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## Which affects affect the use of new technologies? Italian adaptation of the Internet Motive Questionnaire for Adolescents (IMQ-A) and criterion validity with problematic use and body dissatisfaction

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Given the negative role of problematic use of new technological devices (NTD) in behavioral and psychological domains, the aim of the study is the Italian adaptation and validation of the Internet Motive Questionnaire for Adolescents (IMQ-A) in order to understand the motivation for the use of NTD. A total of 769 students 10–19 aged ( $M = 13.22$ ,  $SD = 1.56$ ) completed the IMQ-A, the Collins Figures Rating Scale, and two measures regarding the problematic NTD use, focused on overuse during the night and during meals. The IMQ-A showed adequate internal consistency with regard to its four subscales: Coping ( $\alpha = .84$ ), Social ( $\alpha = .80$ ), Enhancement ( $\alpha = .80$ ), and Conformity ( $\alpha = .68$ ) motives. However, with regard to factorial structure, a three-factor model (excluding Conformity subscale) showed slightly better fit indices than the original model. Coping motive was correlated with problematic NTD use and succeeded in predicting higher scores in body dissatisfaction as evidence of criterion-related and external validity. The Italian adaptation of the IMQ-A can be useful in both research and clinical fields, in order to propose alternative strategies for coping to users and to improve emotion regulation facets.

**Key words:** new technological devices, motivation, problematic use, adolescents, validation.

### Highlights:

- The study provided the Italian adaptation and validation of the IMQ-A.
- The three-factor model (excluding Conformity) had better psychometric quality.
- Coping motive was associated with problematic NTD use and body dissatisfaction.

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Despite benefits linked to the use of new technological devices (NTD), in terms of improvement of social relationships and psychological wellbeing (Chen & Li, 2017), literature shows that the problematic use/overuse of NTD can negatively affect our life. NTDs are defined as mobile digital devices which are featured by the portability and internet access for online activity, such as smartphone, tablet, e-book, smartwatch, or laptop (Traxler, 2010).

For example, the problematic use/overuse of NTD is demonstrated to worsen academic and work performance (Kim, Traiana, Chung, & Oh, 2016), decrease pleasure derived by face-to-face interaction (Dwyer, Kushlev, & Dunn, 2017) and, more widely, has a negative impact on daily life (Chou & Hsiao, 2000). Indeed, it can disturb some basic activities, such as eating and sleeping, as shown by the presence of physical behavior problems (e.g., to go to bed late, to skip meals, or to eat while using technological devices) that may lead to a poorer quality of sleep and to unhealthy nutrition (Gür, Yurt, Bulduk, & Atagöz, 2015; Demirci, Akgönül, & Akpınar, 2015). Given the relevance of this issue, recent literature has investigated psychological factors associated with problematic NTD use, such as personality and self-identity (Walsh, White, Cox, & Young, 2011; Andreassen, Pallesen, & Griffiths, 2017), mental illness (Hussain, Griffiths, & Sheffield, 2017), and self and body-esteem (Ehrenberg, Juckes, White, & Walsh, 2008). In this regard, body dissatisfaction was found to be a relevant factor for intensive NTD use (Rodgers et al., 2013), leading adolescents to use Internet in order to avoid or reduce shame and anxiety (Brouwer, Oenema, Crutzen, de Nooijer, & Burg, 2009). In addition, internet use seems to reinforce worries about body image, increasing social comparison with peers and promoting an unrealistic body ideal (Myers & Crowther, 2009; Tiggemann & Miller, 2010). According to Rubin (2002), the investigation of individuals' motivation to use NTD seems to be necessary to understand the potential effects of NTD and, specifically, to develop prevention and treatment of NTD problematic use. Motivations can be categorized in well-defined groups. For example, some studies distinguished instrumental use (information seeking, arousal-seeking) from ritualistic one (habit, passing time) (Rubin, 1984), finding that smartphone use is affected more by instrumental and goal-oriented motivation than by ritualized and less-goal oriented one (Joo & Sang, 2013). In contrast, addiction to new technologies seems to be better explained by ritualistic motives than by instrumental ones (Park, 2005). However, some studies investigated the influence of different components of affectivity, which play a fundamental role in motivational processes (Ahn & Shin, 2015; Bischof-Kastner, Kuntsche, & Wolstein, 2014), finding that gratification (in terms of pleasure and rewarding) and escapism (in terms of seeking distraction and relief from unpleasant feelings) in NTD use were associated with problematic outcomes (Kim & Haridakis, 2009). Bischof-Kastner et al. (2014) developed the Internet Motive

Questionnaire for Adolescents (IMQ-A), which is an instrument that allows classification of different motives to use NTD based on affectivity. In such a way, it is possible to overcome the main limitation of previous studies, which seem to rely on an unidimensional view of affectivity or focus on the use of specific types of NTD, instead of dealing with different motives for NTD use more widely (Khang, Kim, & Kim, 2013).

