



Are emotional e-competencies a protective factor against habitual digital behaviors (media multitasking, cybergossip, phubbing) in Spanish students of secondary education?

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ABSTRACT

Increased Internet use has introduced several behavior patterns into the daily routines of adolescents, such as phubbing, cybergossip, and media multitasking during homework. These habits can potentialize risks, particularly in post-pandemic situations. Socio-emotional competencies can act as protective factors against cybernetic risks; however, they have not yet been studied in relation with habitual digital behavior. To fill that gap, this study's objective is to analyze, across a sample of 776 students of secondary education (12–16 years old), to what extent socio-emotional competencies in digital interaction ("socio-emotional e-competencies") are related to phubbing, cybergossip, and media multitasking during academic tasks, while being able to predict those behaviors in function of gender and age. We also propose to elicit whether those three behaviors can be regarded as indicators of habitual digital behavior in general. Our structural equation model results indicate that they act as a sole variable, which we denote as "habitual digital behavior". On the other hand, emotional e-regulation and e-self-control of impulsiveness act as protective factors in adolescence, whereas emotional e-independence is crucial in girls and older students, and emotional e-awareness is important in boys. To close, we discuss the relevance of educating students in the matter of e-socio-economic competencies.

1. Introduction

Mobile devices and the Internet have become part of the daily life of students both within school as well as outside of it. Technological devices are used for a multitude of daily activities that provide a number of academic, social, and personal opportunities (Salehan & Negahban, 2013). However, in spite of such potential benefits, researchers have recently started to voice concern regarding psychological, social, and health disorders that have emerged in association with such technologies, including anxiety (Oberst et al., 2017), the preference to interact online instead of offline (Casale et al., 2013), cyberbullying (Rey et al., 2018) and the distracting effect of technology upon the user (Xu, 2015).

Concretely, in a school environment, the majority of educators are of the opinion that technology has a positive impact on learning in that it encourages compromise, motivation, and productivity (Roblyer & Doering, 2010). Disadvantages are nevertheless also

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perceived. When students use their mobile phone in a school context, teachers have pointed out that they pay less attention in class, they copy, make mistakes in their writing, gain access to inappropriate information, cyberbully one another, and engage in the practice of sexting (O'Bannon & Thomas, 2014). At the same time, students find that the use of technological devices improves the quality of their learning, which is nevertheless also one of the reasons for which they cannot stay away very long from technology. It has become the customary channel through which they make comments, quench their curiosity, socialize, work, and find entertainment (Bicen & Arnaut, 2015).

The above-mentioned studies show that the negative effects of the Internet are not only associated with cybernetic risks, but also with other habitual forms of behavior displayed by students when they work on their homework while communicating with one another by technological means, or distract themselves by engaging in several tasks simultaneously. Although the need has been acknowledged to investigate habitual forms of online behavior that pose a threat to academic and social life as well as to students' personal health (Lee, 2015), most studies have focused, instead, on cybernetic risks, i.e., those related to computer technology and the Web, such as Internet addiction (Caplan, 2010) and cyberbullying (Kowalski et al., 2019). In the meantime, less study has been devoted to other habitual forms of conduct such as cybergossip (behavior displayed by several people who make evaluative comments on digital devices about someone who is not present), phubbing (act of looking at one's mobile phone during a face-to-face exchange with another person), or media multitasking during academic tasks in terms of analyzing their repercussions or possible protective factors associated with them (Van Deursen et al., 2015).

Technology plays a significant role in people's behavior, but also affects their emotions and self-esteem (Valkenburg et al., 2017), thereby leading to new kinds of cyberbehavior (Elhai et al., 2018). To face this, certain competencies that allow the individual to deal with online socio-emotional aspects can serve as protective factors against cybernetic risks. In this way, Nasaescu et al. (2018) showed that a high level of socio-emotional competencies including self-awareness, social awareness, and prosocial behavior, predict a lower degree of technology abuse. Arrivillaga et al. (2020) concluded that high competency levels in self-appraisal and regulation of emotions moderate the negative link between problematic Internet use, problematic smartphone use, and suicide risk. Thus, we can indeed suppose that such competencies can also serve as protective factors for habitual digital behavior.

In view of these considerations, this study's objective is to analyze the degree to which socio-emotional competencies developed in online interaction, heretofore termed "socio-emotional e-competencies" (Authors, in press), are related to three habitual digital behaviors: media multitasking during academic tasks, phubbing, and cybergossip. We additionally attempt to ascertain whether these three behaviors are related with one another, and whether they can be regarded as indicators of habitual digital behavior. Lastly, we research the degree to which such competencies can predict those behaviors in function of adolescents' gender and age. It is well-known that girls use the Internet in different ways than boys (Oberst et al., 2016), they score higher on empathy (Christov-Moore et al., 2014) and have a different way of dealing with emotions (Bailen et al., 2019); however, their socio-emotional competencies decrease with age (Zych et al., 2018).

2. Habitual digital behaviors

In this study we base ourselves on the definition of habitual behavior as an automatic behavior triggered by circumstantial signals (Oulasvirta et al., 2012). Such signals can be external, such as receiving a notification on a digital device, or internal, such as the urge to check one's social media feed. Daily habits can have positive or negative effects on the individual (Wood & Neal, 2007); in the latter case, undesired behaviors can reinforce maladaptive behaviors if they are not limited (Rush, 2011). The literature on personal factors that reinforce smartphone addiction has indeed shown that daily habits are those which, to the greatest extent, foment the risk of addiction (Van Deursen et al., 2015). This implies that routine digital behaviors, such as leaving a comment on social media, frequently checking whether one has received a reply or a message, and checking whether the number of likes has increased, are all indirect enhancers of Internet addiction (Huaytalla et al., 2016) and of antisocial behaviors related with the latter, such as cyberbullying (Yudes-Gómez et al., 2018).

In this study we propose to investigate habitual digital behavior in the form of three highly frequent conducts displayed by adolescents, particularly in view of the lack of data on the subjects of phubbing, cybergossip, and media multitasking.

