 506 students eligible for the study, 74 students (14.62% of the initial sample) were excluded: 14 (18.92%) because of an invalid personality profile; 28 (37.84%) because they did not entirely and correctly complete the measures used in the present study, 5 (6.76%) because they were aged above 18 years, and 27 (36.48%) because they did not accept to participate and/or parents did not sign written informed consent.

The final sample was composed by 432 high school students (252 males, 58.3%; 180 females, 41.7%), ranging in age from 14 to 18 years old (*M*=14.41 *SD*=.95). **Table 1** shows the socio-demographic characteristics of the sample.

As **table 1** illustrates, no gender differences in relation to age, time spent on the Internet, or familial status were found. Both female and male students referred to studying as their favorite online activity. Males used the Internet for online videogames and role-playing games more frequently than females, while among female students there was a higher prevalence of online relational activities (i.e., chats and social networks).

Measures

Internet Addiction Test (IAT, Young 1998)

The IAT is a 20-item self-report measure that assesses symptoms linked to problematic Internet usage (e.g. compensatory usage of the Internet, compromised control, lack of control, excitatory usage) and negative consequences of its overuse (compromised social and individual quality of life, compromised scholarly/academic/working careers). The IAT has demonstrated good psychometric proprieties, such as a high internal consistency, concurrent validity and test-retest reliability (Kuss et al. 2014, Widyanto and McMurran 2004), and it is currently the most frequently used measure in Internet-related disorders (Kuss et al. 2014). It includes questions such as "How often do you find that you stay online longer than you intended?", "How often do you fear that life without the Internet would be boring, empty, and joyless?", or "How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?". It has been used in several researches, strongly contributing to our contemporary understanding of Internet pathological use and Internet-related symptoms. Moreover, it has been translated into several languages, including Italian. The Italian translation of the IAT has shown good reliability and convergent validity (Cantelmi et al. 2000, Ferraro et al. 2007, Milani et al. 2009). However, factor analyses on the Italian translation of the IAT showed inconsistent results, revealing different factor structures across samples, including 6 (Ferraro et al. 2007), 2, and 1

factor solutions (Faraci et al. 2013). Also, different cut-off scores for problematic Internet use were used in Italian studies, depending on the sample characteristics and on the strategies for empirical derivations of cut-off scores in different age samples (e.g., Cantelmi et al. 2000, Milani et al. 2009, Schimmenti et al. 2014). The Cronbach's alpha reliability coefficient of the IAT in the present study was 0.88.

Minnesota Multiphasic Inventory – Adolescent (MMPI-A, Butcher et al. 1992)

The MMPI-A is a 478 true/false items self-report measure of personality and emotional problems in adolescents ranging from 14 to 18 years. It is composed by the following scales: 6 Validity Scales, 10 Clinical Scales, 15 Content Scales, and 6 Supplement Scales. As with the adult version (e.g. Minnesota Multiphasic Personality Inventory – 2 – MMPI-2), raw scores are converted to uniform T percentile-comparable scores for interpretation through use of convenient profile forms (Butcher et al. 1992, Tellegen 1988, Tellegen and Ben-Porath 1992). It includes items as "I'm afraid to go home," "Others do not really love me," and "I feel uneasy outdoors." The MMPI-A has demonstrated high internal consistency, good discriminant and concurrent validity (Archer 2005, Lanyon 1995, Merrell 2008), Clinical Scales α coefficients ranging from .43 (Clinical Scale 5) to .88 (Clinical Scale 8) for normative boys and .40 (Clinical Scale 5) to .89 (Clinical Scale 8) for normative girls (Butcher et al. 1992), and they have been shown to have a high long-term stability (Stein et al. 1998). It has been largely used both in clinical, forensic, and research practice, and it has been translated into many different languages, including Italian. The Italian adaptation of the MMPI-A has adequate psychometric properties, comparable to those of the original version (Sirigatti 2000, Sirigatti and Pancheri 2001). Following prior research with the MMPI measures (Bonierbale et al. 2016, Brand and Chasson 2015), in this study we used only the Clinical Scales and the three main Validity Scales (L, F, K) to explore personality profiles among adolescent Internet users. Acronyms, descriptions and α values of these scales are presented in **table 2**. In the present study, interpretation of personality profiles is performed by evaluating Clinical Scales above the clinical cut-off (T-scores≥ 65) (Butcher et al. 1992), and results of elevated Clinical Scales are deepened by Harris-Lingoes (1955) subscales, which provide useful indications for a more accurate interpretation by identifying areas of greatest concern (Archer 1987, 2005). Moreover, within an interpretative framework, MMPI-A profiles are classified as a 2-point codetype, based on the two Clinical Scales that show the greatest degree of clinical-range elevation (Archer 2005). In this study, Cronbach's alpha of the MMPI-A was .81.