The aim of this study is to present the Italian adaptation of the IMQ-A and to assess its reliability and criterion validity in order to understand motivations to NTD use. The lack of similar measures in the Italian context and the influence of cultural aspects related to internet use (Caputo, 2014) make this results particularly valuable. It was hypothesized that using NTD in order to reduce unpleasant feelings can be positively correlated with problematic NTD use, in terms of overuse during the night and during meals. Besides, students with the same motivation as above to NTD use were expected to have higher scores in body dissatisfaction, evaluated according to Collins' body image silhouettes.

### **The IMQ-A**

The IMQ-A was used to examine motives related to Internet use in the adolescent population. The instrument was developed from the Drinking Motive Questionnaire (DMQ-R; Cooper, 1994), based on the traditional motivational model for addictions (Cox & Klinger, 1988) that assumes that people behave in different ways to reach expected or desired effects (Bischof-Kastner et al., 2014). According to Cooper (1994) motives are based on two basic dimensions, which refer to valence and source of the expected affective change respectively. Valence is divided into positive (to enhance positive feelings) and negative (to reduce negative emotions), while source can be internal (e.g., due to individual sensations) or external (e.g., in respect to significant others). From these two dimensions four motives can be derived: enhancement (positive valence and internal source); coping (negative valence and internal source); conformity (negative valence and external source), and social (positive valence and external source) (Bischof-Kastner et al., 2014). In particular, enhancement motive can be defined as the tendency to use NTD to increase positive mood. Social motive refers to the tendency to use NTD to improve contact and relationships (Marino et al., 2016). Conformity motive is the tendency to use NTD to conform with social pressure or to avoid disapproval from others (Zhang, Chen, Zhao, & Lee, 2014). Then, coping motive can be defined as the tendency to use NTD to overcome bad moods and is associated with the most intense dimension of addiction (Kim & Haridakis, 2009).

Based on previous studies on NTD, it was hypothesized that coping motive should be positively correlated with problematic NTD use, such as use during the night and during meals (Bischof-Kastner et al., 2014; Khang et al., 2013; Chou & Hsiao, 2000). Besides, higher coping motive for NTD use was associated with higher scores in body dissatisfaction (Park & Lee, 2017).

## Method

### Italian Adaptation and Translation of IMQ-A

In order to investigate the online activity spent by means of NTD more widely, a slight modification was introduced in the questionnaire instructions, substituting “Think of all the times you have been online during the last 12 months; how often do you go online...” with “Think of all the times you have used technological devices (e.g., smartphone, tablet, e-book, smartwatch, laptop) for online activity during the last 12 months; how often did you do it...”

For the translation of the IMQ-A into Italian, a four-step methodology was used (Sousa & Rojjanasrirat, 2011). First, two translators and a linguistic expert translated IMQ-A from English to Italian independently. Each version was compared with the original inventory in order to identify and resolve both inadequate expressions and discrepancies. Then, the instrument was translated back to English by a professional translator with a good command of both Italian and English, and both the original and back-translated versions were reassessed. The back-translation was compared with the original instrument and, after the necessary modifications, the questionnaire assumed its final version in the target language (Table 1).

Table 1  
*List of the IMQ-A items*

Item No.	English Version Statement	Italian Version Statement
Item 1	To forget your worries?	Per dimenticare le tue preoccupazioni?
Item 2	Because your friends pressurized you to do it?	Perché i tuoi amici ti hanno spinto a farlo?
Item 3	Because it helps you when you feel depressed or irritated?	Perché ti aiuta quando ti senti depresso o irritato?
Item 4	To come into contact with others?	Per entrare in contatto con gli altri?
Item 5	To cheer yourself up when you are in a bad mood?	Per tirarti su quando sei di cattivo umore?
Item 6	Because it gives you a pleasant feeling?	Perché ti dà una sensazione piacevole?
Item 7	Because it is exciting?	Perché è entusiasmante?
Item 8	To experience a feeling of exaltation?	Per provare un senso di esaltazione?
Item 9	Because it is fun to be in contact with others?	Perché è divertente stare in contatto con gli altri?
Item 10	Because you would like to belong to a certain circle of friends?	Perché ti piacerebbe far parte di una determinata cerchia di amici?
Item 11	To improve your contact with friends and acquaintances?	Per migliorare il tuo contatto con amici e conoscenti?
Item 12	To share a special occasion with friends?	Per condividere un'occasione speciale con gli amici?
Item 13	To forget about your problems?	Per dimenticare i tuoi problemi?
Item 14	Simply because it is fun?	Semplicemente perché è divertente?
Item 15	To be liked by others?	Per essere apprezzato dagli altri?
Item 16	To not feel excluded?	Per non sentirti escluso?