2.1. Phubbing

The term "phubbing" denotes the act of looking at one's mobile phone during a face-to-face exchange with another person or with other people; frequent instances of such behavior can lead to the perception that it is normative (Chotpitayasunondh & Douglas, 2016). Although phubbing has become habitual, many people regard it as annoying and disrespectful (Aagaard, 2020), since it interferes with interpersonal ties by making people feel devalued (Vanden Abele & Postma-Nilsenova, 2018). Certain authors, moreover, view phubbing as a form of social exclusion or ostracism (Chotpitayasunondh & Douglas, 2018). Most studies have hitherto been carried out on university-age students and adults, and they have observed a decrease in attention and engagement associated with phubbing, thereby interfering in training and learning processes (Miller-Ott & Kelly, 2017), eroding perceptions of empathy and trust (Roberts & David, 2016), and enhancing symptoms of depression (McDaniel & Coyne, 2016).

The habit of interacting with one's smartphone, thereby no longer paying attention to the workgroup, the teacher, or one's face-to-face peers in an academic or social environment, can be explained by the desire to avoid negative emotions (Elhai et al., 2018), by the tendency to engage in more than one task simultaneously (multitasking), by escapism, by the desire to seek enjoyment in the face of boredom, and by the perceived need to cultivate and maintain one's online friendships (Al-Saggaf et al., 2019).

2.2. Cybergossip

Cybergossip is the behavior displayed by several people who make evaluative comments on digital devices about someone who is not present. Romera et al. (2018) have shown that, as a frequent behavior among adolescents, cybergossip can exert positive functions, such as strengthening social ties, creating friendships, and providing information. The Internet has become a routine channel of socialization through which adolescents construct their identity, exchange opinions, and express judgments while they study or find entertainment. However, cybergossiping can also be employed to exclude someone, or to engage in other maladjusted behaviors such as cyberbullying (López-Pradas et al., 2017) and sexting (Casas et al., 2019).

2.3. Media multitasking while working on academic tasks

Multitasking has become a common way of using media, and it is particularly prevalent among adolescents (Dönmez & Akbulut, 2021). We can differentiate among two types of multitasking mediated through technology: using several technological devices simultaneously, and using technological devices while participating in an activity not associated with them (Van Der Schuur et al., 2015).

This behavior's increasing prevalence has led to worries regarding its potentially negative effects upon the functioning of adolescents. Although many of them may think they can efficiently multitask, research indicates that such behavior interferes in memory and attention span (Baumgartner et al., 2017; Ophir et al., 2009). As indicated by Van Der Schuur et al. (2015), multitasking mediated by technology, in a school environment, negatively affects attitudes associated with study, cognitive control, socioemotional functioning, and perceived academic performance.

A study of the effect of multitasking on 11- to 18-year-old adolescents working on academic tasks (Martín-Perpiñá et al., 2019) evidenced that those who multitasked most often tended to deliver poorer academic results, and displayed decreased cognitive performance in tasks that required human working memory and processing speed. A growing body of literature on media multitasking shows that it can represent a risk factor for psychosocial maladjustments associated with anxiety (Becker et al., 2013) as well as with addiction to technology (Lin et al., 2020).

2.4. Relationships among habitual digital behaviors

The constant and simultaneous use of a wide variety of online media, consulting them for academic subjects as well as for personal relations, suggests that multitasking during academic work can retrofeed behaviors such as cybergossip and phubbing, and vice-versa. Experts indeed affirm that one of the most common multitasking combinations consists in communicating on social media while using e-mail and consulting one's smartphone (Lau, 2017). These three behaviors can produce pleasant sensations that function as gratifications that reinforce their constant consumption, thereby increasing the possibility of developing routine or addictive behavior (Yang & Tung, 2007). On the basis of these observations, we can hypothesize that an adolescent who is multitasking is also phubbing and cybergossiping: in other words, these three types of conduct can be regarded as concurrent habitual digital behaviors. In view of this set of relations we postulate the following hypothesis: media multitasking while working on academic tasks, phubbing, and cybergossip can be highly correlated with one another, thereby exerting similar direct influences through socio-emotional competencies, particularly during adolescence.

2.5. Socio-economic competencies on the internet and habitual digital behaviors

Socio-emotional competencies are of great relevance as they can be defined as the abilities, skills and acquired knowledge necessary to show empathy, to take responsible decisions, to maintain desirable interpersonal relationships, and to understand and manage one's own emotions as well as those of others (CASEL, 2015). A review of the literature shows that they play a key role in the student's personal, academic, and social environment. Research in this area relates high levels of emotional intelligence with active learning (Molinillo et al., 2018), satisfaction in cooperating with others (Bulu, 2012), and improved academic performance at school (MacCann et al., 2019). In relation with psychosocial context, a series of meta-analyses and systematic reviews have found that socio-emotional competencies protect adolescents from the hardships of daily life (López-Cassá et al., 2018), from aggression *viz.* antisocial behavior (Durlak et al., 2011), and from serious technological risks such as cyberbullying (Rey et al., 2018; Zych et al., 2018), from nomophobia (Gentina et al., 2018), from addiction to the Internet, and from thoughts of suicide (Arrivillaga et al., 2020). Thus, if the cultivation of socio-emotional competencies lowers the probability of developing behavioral cybernetic risks, it would be reasonable to hypothesize that socio-emotional competencies are also protective factors of habitual digital behaviors that are conducive to such risks: online behaviors such as cybergossiping, which is a predictor of cyberbullying (Romera et al., 2018); phubbing, which heightens the phenomenon of exclusion (Chotpitayasunondh & Douglas, 2018), and multitasking, which increases addiction to technology (Lin et al., 2020). Indeed, certain studies suggest this very possibility, pointing out that avoid negative emotions leads adolescents to check their digital device (Elhai et al., 2018); Rosen et al., 2013), thereby interrupting academic work (multitasking), leaving online comments (cybergossip), or concentrating overtly on their mobile phone (phubbing). Goleman (2012) also postulates that socio-emotional abilities are those that can help teenagers avoid distractions and focus their attention on academic tasks as well as on face-to-face social encounters.