Statistical analysis

Descriptive statistics were computed for all the variables investigated in this study. Pearson's *r* correlations between MMPI-A scores and IAT scores were examined to investigate the relationships between MMPI-A personality scales and the use of the Internet in our sample. Because of the inconsistency concerning the factor structure and the different cut-off scores of the Italian translation of the IAT, and in line with the aims of the study, we relied on a two-step cluster analysis to classify participants into different groups, according to their scores on individual IAT items. This procedure has been usefully applied in validation studies, for both

Table 2. *Acronyms, descriptions and α values of the validity and clinical scales of the MMPI-A*

	n item	Description	α
Validity Scales - Validity indicators			
L (Lie)	14	Naïve attempts to put themselves in an overly favorable light	.88
K (Defensiveness)	30	Defensive attitude toward the test	.81
F (Infrequency)	66	Simulation of pathology, great maladjustment	.78
Clinical Scales – Clinical conditions			
Hs (Hypochondriasis)	32	Concern for one's physical health, emotional complaints connected with physical symptoms	.83
D (Depression)	57	Global dissatisfaction with one's life, feelings of discouragement, apathy, despair, low morale	.85
Hy (Hysteria)	60	Somatic issues and problem refusal, need for acceptance and social approval	.83
Pd (Psychopathic Deviation)	49	Behavior issues and problems with authority, lack of control and impulsivity, social alienation, aggressiveness	.83
Mf (Masculinity–Femininity)	44	Interests and preferences stereotypically connected to the opposite gender	.56
Pa (Paranoia)	40	Ideas of reference (even persecutory ideations), suspiciousness, persecutory delusions, rigidity, moralistic attitude	.86
Pt (Psychasthenia)	48	Sadness, lack of concentration, obsessiveness, anxiety, sense of inferiority	.83
Sc (Schizophrenia)	77	Bizarre thoughts, social and emotional alienation, impulse dyscontrol, abnormal perceptions	.88
Ma (Hypomania)	46	Grandiosity, nervousness, flight of ideas, egocentricity, high morale, mental and behavioral hyperactivity	.84
Si (Social Introversion)	62	Social withdrawn, avoidance, shyness, embarrassment	.82

selecting the optimal number of clusters with respect to data, and for assessing differences in adolescent and adult samples (Schimmenti 2016a, 2016b). In fact, this data-driven classification of participants use a pre-clustering method and then a hierarchical aggregative procedure to allow researchers selecting the number of homogeneous clusters that fit the data best. In this study, a log-likelihood distance measure with Schwarz Bayesian Information Criterion (BIC) was used to select the number of clusters. Finally, a one-way analysis of variance (ANOVA) with Sheffé's post-hoc tests (significance level at $p <. 01$) was performed to explore the different personality profiles emerging in the identified clusters. The statistical analyses were carried out using the Statistical Package for the Social Sciences software (SPSS; Chicago, IL, U.S), version 20.0 for Windows (Microsoft Corporation).

Results

Descriptive statistics concerning the IAT and MMPI-A measures are reported in **table 3**, for the full sample and differentiated by gender. Males and females did not show significant differences in IAT total score or in MMPI-A Clinical Scales.