## Content Validity

Experts assessed the Italian version's content validity, specifically items' content, meaning, and comprehensibility were evaluated by three psychologists using a Likert scale with the following four points: *inappropriate* (1); *appropriate but item should be revised* (2); *appropriate but minor changes required* (3), and *quite appropriate* (4) (McKenzie, Wood, Kotecki, Clark, & Brey, 1999). The content validity ratio (CVR) was calculated (Lawshe, 1975) for content, meaning, and comprehensibility, with ratings yielding a minimum value of .75 (computed as the percentage of experts that gave the item a score of 3 or 4) deemed to be acceptable, as already used in previous validation studies (Caputo, 2017).

## Face Validity

To test face validity and comprehensibility of the instrument, the questionnaire was tested on a small group of 10 volunteer participants. These volunteers assessed IMQ-A items in terms of readability, comprehensibility, sentence length, and clarity of meaning (Caputo, 2016; Caputo & Langher, 2015), to ready the instrument for implementation. Besides, all of participants agreed that the test appeared to measure different motivations to NTD use, correctly identifying the underlying constructs. After the preliminary pilot testing no changes were required.

## Participants

The target population for this research study included Italian students enrolled in the 2015/2016 academic year in lower secondary schools (from 6<sup>th</sup> to 8<sup>th</sup> grade) and higher secondary schools (limited to 9<sup>th</sup> and 10<sup>th</sup> grade) of the region Latium. A stratified two stage cluster sampling approach was used. Twenty-eight schools were selected (14 lower secondary schools and 14 higher secondary schools) located in the region Latium and distributed by province. In the first stage, schools were randomly selected with probability proportional to size in terms of number of students enrolled; in the second stage, one single class per grade was randomly extracted within each school thus overall including 70 classes (i.e., three classes from lower secondary schools and two classes from higher secondary schools). The total sample consisted of 769 students from 6<sup>th</sup> to 10<sup>th</sup> grade (51.1% females, 48.9% males) 10–19 aged ( $M = 13.22$ ;  $SD = 1.56$ ). In detail, 61.6% of students came from lower secondary schools and 38.4% from higher secondary schools.

## Measures

**Internet Motive Questionnaire for Adolescents (IMQ-A; Bischof-Kastner et al., 2014).** Motives to use NTD for online activity were measured through an adapted version of the Internet Motives Questionnaire (Bischof-Kastner et al., 2014). IMQ-A is a 16-item scale using a five-point Likert scale ranging from 1 (*almost never*) to 5 (*almost always*) to assess the extent to which participants use new technology devices for online activity for different motives. Such motives refer to four different subscales: Coping (e.g., “To cheer yourself up when you are in a bad mood?”), Conformity (e.g., “To not feel excluded?”), Enhancement (e.g. “Because it is exciting?”), and Social motive (e.g., “Because it is fun to be in contact with others?”). Higher scores in each subscale indicate higher levels on each motive.

**Problematic use of NTD.** To assess the problematic NTD use, we decided to investigate whether participants used NTD during the night and during meals, which may indicate an intrusive presence of NTD in daily life (Gür et al., 2015). Participants were asked to answer yes or no to two items: “Do you usually use NTD during the night (between 00.00 and 06.00 am)?” and “Do you usually use NTD during meals?”, respectively.

**Body image dissatisfaction.** To investigate body image dissatisfaction, as discrepancy between current and ideal self, Collins Figures Rating Scale was used, which showed good test-retest reliability and criterion-related validity (Collins, 1991). The instrument consists in seven male and female figures that illustrate body weight ranging from very thin to obese. Adolescents had to select which figure best represented their current body size and then which figure best represented the way they want to look. Discrepancy scores are calculated as the difference between current and ideal body types, in terms of absolute value, and are interpreted as measures of body dissatisfaction.

## Statistical Analyses

The analyses were conducted in SPSS 24.0 and by applying the STATA statistical package (Version 12) for confirmatory factor analysis.