Until now, studies in this area have nevertheless evaluated socio-emotional competencies *outside* of the online environment, regarding them as equivalent to online socio-emotional competencies, despite the fact that encounters in the virtual environment occur

under a different spatio-temporal set of circumstances than face-to-face encounters, and that the virtual environment's system of emotional characteristics and interconnections is thus different (Serrano-Puche, 2016). Face-to-face social life is slower and more localized than online social life, which, in turn, is more rapid, distant, and anonymous (Christie & Dill, 2016), and thus more disinhibited (Suler, 2004). Due to the medium's intrinsic limitations, emotional information tends to be generated and perceived by adding emojis and other emotional resources (Jibril & Abdullah, 2013). This all produces a virtual emotional system primarily based on emotional intensities (Serrano-Puche, 2016), whereas the traditional, face-to-face system has more to do with emotional qualities. Online communication tends to be asynchronous, thereby requiring a greater amount of cognitive effort to interpret the other person's psychological state, since fewer non-verbal communication elements are transmitted. It is thus quite plausible to postulate that the online expression and perception of emotions has a set of significantly different nuances than the expression and perception of emotions in offline, face-to-face situations (González-Cabrera et al., 2016). Indeed, when Zych et al. (2017) designed a tool to evaluate online emotional content, they showed that the two dimensions of online perception and expression need to be evaluated with a differentiated approach: on the Internet, one can perceive emotion without expressing it, and vice versa.

This all seems to indicate that there is a need to acquire socio-emotional competencies that enable one to act in a digital environment. Authors (in press) have established a model that determines socio-emotional e-competencies, which comprise five sub-competencies: 1) emotional e-awareness, defined as the capacity to identify and understand one's own emotions in a virtual context; 2) emotional e-regulation, the capacity to generate adaptive responses to a given context by being able to identify the emotional states generated through communication on the Internet; 3) e-self-control of impulsiveness, the competency that consists in inhibiting impulsive responses to social stimuli and demands and/or to information appearing on the Internet; 4) emotional e-independence, defined as the competency to feel emotionally strong and to value oneself in virtual social relations without depending on virtual reputation and/or status negotiation, and 5) social e-competency, i.e., the ability to develop positive relations and prosocial behaviors in the virtual environment, taking into account that digital social life takes place at a more rapid rate, and often in a more anonymous fashion.

3. Hypothesis and research model

After having presented this study's objective and its theoretical basis, we now describe its hypothesis and methodological approach. We postulate three hypotheses:

H1. In a sample of students of secondary education in Spain, we expect to find a high relation between the three habitual digital behaviors defined in this study: media multitasking, phubbing, and cybergossip (since these three practices produce pleasure, acting as gratifications that mutually reinforce one another as they are continually consumed, thereby increasing the probability of developing routine or addictive behaviors (Yang & Tung, 2007).

H2. We expect socio-emotional competencies to have a direct negative relation with the three habitual digital behaviors. This can be expected, on the one hand, because avoid negative emotions leads adolescents to check their digital device (Elhai et al., 2018); it is therefore reasonable to expect that a high level of socio-emotional competencies would decrease the frequency of task interruption (multitasking), the posting of online comments (cybergossip), and the tendency toward phubbing. On the other hand, since socio-emotional competencies are a protective factor of cybernetic risks, it is presumable that they will also act as a protective factor of habitual digital behaviors that are conducive to such risks: of cybergossip, which predicts cyberbullying (Romera et al., 2018), of phubbing, which heightens exclusion (Chotpitayasunondh & Douglas, 2018), and of multitasking, which increases addiction to technology (Lin et al., 2020). Moreover, socio-emotional competencies could regulate emotions that generate habitual digital behaviors such as social acceptance or rejection stemming from evaluative comments on social media, as well as stress and anxiety stemming from multitasking (Becker et al., 2013) and feelings of being bothered by phubbing (Aagaard, 2020): thus, as an effect of such emotions, new online behaviors could be reduced (Rosen et al., 2013).

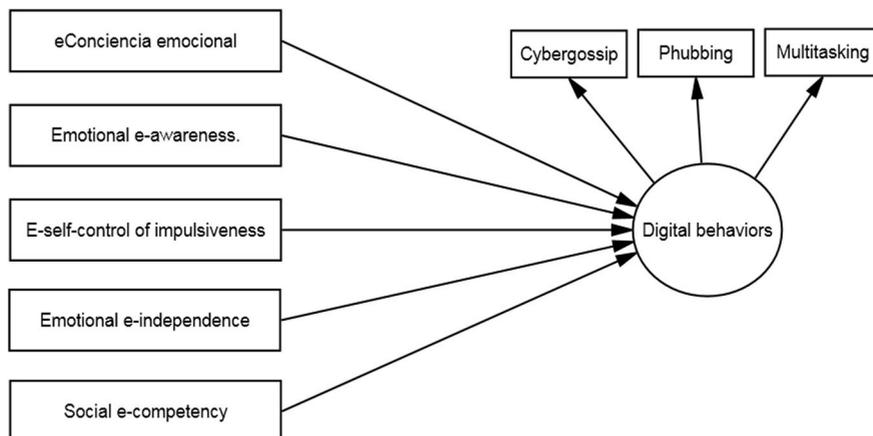


Fig. 1. Diagram of the study model.

H3. Age and gender differences in adolescent development (Crone & Konijn, 2018) as well as in terms of socio-emotional competencies (Zych et al., 2018), lead us to hypothesize that we will find differences in the relations between socio-emotional e-competencies and the three habitual digital behaviors in function of gender and age. Several studies have confirmed that girls have higher levels of empathy, a greater concern for other people, along with and a capacity to “put themselves in others’ shoes” (Christov-Moore et al., 2014) and emotional attention capacity (Garaigordobil, 2020) moreover, they experience emotional instability with greater frequency and intensity (Bailen et al., 2019) as compared to boys, who, at the same age, score lower in terms of emotional clarity (Alloy et al., 2016). Regarding the age factor, neuroscience research on adolescent development has shown that the development of the prefrontal cortex, an important region for emotion regulation, matures until early adulthood (Tamnes et al., 2017) and emotion regulation strategies development does not follow a linear progression (Santos et al., 2021).