The associations between IAT and MMPI-A were explored using Pearson's *r* correlations. The results of correlational analyses are presented in **table 4**.

In order to identify subgroups of Internet users and explore their personality profiles, participants' scores on individual IAT items were entered into a two-step cluster analysis. The cluster analysis generated three clusters with the average silhouette measure of cohesion and separation being 0.74, which indicates a good fit to the data. The first cluster was the largest group identified by cluster analysis (*n*=180, 41.7%). Participants in this cluster had a mean IAT score of 40.27 (*SD*=10.70), and a mean time of 116.44 minutes a day spent online (*SD*=62.80). It was equally composed with respect to gender (50% females), and prevalent online activities were studying (46.7%) and gaming (30.0%). We called this cluster "Involved with Internet activities". The second group (*n*=105, 24.3%) was labeled "Regulated Internet users". The average IAT score was 33.94 (*SD*=9.10), and the average time spent online was 87.96 minutes a day (*SD*=52.09). It was mainly composed by males (*n*=96, 65.3%) who reported to use the Internet mainly for studying (85.3%). Finally, the last group (*n*=147, 34.0%) showed the highest levels of Internet use, with an IAT mean score of 55.88 (*SD*=15.07), above the traditional cut-off of 50 used in several previous studies (e.g. Billieux et al. 2015b, Ni et al. 2009, Milani et al. 2009, Schimmenti at al. 2012, Wang et al. 2011). Thus, this group was named "At risk for problematic Internet use". There was a higher prevalence of males in this group (62.9%). The favorite online activity in this group was gaming (45.7%) and the mean time spent online was 184 minutes a day (*SD*=40.78).

The between-group differences in MMPI-A Clinical Scale scores were examined through analysis of variance (ANOVA) with Sheffé's post hoc test, which revealed significantly different personality profiles in the identified clusters (see **table 5**; see also **figure 1** for a summary).

More specifically, while no significant differences were found between groups with respect to gender or age, significant differences were found between the two clusters composed by non-problematic Internet users

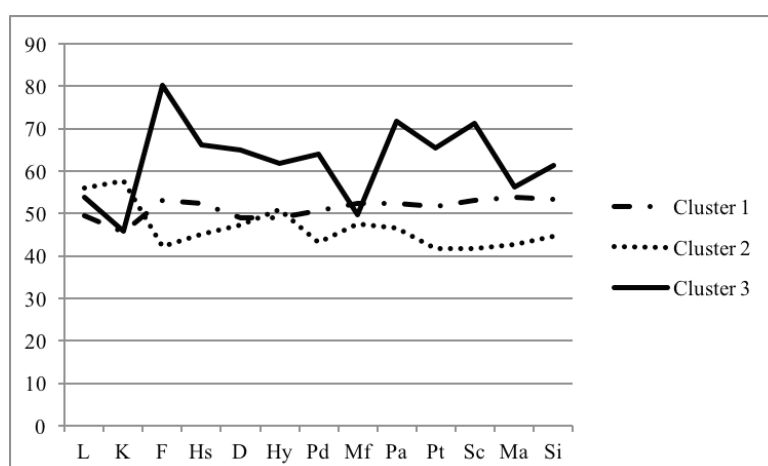**Table 3.** *Descriptive statistics and gender differences*