**Factorial validity.** To test factorial validity, the odd-even split method was used by dividing the total sample ( $N = 769$ ) into two groups: Group A ( $n = 385$ ) that was used for exploratory factor analysis (EFA) and Group B ( $n = 384$ ) that was used for confirmatory factor analysis (CFA). Indeed, EFA followed by CFA is one of the most common approaches to scale development and validation (Worthington & Whittaker, 2006); besides EFA in a CFA framework may consent to refine the item pool. EFA with a maximum likelihood (ML) and direct oblimin rotation allowed the extraction of underlying common variance among items. ML was adopted because of its robustness as an estimation procedure when variables are deviating from normality (Fuller & Hemmerle, 1966); whereas direct oblimin rotation was used because it assumes factors to be correlated thus consenting to obtain simple structure and consider best results. Items with factor loadings less than .3 or with cross-loading should be deleted, whereas to determine how many factors should be retained, three main criteria were used: 1) the Kaiser criterion selecting those factors with an eigenvalue  $> 1$ ; 2) scree plot analysis, in which factors above the point of inflexion in the curve were retained, and 3) parallel analysis to decide the number of factors to retain, by comparing eigenvalues extracted from experimental data with those extracted from 100 randomly generated data sets by conducting a principal component analysis (PCA). Preliminarily Kaiser-Meyer-Olkin (KMO) measure was considered to assess sampling adequacy with good values between .7–.8 and excellent values between .8–.9 (Hutcheson & Sofroniou, 1999). KMO values for individual variables produced on the diagonal of the anti-image correlation matrix higher than .5 were considered as acceptable (Field, 2013). In relation to CFA on the second sub-sample, the maximum likelihood (ML) method was used and the latent factors were allowed to correlate, consistently with the proposed theoretical framework. As well, the following fit indices were considered (Hu & Bentler, 1995): The  $\chi^2$  ratio ( $\chi^2$  /degrees of freedom,  $df$ ), RMSEA, SRMR, CFI, and TLI. Smaller  $\chi^2$  value corresponds to better fitting models (Schumacker & Lomax, 2010). As Hu and Bentler (1999) stated, RMSEA values up to .06 and SRMR values up to .08 are indicative of good fit; whereas CFI and TLI values higher than .95 generally indicate good model fit.

**Criterion and external validity.** To investigate the criterion validity of the IMQ-A, logistic regression analyses were performed, using the motives as predictors and the NTD use during the night and during meals as criterion, respectively. Then a linear regression model was used to assess external validity by investigating the extent to which motives for NTD use (as predictors) succeed in explaining body dissatisfaction (as dependent variable).

**Reliability.** IMQ-A was examined to assess the reliability of test scores in terms of internal consistency, with Cronbach's alpha being excellent when it is greater than .9, good when it ranges between .8 and .9, acceptable between .7 and .8, questionable between .6, and .7, poor when it is lower than .6 (George & Mallery, 2010).

## Results

Skewness and kurtosis values revealed that most of items fell within an acceptable range indicating a normal univariate distribution, because they were between  $-2$  and  $+2$  (George & Mallery, 2010), with the exception of items 2, 15, and 16 that overall had lower mean and standard deviation values (Table 2). Overall, the distribution at subscale level was as follows: Coping ( $M = 2.21$ ,  $SD = 1.05$ ), Conformity ( $M = 1.63$ ,  $SD = 0.75$ ), Social ( $M = 3$ ,  $SD = 1.05$ ), and Enhancement ( $M = 2.34$ ,  $SD = 1.02$ ).

Table 2  
*Item distribution statistics*

Item no	Range	<i>M</i>	<i>SE</i>	<i>SD</i>	<i>Skewness</i>	<i>Kurtosis</i>
Item 1	1–5	2.06	.04	1.14	1.11	0.49
Item 2	1–5	1.35	.03	.69	2.42	6.72
Item 3	1–5	2.14	.05	1.26	1.00	-0.02
Item 4	1–5	3.35	.05	1.35	-0.26	-1.17
Item 5	1–5	2.46	.05	1.35	0.60	-0.88
Item 6	1–5	2.53	.05	1.36	0.49	-1.0
Item 7	1–5	2.18	.05	1.26	0.84	-0.40
Item 8	1–5	1.69	.04	1.10	1.59	1.58
Item 9	1–5	3.2	.05	1.31	-0.11	-1.15
Item 10	1–5	2.09	.05	1.34	0.99	-0.30
Item 11	1–5	2.61	.05	1.36	0.38	-1.12
Item 12	1–5	2.88	.05	1.28	0.15	-1.1
Item 13	1–5	2.18	.05	1.36	0.92	-0.45
Item 14	1–5	2.96	.05	1.39	0.11	-1.28
Item 15	1–5	1.47	.04	.95	2.08	3.51
Item 16	1–5	1.60	.04	1.1	1.89	2.59