In order to test these hypotheses, we postulate a structural equation model in two separate parts. On the one hand, we propose an endogenous latent variable of habitual behaviors on the Internet, which would be made up of multitasking, phubbing, and cybergossip, all regarded as one sole construct entitled “habitual digital behaviors”. On the other hand, we propose as exogenous variables the five socio-emotional e-competencies defined in Authors (in press). Moreover, we will apply invariance analysis to verify whether the relations among the variables are the same in the case of boys and girls, and in two different age groups: younger students (1st and 2nd year of Compulsory Secondary Education), and older students (3rd and 4th year). The model is illustrated in Fig. 1.

4. Material and methods

4.1. Participants

Information was gathered from students enrolled in secondary school (in Spain: 1st-4th years of ESO, e.g., *Educación Secundaria Obligatoria*, “Compulsory Secondary Education”, comprising ages 12 to 16) in the Autonomous Community of Aragon (Spain). Our non-probabilistic, incidental sample was assembled according to the accessibility of institutions of secondary education. A total of 880 participants between the ages of 12 and 16 ultimately completed the survey. However, for this article, we only selected those cases which did not present missing values in the analyzed variables, thereby resulting in a final sample of $n = 776$ participants. Distribution by gender was equitable (55.0% girls and 45.0% boys), with a mean age of 13.83 ($SD = 1.26$) and a well-balanced distribution across school years (26.9% were in First ESO Year, 25.5% in Second, 23.1% in Third, and 24.5% in Fourth Year). Those four different school years had the following age means: [1st = 12.37 (0.532), 2nd = 13.34 (0.544), 3rd = 14.40 (0.534), and 4th = 15.40 (0.580)]. The percentage of males and females enrolled in the different academic years did not result in statistically significant differences (Chi-square = 3.37, $gl = 3$, $p = .338$), neither between the mean age of boys and girls ($F_{1,774} = 2.587$, $p = .108$).

4.2. Tools

Cybergossip questionnaire: *Cuestionario de « cybergossip » Adolescentes (CGQ-A)*, (Romera et al., 2018), based on the four main functions of gossip: to inform, to influence, to create friendships, and to entertain as, for example “I talk about others on social network or WhatsApp because it makes me feel closer to my group of friends” and “I have told things about a classmate or friend on social network or WhatsApp to make the group change their opinion about him/her”. The questionnaire is made up of 9 items on a 5-point Likert scale (ranging from 0 = never to 4 = always) ($\alpha = 0.839$). The scale’s internal consistency index in relation with the current study sample was $\alpha = 0.845$.

Phubbing Scale (Karadağ et al., 2015). We used the Spanish-language version established by Blanca and Bendayan (2018). It is made up of 10 items on a Likert scale (ranging from 1 = never to 5 = always) distributed across two dimensions: 1) Disruption of communication (5 items, $\alpha = 0.85$), which quantifies the frequency of interruption of conversations to check one’s mobile as, for example “I am busy with my mobile phone when I’m with my Friends” and “People complain about me dealing with my mobile phone” and 2) Obsession with the phone (5 items; $\alpha = 0.76$), which evaluates the need felt by the subject for his/her mobile telephone as, for example “My phone is within my reach” and “When I wake up in the morning, I first check the messages on my phone”. Internal consistency in our study was $\alpha = .76$ y $\alpha = 0.75$, respectively. Nevertheless, for this study, we only took the total phubbing score ($\alpha = 0.83$) into account.

Media multitasking index (Martín-Perpiñá et al., 2019). This is a version adapted from a tool proposed by Ophir et al., 2009. We evaluated the degree to which students become involved in nine extraneous media activities (watching television, reading, listening to music, talking on the phone, sending messages, social media, online videos, other digital activities, and video games) while working on their academic tasks. The questionnaire uses a 1–4 point Likert scale ranging from 1 (never) to 4 (quite frequently). The scale’s internal consistency index in relation with the current study sample was $\alpha = 0.84$.

For socio-emotional e-competencies: *Cuestionario de las e-competencias socioemocionales (e-COM)* (Cebollero-Salinas et al., 2022).

This is a questionnaire that evaluates socio-emotional e-competencies in an online environment. It comprises 25 elements, to which participants respond on an 11-point Likert scale ranging from 0 (totally disagree) to 10 (totally agree). The questionnaire has five subscales:

- emotional e-awareness. Quantifies ability to identify and understand one’s own emotions in a virtual context, as, for example: “When I am on social media (reading comments, watching videos, exploring people’s profiles, etc.), I can put a name on what I feel” (5 items; $\alpha = 0.80$).

- emotional e-regulation. Evaluates the capacity to generate appropriate responses to a context by identifying one's emotional states, generated by the specific characteristics of communication on the Internet, as, for example: "Before making a joke about someone on social media, I am capable of imagining how they are going to feel" (5 items; $\alpha = 0.80$).
- e-self-control of impulsiveness. Quantifies the competency to inhibit spontaneous responses in the face of stimuli, social requirements, and information appearing on the Internet, as in, for example: "I cannot help clicking on attractive links that appear in my feed" (5 items; $\alpha = 0.84$).
- emotional e-independence. Evaluates the ability to feel emotionally strong in virtual social relations without depending on reputation and virtual status negotiation. For example: "If people don't react to me on social media, I feel as if they did not regard me as part of the group" (5 items; $\alpha = 0.91$).
- social e-competency. Quantifies the competency to maintain good relationships in a virtual environment, as well as pro-social conduct, as, for example: "On social media (Instagram, WhatsApp, etc.) I pay attention to the needs of others" (5 items; $\alpha = 0.86$).

4.3. Method

4.3.1. Method

Firstly, we obtained consent from the administrators of learning institutions (secondary education) after having sent them a brief report detailing our study's objectives and its scope. We then proceeded to obtain parental consent. We explained the study's objective to the students, as well as the fact that their responses would remain anonymous, and that their participation was voluntary. The questionnaire battery was filled out during class time in the presence of a research team member. The study was approved by the Research Ethics Commission of the Autonomous Community of Aragón (Spain).