	Full sample (*N*=432)			Males (*N*=252)		Females (*N*=180)		$t_{(430)}$	*p*
	M	*SD*	*Range*	*M*	*SD*	*M*	*SD*		
IAT	39.48	12.24	19–88	41.20	10.54	38.25	13.25	1.431	.140
L	52.77	11.26	30–84	53.65	11.81	51.53	10.43	1.115	.257
K	49.79	10.44	30–76	49.28	10.92	50.50	9.77	− .687	.485
F	56.06	17.63	36–92	56.00	19.59	56.17	14.64	− .056	.956
Hs	53.25	13.21	30–113	53.68	13.39	52.65	13.06	.459	.645
D	52.24	11.55	30–93	52.09	12.21	52.45	10.66	− .181	.853
Hy	52.81	11.99	31–105	52.45	11.43	53.32	12.82	− .425	.677
Pd	51.39	11.42	30–95	50.34	11.42	52.85	11.34	−1.301	.195
Mf	50.13	9.40	30–79	49.01	8.18	51.70	10.75	−1.703	.091
Pa	55.08	12.94	31–91	54.50	13.59	55.88	12.05	− .631	.521
Pt	51.65	10.79	30–101	51.31	11.64	52.13	9.55	− .450	.642
Sc	53.76	13.10	30–107	53.89	14.47	53.57	11.00	.147	.883
Ma	50.65	10.19	30–78	50.83	9.77	50.40	10.83	.251	.806
Si	52.30	9.99	32–80	51.44	10.89	53.50	8.50	−1.222	.205

Table 4. *Pearson's r correlations between Internet addiction test and MMPI-A scales*

	L	K	F	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
IAT	−.20*	−.23***	.38****	.36****	.25***	.38****	.20*	.41****	.51****	.47****	.33****	.39****
L	-	.50****	.01	.09	.21**	−.18*	−.05	−.01	−.19*	−.13	−.12	−.06
K		-	−.21*	−.10	.25***	−.24***	−.03	−.24***	−.54****	−.45****	−.39****	−.40****
F			-	.52****	.41**	.67****	.16*	.76****	.73****	.87****	.49****	.52****
D				-	.56****	.63****	.03	.60****	.64****	.61****	.05	.60****
Hy					-	.51****	−.017	.48****	.34****	.40****	.03	.22***
Pd						-	.06	.68****	.68****	.73****	.44****	.42****
Mf							-	.10	.11	.14	.07	.15
Pa								-	.73****	.80****	.48****	.50****
Pt									-	.88****	.51****	.71****
Sc										-	.55****	.64****
Ma											-	.17*
Si												-

Note. *p < .05; **p < .01; ***p <.005; ****p<.0001

Figure 1. *MMPI-A scores across different typologies of adolescent Internet users*

Note. Cluster 1 = Involved with Internet activities; Cluster 2 = Regulated Internet users; Cluster 3 = At risk for problematic Internet use; L = Lie; K = Defensiveness; F = Infrequency; Hs = Hypochondriasis; D = Depression; Hy = Hysteria; Pd = Psychopathic Deviation; Mf = Masculinity–Femininity; Ps = Paranoia; Pt = Psychasthenia; Sc = Schizophrenia; Ma = Hypomania; Si = Social Introversion

Table 5. *Difference between groups of adolescent Internet users*

Varia-bles	Cluster 1 Involved with Internet activities (*n*=180)		Cluster 2 Regulated Internet users (*n*=105)		Cluster 3 At risk for problematic Internet use (*n*=147)		*F*	*p*
	Range	*M (SD)*	*Range*	*M (SD)*	*Range*	*M (SD)*		
Age	13-16	14.55 (1.05)	14-16	14.51 (0.82)	14-17	14.03 (0.89)	3.841	.240
Time	49-395	116.44 (62.80)	10-360	87.96 (52.09)	30-480	184.96 40.78)	5.324	.006 c>a>b
IAT	23-75	40.27 (10.70)	19-74	33.94 (9.10)	32-88	55.88 (15.07)	11.376	<.00001 c>a,b
L	34-70	49.48 (9.01)	30-74	56.10 (12.61)	34-79	53.74 (11.51)	5.104	.057
F	39-73	53.20 (9.34)	36-62	42.31 (5.36)	52-92	80.26 (15.01)	150.402	<.00001 c>a,b
K	31-67	45.63 (8.57)	42-76	57.71 (8.09)	30-72	45.83 (10.06)	30.107	<.0001 c>a,b
Hs	38-75	52.35 (8.45)	30-64	45.16 (6.99)	44-103	66.11 (16.61)	40.030	<.0001 c>a,b
D	30-66	48.93 (7.33)	35-64	47.22 (6.15)	43-93	64.94 (13.89)	46.016	<.0001 c>a,b
Hy	31-73	49.10 (9.11)	40-70	50.88 (7.73)	40-95	61.89 (16.19)	16.449	<.0001 c>a,b
Pd	40-71	50.75 (7.80)	30-56	43.22 (5.58)	43-95	63.91 (11.86)	62.749	<.0001 c>a,b
Mf	32-78	52.40 (9.44)	30-75	47.59 (9.15)	30-71	49.80 (8.97)	3.692	.270
Pa	37-75	52.40 (8.18)	31-66	46.51 (7.28)	56-101	71.66 (10.60)	93.330	<.00001 c>a,b
Pt	43-64	51.62 (4.52)	30-51	41.86 (4.83)	50-91	65.43 (9.38)	150.476	<.00001 c>a,b
Sc	44-67	53.22 (5.25)	30-49	41.84 (4.23)	54-107	71.37 (11.14)	187.628	<.00001 c>a,b
Ma	38-73	53.77 (9.45)	30-59	42.80 (6.96)	44-78	56.31 (8.64)	32.920	<.00001 c>a,b
Si	37-76	53.25 (7.73)	32-66	44.63 (7.54)	43-80	61.40 (8.01)	48.742	<.00001 c>a,b