An EFA was used to test the dimensionality of the IMQ-A from a randomly chosen half of the sample ( $N = 385$ ), and the remaining responses were used for a CFA. In the initial EFA, four factors with an eigenvalue greater than 1.0 were extracted, which explained 65.91% of the overall variance. The four-factor solution was confirmed by the examination of the scree plot and by parallel analysis. Only the eigenvalues of first four factors from our actual data set exceeded the 95th percentile of eigenvalues derived from random data sets (Factor 1 = 6.11, CI [1.35, 1.42]; Factor 2 = 1.78, CI [1.28, 1.34]; Factor 3 = 1.37, CI [1.23, 1.27]; Factor 4 = 1.27, CI [1.17, 1.21]). A KMO value of .87 verified the sampling adequacy for the EFA. KMO values for individual items produced on the diagonal of the anti-image correlation matrix were all  $> .81$ . Factor loadings were  $> .30$ , with the exception of item 2 that had a low communality, whereas item 10 loaded on two different factors (Table 3). Thus, two items (2 and 10) with unacceptable parameters were removed from the statistical analysis and a second EFA was conducted.

Table 3  
*Factor loading – exploratory factor analysis (16 items)*

Item	Factor 1 Enhancement	Factor 2 Social	Factor 3 Coping	Factor 4 Conformity	Communalities
6) Because it gives you a pleasant feeling?	<b>.679</b>	-.016	-.169	.016	.598
7) Because it is exciting?	<b>.984</b>	-.068	.073	-.022	.870
8) To experience a feeling of exaltation?	<b>.578</b>	.014	-.097	-.177	.541
14) Simply because it is fun?	<b>.593</b>	.136	-.006	.051	.406
4) To come into contact with others?	-.088	<b>.698</b>	-.120	.080	.494
9) Because it is fun to be in contact with others?	.153	<b>.710</b>	.004	.107	.548
11) To improve your contact with friends and acquaintances?	.008	<b>.750</b>	.053	-.162	.638
12) To share a special occasion with friends?	.054	<b>.648</b>	-.017	-.113	.529
1) To forget your worries?	-.010	.069	<b>-.793</b>	.093	.616
5) To cheer yourself up when you are in a bad mood?	.090	.062	<b>-.623</b>	-.063	.545
3) Because it helps you when you feel depressed or irritated?	-.005	-.029	<b>-.826</b>	-.010	.663
13) To forget about your problems?	.015	-.051	<b>-.735</b>	-.098	.590
2) Because your friends pressurized you to do it?	.123	.013	-.064	<b>-.206</b>	.106
10) Because you would like to belong to a certain circle of friends?	-.018	.417	-.045	<b>-.438</b>	.516
15) To be liked by others?	.022	.038	-.041	<b>-.736</b>	.607
16) To not feel excluded?	.008	-.024	-.026	<b>-.805</b>	.658

Also in the second EFA, four factors with eigenvalues greater than 1.0 were extracted (explaining 70.62% of the total variance). The scree plot and parallel analysis confirmed again the four-factor solution, with only the first four eigenvalues from our data set exceeded the 95th percentile of eigenvalues derived from random data sets (Factor 1 = 5.65, CI [1.32, 1.41]; Factor 2 = 1.69, CI [1.25, 1.30]; Factor 3 = 1.29, CI [1.19, 1.23]; Factor 4 = 1.2, CI [1.14, 1.19]). A KMO value of .86 verified the sampling adequacy for the EFA. KMO values for individual items produced on the diagonal of the anti-image correlation matrix were all > .74. Overall factor loadings were satisfactory and communalities ranged from .40 to .87 (Table 4).



Table 4  
 Factor loadings – exploratory factor analysis (14 items)

Item	Factor1 Enhancement	Factor 2 Social	Factor 3 Coping	Factor 4 Conformity	Communalities
6) Because it gives you a pleasant feeling?	<b>.665</b>	-.005	-.168	-.002	.592
7) Because it is exciting?	<b>.998</b>	-.080	.081	-.017	.876
8) To experience a feeling of exaltation?	<b>.576</b>	.009	-.151	-.099	.520
14) Simply because it is fun?	<b>.581</b>	.138	.006	.022	.404
4) To come into contact with others?	-.119	<b>.733</b>	-.097	.041	.529
9) Because it is fun to be in contact with others?	.136	<b>.727</b>	.031	.080	.563
11) To improve your contact with friends and acquaintances?	.008	<b>.714</b>	.024	-.127	.571
12) To share a special occasion with friends?	.052	<b>.659</b>	-.008	-.105	.528
1) To forget your worries?	-.002	.064	<b>-.783</b>	.084	.616
5) To cheer yourself up when you are in a bad mood?	.101	.082	<b>-.632</b>	-.027	.557
3) Because it helps you when you feel depressed or irritated?	.009	-.033	<b>-.840</b>	.018	.678
13) To forget about your problems?	.014	-.041	<b>-.703</b>	-.164	.591
15) To be liked by others?	.046	.084	-.062	<b>-.644</b>	.526
16) To not feel excluded?	-.006	-.014	.024	<b>-.951</b>	.875