4.3.2. Statistical method

Analysis of results was carried out in two phases. In a first phase, we applied descriptive analysis of the means of the scales that had been used, differentiating by gender in order to carry out an initial exploration of results and to test whether there were differences between boys and girls. In a second phase, we tested the hypothetical model of causal structure by applying SEM. In this model, the above-mentioned e-competencies are considered exogenous variables, whereas the analyzed behaviors are considered endogenous variables (or criterion variables in the regression equations). Since this method allows for the establishment of factor measurements, the three behaviors (phubbing, cybergossip, and media multitasking) were grouped into one sole factor score. The method also allows for the implementation of factorial invariance studies, thereby permitting researchers to analyze whether the endogenous variables' regression weights differ among the groups of girls and boys.

Our SEM model, designed on the basis of our review of previous literature and represented in Fig. 1, was tested with IBM-SPSS software and its AMOS extension (v.17). The estimation method chosen to test the measurement model was asymptotically distribution-free (ADF), an approach recommended for scales that cannot be measured quantitatively, and for which multivariate normality cannot be assumed (Byrne, 2010). To begin with, we obtained correlations among all the factor scores of the variables in both the girls and boys subsamples and the first-second year group and third-fourth year group. Then we compared the two subsamples by applying Fisher's Z transformation of the correlation coefficient. We tested the model's goodness of fit using the χ^2 test, as well as the normal and the χ^2 of freedom ratio (DCIM/GL in Amos), by RMSEA and GFI indicators, and by their critical levels as indicated by authors such as Vandenberg (2006), and Byrne (2010). We applied multi-group analysis to verify the hypothesis whether the interviewees of different sexes displayed significant differences in terms of influencing relationships. To make this distinction between models, we compared a series of nested models, the results of which are described in the Results section. To contrast differences between groups, the models were compared by calculating differences in χ^2 and the AIC index (Byrne, 2010).

5. Results

The values obtained in this study show that the analyzed behaviors (cybergossip, phubbing, and media multitasking) are present

Table 1
ANOVA of habitual digital behaviors in function of gender and of academic year.

	Group	N	Mean	S.D.	F	Sig	η^2
Cybergossip	Females	427	15.24	4.97	.575	.448	.001
	Males	349	14.96	5.55			
Phubbing	Females	427	23.15	6.95	14.452	.000	.018
	Males	349	21.34	6.22			
Multitasking	Females	427	17.44	5.26	.606	.436	.001
	Males	349	17.13	5.96			
Cybergossip	1st/2 nd year	407	14.33	5.12	19.487	.000	.025
	3rd/4th year	369	15.98	5.24			
Phubbing	1st/2 nd year	407	21.03	6.69	34.063	.000	.042
	3rd/4th year	369	23.78	6.40			
Multitasking	1st/2 nd year	407	16.16	5.25	37.165	.000	.046
	3rd/4th year	369	18.56	5.68			

among students of Secondary Education, since their mean values lie in the vicinity of or lie over the mean interval score, particularly in the case of multitasking and phubbing. However, analysis of distribution of those values shows that they do not follow a normal curve, thereby implying that the majority of those values have medium or low scores, and that high scores are less frequent, particularly in the case of cybergossip and multitasking. In terms of gender, the sole significant differences appear in the case of phubbing, where girls score slightly higher than boys. In terms of academic year, the three behaviors display significant differences: more advanced academic years (3rd and 4th year) obtain higher scores than the lower ones (1st and 2nd year: Table 1). Size effect analysis reveals that these differences are considerable, particularly those among academic years.

Differences among e-competencies in function of gender and academic year are displayed in Table 2. As in the previous case, we found certain differences according to gender, with higher levels of emotional e-awareness for boys (35.26 vs. 32.31), and of social e-awareness for girls (32.70 vs. 30.54). In terms of academic year, results follow contrary tendencies: thus, younger students (1st and 2nd year) score higher in emotional e-regulation (37.38 vs. 35.76), in e-self control of impulsiveness (32.82 vs. 31.07), and in emotional e-independence (36.94 vs. 34.22), whereas older students have higher levels of emotional e-awareness (34.45 vs. 32.90). In all cases, notwithstanding, size effects are low: i.e., the differences' magnitude is not large.

Table 3 shows two important aspects of the analysis of relations among variables. The first portion displays the factorial weights of CFA (confirmatory factor analysis) of the three analyzed behaviors presented in Fig. 1: cybergossip, phubbing, and multitasking. Data confirm that these three variables can be regarded as belonging to the same factor, which we denote as "habitual digital behaviors". Factorial weights present slight differences among groups, but the two models assuming that they are invariant among groups (boys vs. girls, and 1st/2nd year vs. 3rd/4th year) have adequate fit (gender: $\chi^2 = 2.232$, g.l. = 3, $p = .526$, $\chi^2/\text{g.l.} = 0.744$, CFI = 1.0, RMSEA = 0.000; academic year: $\chi^2 = 3.095$, g.l. = 3, $p = .377$, $\chi^2/\text{g.l.} = 1.032$, CFI = 0.999, RMSEA = 0.006). In view of this, and taking the value of regression weights into account, it can be assumed that the three variables could serve as indicators of the same type of behavioral profile in an online environment.

Taking the above results into account, we calculated the correlations between the new variable, "habitual digital behaviors", and e-competencies, differentiated according to gender and academic year, as gathered in Table 3. These results reveal significant correlations with four of the five e-competencies, with the exception of emotional e-awareness. The correlation with social e-competency is of low magnitude, yet the same does not occur with e-regulation of impulsiveness, emotional e-regulation, and emotional e-independence. Between the latter, certain differences among groups appear ($Z = 13.72$, $p < .001$; $Z = 2.57$, $p = .01$). Thus the correlation between emotional e-regulation and "habitual digital behaviors" is lower in boys ($r = -0.332$) than in the case of girls ($r = -0.566$), and the relation between emotional e-independence and "habitual digital behaviors" is more pronounced in older students ($r = -0.485$) than in younger ones ($r = -0.331$). Thus, from a relational angle, we ascertain that there is a relation between habitual digital behaviors and e-competencies, particularly with e-regulation of impulsiveness, emotional e-regulation, and emotional e-independence. All of these relations are negative, i.e., the greater the degree of competency, the less habitual digital behaviors appear, except in the case of social e-competency, which is associated with a greater prevalence of habitual digital behaviors.