Note. a = Cluster 1 "Involved with Internet activities"; b = Cluster 2 "Regulated Internet users"; c = Cluster 3 "At risk for problematic Internet use". Scheffé's post-hoc test (*p* = .01)

("Involved with Internet activities" and "Regulated Internet users") and the cluster comprising adolescents "At risk for problematic Internet use" for what concerns their Internet addiction scores and MMPI-A clinical profiles. In fact, the latter cluster was characterized by significantly higher scores on IAT and higher elevations in F, Hs, D, Hy, Pd, Pa, Pt and Sc (**Table 5**). In this cluster, the two main elevated scores in MMPI-A Clinical Scales were Pa (scale 6) and Sc (scale 8), suggesting that the best fit codetype was 6-8/8-6. Exploring the Harris-Lingoes subscales of these scales we found a significant elevation of Pa1 – Persecutory (M=68.89, *SD*=8.49), Sc2 – Emotional Alienation (M=66.39, *SD*=10.75), and Sc6 – Bizarre Sensory Experiences (M=65.10, *SD*=11.58).

Discussion

The aim of the present study was to investigate the relationships between Internet addiction symptoms and personality profiles in a sample of Italian adolescents. Internet addiction scores in this sample were similar to those reported in previous research among Italian adolescents (Schimmenti et al. 2014, Schimmenti et al. 2015, Scimeca et al. 2014). Counter-intuitively with respect to the literature, no gender differences were found in IAT scores and time spent online (Durkee et al. 2012, Ha and Hwang 2014, Heo et al. 2014, Kormas et al. 2011, Li and Kirkup 2007), suggesting that the past discrepancy between males and females in Internet use seems to be less substantial today. Nowadays the Internet has become an everyday tool for all people, which offers the possibility of engaging in relational activities, fulfilling a wide range of needs and probably shaping our contemporary identity (Wong et al. 2015, Lemma 2015). As recently quoted by Kuss, Griffiths and Binder (2013), in fact, today the use of the Internet is deeply embedded in the identity construction and

"young students may be hampered in the process of forming an individual identity and establishing real, meaningful and intimate relationship outside the arena of the virtual worlds" (Kuss et al. 2013, p. 961).

In our sample, males and females stated their preferred online activity was studying. This finding could underline a certain social desirability bias linked to the sample constitution (i.e., students) and the place in which the assessment procedure was performed (i.e., in school). Apart from studying, males and females seemed to use the Internet in different ways: male students were more involved in video games, while females preferred to use the Internet as a *medium* to engage in relationships through the use of chats, blogs and social networks such as Facebook, Instagram, and Twitter. These data stress the importance to investigate specific Internet-related activities and the purpose behind them, and suggest considering Internet addiction as a spectrum disorder rather than a unique phenomenon (Widyanto and Griffiths 2006, Starcevic and Billieux *this issue*).