Because results showed a four factor solution with the Conformity factor loaded by only two items (13 and 14), which is quite questionable (Costello & Osborne, 2005), we decided to perform a third EFA including only items related to Coping, Social motive, and Enhancement. Three factors with eigenvalues greater than 1.0 were extracted, as also shown by the analysis of the scree plot. Parallel analysis confirmed the three-factor solution and eigenvalues from our data set exceeded the 95<sup>th</sup> percentile of eigenvalues derived from random data sets (Factor 1 = 5.16, CI [1.29, 1.36]; Factor 2 = 1.68, CI [1.22, 1.27]; Factor 3 = 1.25, CI [1.15, 1.19]). A KMO value of .86 verified the sampling adequacy for the EFA. Anti-image correlation values for individual items were all > .80. Overall factor loadings were satisfactory and communalities ranged from .38 to .85 (Table 5). The three-factor solution (including Coping, Social, and Enhancement) explained 67.57% of the total variance.

Table 5  
*Factor loadings – exploratory factor analysis (12 items)*

Item	Factor 1 Enhancement	Factor 2 Social	Factor 3 Coping	Communalities
6) Because it gives you a pleasant feeling?	<b>.660</b>	.007	-.162	.588
7) Because it is exciting?	<b>1.006</b>	-.080	.081	.874
8) To experience a feeling of exaltation?	<b>.591</b>	.030	-.171	.513
14) Simply because it is fun?	<b>.541</b>	.150	.001	.379
4) To come into contact with others?	-.154	<b>.736</b>	-.089	.531
9) Because it is fun to be in contact with others?	.089	<b>.719</b>	.044	.543
11) To improve your contact with friends and acquaintances?	.044	<b>.733</b>	.019	.550
12) To share a special occasion with friends?	.078	<b>.682</b>	-.007	.519
1) To forget your worries?	-.015	.035	<b>-.764</b>	.598
5) To cheer yourself up when you are in a bad mood?	.102	.070	<b>-.648</b>	.559
3) Because it helps you when you feel depressed or irritated?	-.012	-.042	<b>-.853</b>	.683
13) To forget about your problems?	.027	-.008	<b>-.737</b>	.561

As shown in Table 6, in order to examine which one of the hypothetical structures of the scale extracted from EFA fitted data better, three CFA with ML estimation were performed on the second half of the sample ( $n = 384$ ). Examined factor solutions were quite similar overall, in spite of the three-factor model showing slightly better fit indices, with specific regard to CFI and TLI, values of which were greater than .90, generally indicating an acceptable model fit.

Table 6  
*Goodness-of-fit Indices*

Factor solution	CHI <sup>2</sup>	DF	CHI <sup>2</sup> /DF	RMSEA	CFI	TLI	SRMR
Four factors (16 items)	276.75	98	2.82	.078	.893	.869	.06
Four factors (14 items)	192.462	71	2.71	.075	.921	.898	.052
Three factors (12 items)	144.757	51	2.83	.077	.933	.913	.051

The evidence of reliability, criterion and external validity was investigated by using the total sample ( $N = 769$ ) and maintaining the original four-factor solution. This choice was suggested by the need for comparing the results of the present study with previous findings; as well, it allowed an empirical evaluation of the reference theoretical model which the IMQ-A

was developed from, so to test its potential suitability for the internet context. With regard to the NTD use during the night, the results revealed that the logistic regression model was statistically significant,  $\chi^2(4) = 49.233$ ,  $p < .001$ . The Nagelkerke  $R^2$  was equal to .095 and the model correctly classified 60.2% of cases. The Wald criterion demonstrated that Coping ( $p < .001$ ) and Social motives ( $p = .014$ ) made a significant contribution to prediction. Higher Coping and Social motives were associated with an increase in the likelihood to use NTD during the night, specifically when the score of coping and social motive is raised by one unit the odds ratio is 1.454 and 1.247 times as large, respectively (Table 7).

With regard to the use of NTD during meals, results revealed that the logistic regression model was statistically significant,  $\chi^2(4) = 39.448$ ,  $p < .001$ . The Nagelkerke  $R^2$  was equal to .078 and the model correctly classified 66.3% of cases. The Wald criterion demonstrated that Coping ( $p = .019$ ) and Conformity ( $p = .010$ ) motives made a significant contribution to prediction. Higher Coping and Conformity were associated with an increase in the likelihood to use NTD during meals, specifically when the score of coping or conformity motive is raised by one unit the odds ratio is 1.240 and 1.375 times as large, respectively (Table 8).