In accordance with this study's objective, we tested the model displayed in Fig. 1. In Table 4 we thus present the results of fit of the models applied to boys and to girls, as well as to students of 1st/2nd year and 3rd/4th year, with analysis of invariance (Figs. 2 and 3). In both cases, we observe that the proposed model fits the data, and, as previously noted, it assumes important invariance restrictions of the types of behavior. In both models, notwithstanding, we find that not all e-competencies have the same relevance. The most important ones are emotional e-regulation, both for boys and for girls ($\beta = -0.39$), as well as for the two academic year age groups ($\beta = -0.34$), as well as e-regulation of impulsiveness, with the same factorial weight according to gender ($\beta = -0.35$), but with a greater relevance for 1st/2nd year students ($\beta = -0.45$) than for 3rd/4th year students ($\beta = -0.24$). Emotional e-independence is the third

Table 2
Socio-emotional e-competencies. ANOVA according to gender and academic year.

		N	Mean	S.D.	F	Sig	η^2
Emotional e-awareness	Female	427	32.31	9.74	17.589	.000	.022
	Male	349	35.26	9.75			
Emotional e-regulation	Female	427	37.07	9.20	2.330	.127	.003
	Male	349	36.05	9.21			
E-self-control of impulsiveness	Female	427	32.32	10.52	.963	.327	.001
	Male	349	31.57	10.70			
Emotional e-independence	Female	427	35.81	12.22	.165	.684	.000
	Male	349	35.45	11.78			
Social e-competency	Female	427	32.70	9.04	9.591	.002	.012
	Male	349	30.54	10.30			
Emotional e-awareness	1st/2nd year	407	32.90	10.04	4.805	.029	.006
	3rd/4th year	369	34.45	9.58			
Emotional e-regulation	1st/2nd year	407	37.38	9.23	6.003	.015	.008
	3rd/4th year	369	35.76	9.12			
E-self-control of impulsiveness	1st/2nd year	407	32.82	10.77	5.310	.021	.007
	3rd/4th year	369	31.07	10.34			
Emotional e-independence	1st/2nd year	407	36.94	11.65	10.039	.002	.013
	3rd/4th year	369	34.22	12.27			
Social e-competency	1st/2nd year	407	31.54	10.25	.313	.576	.000
	3rd/4th year	369	31.93	9.02			

Table 3
Factorial weight of behaviors and correlations between “habitual digital behaviors” and e-competencies.

	Male	Female	1st/2 nd year	3rd/4th year
Factorial Weights				
Cybergossip	.703	.688	.744	.645
Phubbing	.790	.703	.705	.733
Multitasking	.598	.639	.610	.582
Correlations between e-competencies and habitual digital behaviors				
Social e-competency	.178**	.111	.148*	.155**
Emotional e-independence	-.357***	-.467***	-.331***	-.485***
E-self-control of impulsiveness	-.556***	-.532***	-.584***	-.505***
Emotional e-regulation	-.332***	-.566***	-.439***	-.412***
Emotional e-awareness	.051	-.044	.013	-.115

Table 4
Fit of the SEM models and analysis of invariance.

Model	CMIN	DF	P	CMIN/DF	GFI	RMSEA	AIC
Comparison by gender							
Structural covariances	107.68	44	.000	2.447	0.956	0.043	163.68
Structural residuals	110.578	45	.000	2.457	0.955	0.043	164.578
Measurement residuals	120.164	48	.000	2.503	0.951	0.044	168.164
Weights not sig B5 Y B4	99.531	44	.000	2.262	0.96	0.040	155.531
Dif B1	99.268	43	.000	2.309	0.96	0.041	157.268
Dif B2	99.121	43	.000	2.305	0.96	0.041	157.121
Dif B3	98.544	43	.000	2.292	0.96	0.041	156.544
Comparison according to academic year group							
Structural covariances	95.829	44	.000	2.18	0.958	0.039	151.829
Structural residuals	95.84	45	.000	2.13	0.958	0.038	149.840
Measurement residuals	108.374	48	.000	2.26	0.953	0.040	156.374
Eliminating not sig liberating_b2	93.327	45	.000	2.07	0.96	0.037	147.327
liberating_b2	91.078	44	.000	2.07	0.96	0.037	147.078
liberating_b3	86.366	44	.000	1.96	0.963	0.035	142.366
liberating_b1	93.301	44	.000	2.12	0.96	0.038	149.301

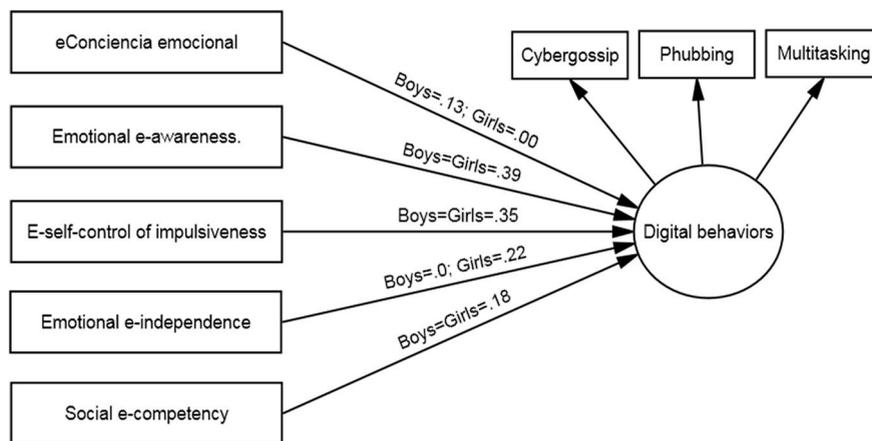


Fig. 2. Path Model for boys and girls.

predictor of the model, but displays a differential behavior, since it is only relevant for girls ($\beta = -0.22$) and for 3rd/4th year students ($\beta = -0.29$). Social e-competency serves as a relevant, invariant predictor among genders ($\beta = 0.18$) and age groups ($\beta = 0.22$). Lastly, emotional e-awareness only appears in the case of boys, and with low factorial weight ($\beta = 0.13$). These models explain a percentage of similar variance according to academic year ($R^2_{1st/2nd\ year} = 0.456$; $R^2_{3rd/4th\ year} = 0.462$), but they offer better prediction in the case of girls ($R^2 = 0.553$) than in boys ($R^2 = 0.334$). At any rate, the data substantiate the relevance of e-competencies in social behavior on the Internet, while displaying certain differences in function of gender and school year (thus of age).