In the current study, three different clusters of Internet users emerged from data analysis. Two clusters (cluster 1 and 2) comprised non-problematic Internet users, while the other cluster (cluster 3) included adolescents who reported higher IAT scores and could be considered at-risk for developing a problematic Internet use. The first two clusters represented the largest amount of the sample (66%). People in these clusters not differ in personality profiles or preferred online activity, though the first group was characterized by a larger amount of time spent online. Although the first two groups did not differ in Internet addiction severity, adolescents in cluster 1 spent significantly more time on the Internet and obtained more elevated scores on the IAT, suggesting that time could be a possible risk factor for incurring in addictive online behaviors (González and Orgaz 2014, Pawlikowski et

al. 2012).This interpretation is consistent with results emerging from cluster 3, composed by adolescents who were considered at risk for developing a dysfunctional use of the Internet and who showed the greater amount of time spent online.

In contrast with adolescents with non-problematic Internet use (cluster 1 and 2), those considered at risk (cluster 3) were characterized by the propensity to use online video games, confirming that online gaming is among the most potentially seducing and addictive Internet activities (Cantelmi and Talli 2009, Griffiths and Pontes 2014, Kuss 2013, Kuss et al. 2013, Laconi et al. 2015, Ng and Wiemer-Hastings 2005). Moreover, these adolescents reported personality characteristics which were dissimilar from those of the adolescents grouped in the other two clusters, and which describes conditions of ego immaturity, reduced reality testing, and a severe difficulty to regulate negative affects and to plan actions. The codetype 6-8/8-6 suggests that the adolescents in this group also had bizarre behaviors, little insight and grandiose thoughts (Archer 2005). This codetype, as well as elevations of Pa1 and Sc6, have been related to traits of psychoticism (Archer 2005, Archer et al. 1994, Archer and Krishnamurthy 2002), which suggests that adolescents at risk to seek retreat in virtual worlds are characterized by such traits. Similar results have been found in previous studies which have identified psychoticism as a possible risk factor for developing a problematic use of the Internet (Adalier and Balkan 2012, Dong et al. 2012, Ge et al. 2014, Kuss et al. 2014, Yao et al. 2014, Xiuqin et al. 2010). A possible explanation could be rooted in the quality of feelings and mental states that the adolescent could experience in the online world, compared to daily life, when traits of psychoticism are predominant. For adolescents with these traits, the Internet could even lose its function of providing possibility for the exploration of identity and mental states (Schimmenti and Caretti 2010). It becomes instead a place where to project unintegrated feelings, odd thoughts, and unrecognized desires, and where to retreat from disappointment, frustration, anxieties and depression experienced in the real word.

Usually, subjects with codetype 6-8/8-6 during their childhood have been exposed to physical punishment as a primary form of discipline for their misconduct or disobedience, and they are characterized by intense feelings of guilt and shame (Archer 2005). This is consistent with previous researches which have shown that child maltreatment and early trauma are linked with Internet addiction symptoms (Dalbudak at al. 2014, Hsieh et al. 2016, Schimmenti et al. 2015, Yates et al. 2012). The elevations of Harris-Lingoes subscales strengthen this view, suggesting that these adolescents may experience intense feelings of hopelessness, anguish and despair, together with the perception of being exposed to unfairness and injustice. It is possible that some adolescents in the third cluster perceived to be mistreated by their parents or were exposed to relationally traumatic experiences during their childhood. This might have lead these students to feel unprepared and intolerant to the emotional impact of the external world, producing consequential difficulties in regulating the aggressive and destructive impulses (Fonagy et al. 2002). Moreover, the high scores on Pa1 and Sc2 subscales, associated with increased F elevation, may suggest a certain immaturity, along with limited self-awareness and little psychological insight, egocentricity, difficulty regulating impulses and evaluating the consequences of aggressive behaviors (Archer 2005). Therefore, some adolescents at risk

for problematic Internet use may perceive the world as a hostile and persecutory place, and because of a certain lack in the capability to regulate their emotions and actions, they could externalize self-blame and aggressive behaviors in the Internet, which is consistent with an impulsive use of the online services (Billieux et al. 2015b).