Table 7  
 Logistic regression analysis for predicting NTD use during the night by IMQ-A motives

	B	E.S.	Wald	Exp(B)	95% CI
Enhancement	.023	.092	.060	1.023	0.853–1.226
Social	.220	.090	6.031	1.247	1.046–1.486
Coping	.374	.095	15.663	1.454	1.208–1.750
Conformity	.063	.126	.254	1.066	0.832–1.364
Constant	-1.606				

Table 8  
 Logistic regression analysis for predicting NTD use during meals by IMQ-A motives

	B	E.S.	Wald	Exp(B)	95% CI
Enhancement	.024	.094	.066	1.024	0.853–1.230
Social	.159	.092	2.982	1.172	0.979–1.403
Coping	.215	.092	5.523	1.240	1.036–1.484
Conformity	.318	.124	6.614	1.375	1.079–1.752
Constant	-2.112				

Results also revealed that the multiple linear regression model was statistically significant,  $F(4) = 3.97$ ,  $p = .003$  and explained 2.5% of variance. Coping motive ( $\beta = .186$ ,  $p < .001$ ) was positively associated with body dissatisfaction to a statistically significant extent.

Test reliability showed good internal consistency for Coping ( $\alpha = .84$ ); Social ( $\alpha = .80$ ); Enhancement ( $\alpha = .80$ ), and fair internal consistency for Conformity ( $\alpha = .68$ ).

## Discussion

In the present paper we investigated psychometric properties of the Italian version of the Internet Motive Questionnaire for Adolescents (IMQ-A) (Bischof-Kastner et al., 2014). The item and subscale distribution revealed higher values for the Social factor and lower values for the Conformity one, with the latter showing a not normal distribution. In regard to the factorial validity of IMQ-A, different solutions were tested due to some problems with Conformity-related items: four factors with four items each; four factors with Conformity including only two items, and three-factors (without the Conformity subscale) with four items each. The examined factor solutions seem to be quite similar, despite the three-factor model showing slightly better fit indices, with specific regard to CFI and TLI. In this regard, the original validation study has also highlighted that both TLI and SRMR were very close to the recommended thresholds thus indicating a merely acceptable fit. The authors of the IMQ-A also reported that item 2 showed a lower factor loading; indeed, in spite of Internet motives and drinking motives being quite similar to each other, the item “Because your friends pressured you to do it” seems to be too strong for the Internet context, as also shown by a weak item loading (Bischof-Kastner et al., 2014) (e.g., it could be restated as follows: “Because most of your friend invited you to do it”). In our study, item 10 (“because you would like to belong to a certain circle of friends?”) also resulted as problematic due to its loadings on both Conformity and Social factor. Indeed, despite the item being originally conceived on the Conformity factor, we hypothesize that at the same time it may trigger an affiliative dimension concerning the need for intimacy and belonging.

With regard to evidence for criterion and external validity, analyses partially confirmed our hypothesis: based on what is suggested by the literature on motives and problematic behaviors, NTD use driven by internal motives (Coping and Enhancement) should be more dysfunctional than use of NTD driven by Social motives (Bischof-Kastner et al., 2014; Stewart & Zack, 2008). In our study Coping as well as Social motives explain use of NTD during the night, whereas Coping and Conformity motives explain potential intrusive presence of NTD during meals. Therefore, our results about the coping motive are in line with previous findings regarding to problematic NTD use (Kim & Haridakis, 2009; Zhang et al., 2014). Conformity motive was found to be predictive of problematic facebook use in another adaptation of IMQ-A (Marino et al., 2015). Our results about the association between social motive and the increase of NTD use during the night seems to be consistent with previous research on internet addiction (Lee & Park, 2014), despite some previous studies using the IMQ-A did not find any effect (Bischof-Kastner et al., 2014; Marino et al., 2015). Probably, this can depend on the fact that NTD use during the night may not necessarily refer to pathological but just to problem use. Besides this, social motive was found to be prevalent compared to other motives in general sample (Bischof-Kastner et al., 2014), therefore the use of NTD during the night may grasp a wider tendency to overuse.

Evidence of external validity was also provided, showing that coping motive is associated with higher scores in body dissatisfaction. According to previous studies, in fact, lower body esteem is linked with problematic use of internet, independently from BMI (Park & Lee, 2017). Negative feelings and thoughts associated with body dissatisfaction and low self-esteem seem to lead adolescents to use NTD in order to avoid or reduce such negative emotions, suggesting a deficient self-regulation where NTD use may become maladaptive (Brouwer et al., 2009; Caplan, 2010).