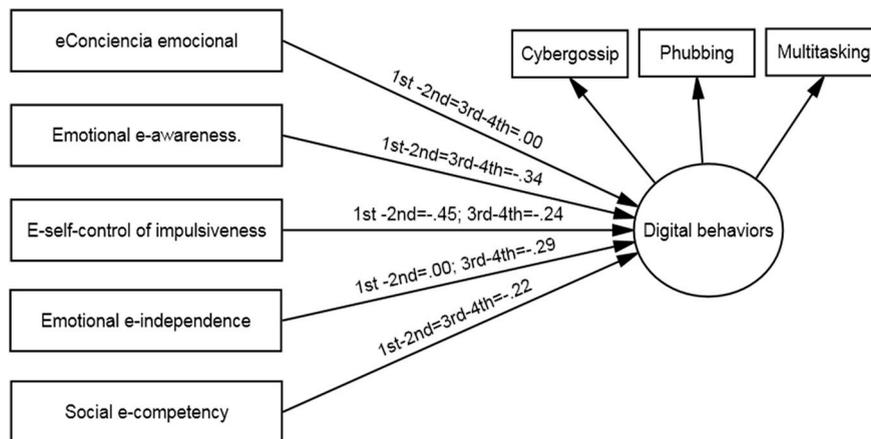


Fig. 3. Path diagram by year.

6. Conclusions

This study investigated whether socio-emotional e-competencies play a protective role against habitual digital behaviors which, in turn, can exacerbate other major risks. We postulated three hypotheses. The first one was confirmed: we ascertained that the three analyzed behaviors (media multitasking, phubbing, and cybergossip) can be regarded as one sole construct, since they form part of the same factor. This finding represents a relevant contribution to scientific knowledge regarding such behaviors in adolescents. Data show that these three behaviors are present in the age groups we studied. This finding is in line with certain previous studies, which found that a frequent way of engaging simultaneously in two tasks consists in consulting the smartphone and leaving comments on social media, or on another screen (Lau, 2017).

Our second hypothesis had the purpose of analyzing the negative relation between socio-emotional e-competencies and habitual digital behaviors. Our results have evidenced the existence of that relation, but with a different incidence according to the type of e-competency. Results for emotional e-regulation, e-self-control of impulsiveness, and emotional e-independence thus indicate that these three competencies have a negative influence on habitual digital behaviors such as multitasking while studying or leaving comments about other people on social media.

At odds with our second hypothesis (H2) regarding social e-competencies, our results point to a relation with habitual digital behaviors, but with less magnitude and with a positive effect: in other words, higher levels of such e-competencies are associated with higher frequencies of such habitual digital behavior in online interaction. This relation can be explained by the specific characteristics of virtual environments. Social media allow the user to form part of a multitude of different groups within which relations tend to be more distant and anonymous, leading to greater levels of online prosocial behavior (social e-competency). These, in turn, allow the person to devote more attention to other conducts, thereby reinforcing social interaction behaviors, either through functions such as cybergossiping when leaving comments about others to reinforce bonds with others, or sharing information while working on academic tasks.

Regarding the factor of emotional e-awareness, our results only support the hypothesis to a limited extent. The fact that this e-competency is not related with the habitual digital behaviors could be explained by the difficulty of developing it in a digital environment. The experience of time on the Internet is different from the face-to-face environment (Serrano-Puche, 2016). Communication is more rapid and immediate, which makes it more difficult and complex to identify one's own emotions. Communication is also limited by the lack of non-verbal cues; emotional communication on the Internet tends to be more superficial. Users tend to translate what they feel by adding a considerable amount of emoticons, GIFs and other resources (Jibril & Abdullah, 2013) that allow the recipient to infer something about the emotions' intensity.

Lastly, our third hypothesis (H3) postulated the existence of certain differences according to participant gender and age. Indeed, in the SEM models we posited, socio-emotional e-competencies explain the habitual digital behaviors to a considerable and similar degree according to age, and in greater proportion in girls, which indicates that social e-competencies are highly relevant in the ages under study, especially for girls. This observation can be explained by the fact that girls tend to be more empathetic; they score higher on pro-social behavior (Christov-Moore et al., 2014; Zych et al., 2018), their use of the Internet is more socially oriented (Oberst et al., 2016) and, according to certain studies, they tend to seek a greater deal of social support and have higher levels of brooding and catastrophic interpretation of events than boys (Garnefski & Kraaij, 2018). These same reasons might explain why emotional e-independence (i.e., the capacity to feel emotionally competent and to value oneself without depending on recognition on social media) is a specific protective factor for girls in the face of this type of behavior, whereas emotional e-awareness is the competency that acts as a differential factor in boys.

Our results also show that emotional e-independence exerts a negative influence on the level of habitual digital behaviors in the group of older students (3rd and 4th year). In other words, it is crucial for 14-to-16-year-old adolescents to acquire self-esteem without depending on popularity indicators (such as their number of followers) or on their perception of the degree of integration in online

groups (for instance, according to the amount of responses received), thereby enabling them to avoid high degrees of cybergossip, phubbing, or media multitasking. One possible explanation for the fact that this competency is relevant in the older group could be found in the fact that self-esteem tends to decrease with age in this phase (Rodríguez & Caño, 2012). 14-to-16-year-olds can be more vulnerable in terms of being affected by social recognition on the Internet (e.g., by the number of likes they receive). They would consequently increase their rate of habitual digital behaviors in an attempt to feel more secure and to counteract their fear of rejection (Valkenburg et al., 2017). This means that emotional e-independence could be key for behaviors upon which self-esteem has a significant influence, as is the case of Internet addiction (Blachnio et al., 2019; Huaytalla et al., 2016).