Our results are similar to those of previous studies which have underlined that a personality characterized by low emotional stability, a dispositional hostility and aggressiveness, and impulsivity traits could lead to a dysfunctional use of online activities (Billieux et al. 2011, 2015b; Cole and Hooley 2013; Ko et al. 2009, 2012; Munno et al. 2015, Peters and Malesky 2008, Przybylski et al. 2012, Schimmenti et al. 2015). The possibility to play with "reality" (Fonagy and Target 2007) in virtual spaces may offer to these adolescents the chance to translate their vehement feelings and reactions to pre-existing stressful conditions in the game (Griffiths 2005, Munno et al. 2015, Snodgrass et al. 2014). As a result, it is possible that online games act for these subjects as a sort of "container" for overwhelming feelings (Schimmenti and Caretti 2010), allowing them to express their dysregulated feelings of anger and hostility in a safe and protected environment (Kim et al. 2008, Ko et al. 2009, 2012, Kuss 2013, Yen et al. 2011). At the same time, the use of the Internet may allow them to reduce a certain amount of hopelessness and low self-esteem, for example by creating powerful avatars and by increasing a personal sense of mastery (Schimmenti et al. 2012).

Following a psychoanalytic perspective, we could speculate that acting out aggressive behaviors in the Internet, and especially in online games, could be interpreted as a sort of "identification with the aggressor", i.e. as a psychological defense mechanism that permits to split and project aggressive and destructive impulses, likely generated in dysfunctional relational environments (Ferenczi 1932). Thus, it is possible that some adolescents grouped in cluster 3 split off aggressive and destructive impulses they are not capable to regulate, projecting them into a protected virtual space without experiencing the consequences of their behaviors. However, because of ego immaturity and the difficulty in discriminating the virtual and real world (i.e., poor reality testing), these adolescents run a risk of being "sequestrated" in cyberspace, which is experienced as a safe place where to act and obtain the opportunities they wasted in the real world (Curtis 2007, Toronto 2009).

Conclusions

This study comes with a number of limitations. We have only taken into account the preferred online activities reported by participants. Nevertheless, each individual can use the Internet in several ways and can engage in different online activities (e.g., studying, gaming and online sex are not mutual exclusive), and for different motives and purposes. Future researches could investigate the relationships between MMPI-A profiles and different online activities independently from a preference for a single activity, and could compare different clusters of Internet users with regard to both their actual and preferred activity. Moreover, it would be important to explore the relationship between motivations for engaging in Internet activities and MMPI-A profiles, and how they concur in the onset and maintenance of a problematic use of the Internet. Also, it could be important to conduct longitudinal studies

with multi-method assessment to better address the relationships between specific personality profiles and problematic Internet use in adolescence.

The MMPI-A is a useful tool that can help to plan, direct, and evaluating treatments (Lanyon 1995). Therefore, in order to prevent possible negative outcomes of an excessive use of the Internet among adolescents, it is crucial to explore both in clinical and research practice how particular online activities and specific motivations that may be hidden behind the different usage of the Internet could exercise a potentially addictive influence on vulnerable personality configurations assessed by the MMPI-A.

Despite the limitations of the study, it is possible to suggest on the basis of our findings that identifying the specific personality profile and characteristics beyond a dysfunctional Internet use is a very important step in the direction of specific and empirically supported psychological interventions for effectively addressing addictive tendencies and behaviors (Billieux et al. 2015b, Wang et al. 2015), in adolescence and beyond.

Contributions

FG designed the study, performed the statistical analysis, and wrote the first draft of the article and the subsequent redrafts. MS and GZ were responsible for data collection, literature search and the editing process. AG and DM contributed with important clinical and theoretical inputs. All authors critically revised the manuscript and approved its final version.

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