The results of the present study are preliminary and some limitations need to be highlighted. For instance, the generalizability of our findings to Italian adolescent population can be called into question and future research could carry out a representative nationwide survey. Besides, the examined measures are self-reported and a response bias may exist, which does not allow for exhaustive evaluation of the evidence for criterion validity. Future studies may include further variables, as well as other-reported and behavioral measures, which could better deepen the practical relevance of the examined motives to use NTD and differentiate respondents based on problematic use, given the strong interrelations between motivations, self-concepts and attributions in a school aged population (Caputo, 2015). With regard to psychometric characteristics of the IMQ-A, the factorial structure of the scale shows some problematic issues. More precisely, two items related to the Conformity factor have poor factor loadings, thus negatively affecting the internal consistency of this subscale, as also highlighted in the original validation study. Some interpretations may be advocated in this regard. On one hand, it may depend on the poor suitability of conformity as reliable motive to use NTD, given that the reference motivational model was originally adapted from alcohol addiction to the field of internet consumption. On the other hand, it may depend on the operational definition of the conformity construct through the items “Because your friends pressurized you to do it?” and “Because you would like to belong to a certain circle of friends?”. Indeed, as discussed above, the first item seems to be worded too strongly for the Internet context and on average tends to have low scores; whereas the second item seems to also grasp social and affiliative aspects. Therefore, the factorial structure of the IMQ-A should be further tested in future validation studies, because some concerns raised with regard to underlying dimensions of the IMQ-A, potentially highlighting the scarce appropriateness of the reference theoretical model from which the instrument was originally developed. Specifically, the Conformity factor does not seem to provide robust evidence of sound psychometric quality and thus its potential use in clinical practice could be questionable. Despite these limitations, the Italian IMQ-A version could be useful to assess motives related to use of NTD by Italian speaking adolescent, especially for developing not only treatments for young adults that show problematic NTD use, but also to prevent maladaptive use. For example, although NTD use driven by Coping motive produces a “security blanket” effect, which allows the initial handling of reactions to negative emotions and stress, a long term utilization of NTD as an emotional coping strategy may negatively affects mental health (Panova & Lleras, 2016, p. 256). Thus, IMQ-A can help identify coping motivation for NTD use in order to propose alternative strategies of coping and to improve emotion regulation facets (Bischof-Kastner et al., 2014; D’Aguanno, Langher, & Velotti, 2017).

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## Koje emocije utiču na upotrebu novih tehnologija? Italijanska adaptacija Skale motivacije za korišćenje interneta kod adolescenata i kriterijumska validnost u odnosu na problematičnu upotrebu interneta i nezadovoljstvo telom

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Imajući u vidu negativne aspekte problematične upotrebe novih tehnoloških uređaja (eng. new technological devices – NTD, prim. prev.) na psihološkom i ponašajnom planu, cilj ovog istraživanja je da se predstavi italijanska adaptacija i validacija skale motivacije za korišćenje interneta kod adolescenata (eng. the Internet Motive Questionnaire for Adolescents; IMQ-A), a u nameri da se razume motivacija za korišćenje novih tehnoloških uređaja. 769 učenika uzrasta od 10–19 godina ( $M = 13.22$ ,  $SD = 1.56$ ) je popunilo IMQ-A skalu, Kolinsovu skalu procene ljudskih figura (eng. the Collins Figures Rating Scale) i dve mere koje se odnose na problematičnu upotrebu novih tehnoloških uređaja sa fokusom na prekomernoj upotrebi tokom noći i za vreme obroka. Interna konzistencija sve četiri subskele IMQ-A je bila zadovoljavajuća: Prevladavanje ( $\alpha = .84$ ), Socijalna motivacija ( $\alpha = .80$ ), Poboľšanje (raspoloženja, prim. prev.) ( $\alpha = .80$ ) i Konformizam ( $\alpha = .68$ ). Međutim, faktorska struktura je pokazala da trofaktorsko rešenje (bez subskele Konformizma) ima nešto bolje indekse uklapanja u odnosu na originalni model. Motiv prevladavanja je u korelaciji sa problematičnom upotrebom novih tehnoloških uređaja i pokazao se uspešnim prediktorom visokih skorova na Nezadovoljstvu telom, što su podaci koji govore u prilog kriterijumske i eksterne validnosti. Italijanska adaptacija IMQ-A skale može biti korisna i na polju istraživanja i na kliničkom polju, kada je potrebno korisnicima predložiti alternativne strategije prevladavanja i unaprediti pojedine aspekte njihove emocionalne regulacije.

**Ključne reči:** novi tehnološki uređaji, motivacija, problematična upotreba, adolescent, validacija

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