These results are novel in that they analyze emotions in virtual environments and respond to the need highlighted by Van Deursen et al. (2015), who studied the relation between emotional intelligence and habitual, abusive smartphone use and pointed out the need to investigate the regulation of emotions by applying a more differentiated approach. What is more, the fact that most studies of the influence of socio-emotional competencies on cyberbehaviors are carried out on models in real-life presentational situations (Nasaescu et al., 2018) justifies the need to carry out studies such as ours. This study's results indicate that the dimensions of self-regulation (emotional e-regulation and e-self-control of impulsiveness) protect teenagers of all the ages under study and of both genders from habitual digital behaviors such as multitasking while working on homework, thereby improving their attention span and their memory capacity (Baumgartner et al., 2017; Ophir et al., 2009) by decreasing the frequency at which they check notifications, for example. This highlights these competencies' importance in the face of specific characteristics of the virtual environment, such as the possibility the latter offers for a greater amount of disinhibition (Suler, 2004), as well as in the face of potential misunderstanding due to a lack of communication elements that contextualize information, such as body language cues (Romera et al., 2018). In order to prevent habitual digital behaviors from leading to greater risks on the Internet for girls and boys, it becomes highly necessary for them to regulate themselves emotionally by learning to tone down or entirely avoid uncontrolled, immediate responses when cybergossiping (for example, when commenting on messages and photos), or learning to avoid focusing on the mobile phone and clicking on screen announcements when they are in the midst of a face-to-face conversation. Regarding the age at which these e-competencies are exerted to a greater or lesser degree, our results show that e-self-control of impulsivity is a greater predictor of the level of habitual digital behaviors in younger adolescents; its predictive capacity decreases with age. Studies in neurological development show that the regions of the brain that are responsible for cognitive regulation and, thus, for the regulation of impulses (Steinberg et al., 2008), are still immature in early adolescence; as teenagers grow older, cognitive processes become more flexible and efficient (Crone & Konijn, 2018). It is thus probable that e-self-control of impulsivity is required to discriminate less as age increases, and thereby loses predictive power.

On the other hand, our results show that the predictive capacity of emotional e-regulation remains constant with age: all of these students experience emotions frequently and intensely (Bailen et al., 2019). At these ages groups in our study (12–16) could have a similar level of vulnerability in terms of emotional regulation; there is evidence that at these ages the brain regions in charge of these functions are subject to temporal alterations (Zimmermann et al., 2019). As recent neuroimaging studies show, youngsters probably use different emotional regulation strategies according to age. A positive refocusing process takes place in pre-adolescence (at ages 10 to 12); teenagers in middle adolescence adopt a more detached perspective, but more efficient strategies such as cognitive reevaluation and planning are mostly not incorporated until an age of greater cerebral maturity is reached (Santos et al., 2021).

These results have significant implications. We have ascertained that the three analyzed habitual digital behaviors have a high incidence among adolescents, and can automatically perpetuate themselves due to the fact that they provide gratification and a sense of belonging (Allen et al., 2014); indeed, some teenagers may eventually prefer communication on social media to maintaining a face-to-face conversation (Karadağ et al., 2015). Certain authors have observed that those students who spend the greatest amount of time on the Internet tend to suffer from certain disadvantages in their social life: thus, habitual digital behaviors without proper regulation can reinforce maladjustments, upon which each one of them has a specific influence, as occurs in cyberbullying as a consequence of cybergossip (Romera et al., 2018), in depressive symptoms associated with phubbing (McDaniel & Coyne, 2016), and in addiction to technology as associated with multitasking (Lin et al., 2020). It would thus be recommendable to design educational programs that help young people become more aware of certain dangers eventually associated with gratifications which, at first glance, may seem inoffensive or irrelevant, such as the constant search for novelty on the Internet to counteract boredom, which nevertheless increases the degree of phubbing (Al-Saggaf et al., 2019).

Moreover, our results point to the need for adolescents to acquire socio-emotional competencies that are specifically adapted to online environments, since these competencies explain a high percentage of the variability of habitual digital behaviors. The acquisition thereof can play a key role in these youngsters' personal development, since they spend a substantial portion of their life in an environment whose characteristics differ considerably from presentational situations. Social media, moreover, are designed to encourage users to spend the greatest possible amount of time on them by means of a series of reinforcements and intermittent gratifications, such as a user's popularity index (van Velthoven et al., 2018); in view of this, the acquisition of regulative e-competencies becomes crucial. Many formerly presentational activities have been transferred to online environments, and this tendency has been exacerbated in the wake of the Covid-19 pandemic: it thus seems reasonable to suppose that the acquisition of socio-emotional competencies can produce a number of positive effects in an individual's emotional, social, and academic life.

Primary and secondary schools should not only direct their efforts to educating their students about digital risks, but should also incorporate the acquisition of socio-emotional e-competencies in order to encourage balanced, responsible use of the Internet as a transversal element in the learning of digital competencies across all subjects: for instance, by encouraging pro-social online behavior, as well as online conflict management as a subject that can be handled in group academic tasks. One way to do this would be to include specific modules regarding socio-emotional competencies in training programs that would encourage appropriate emotional regulation strategies according to age, as well as improving emotional independence by suggesting that youngsters limit multitasking along

with the gratification that comes with it, and by encouraging them to analyze practices of social comparison as well as their personal experiences of acceptance or rejection on social networks. It would also be advisable to help families supervise their children by encouraging e-competencies during their screentime (Hurwitz & Schmitt, 2020) within a framework of responsible use of social networks.

6.1. Limitations and outlook

This study has several limitations, in the light of which its results need to be interpreted. For one, its transversal nature does not allow for the establishment of causal relations among the variables: it would thus be recommended to carry out longitudinal studies. Furthermore, although this study provides relevant perspectives on digital behavior in adolescents, it only does so from one angle, since questionnaire responses are its sole source of quantitative data. A general drawback of such tools is that participants may either misinterpret certain items, or may not respond sincerely (Beard, 2005); moreover, when answering questionnaires, adolescents tend to evaluate themselves positively, as Hutchison et al. (2016) have shown. In digital abilities such as virtual communication, boys tend to attribute greater skill to themselves than to girls, despite the fact that girls obtain significantly higher scores in this area. These drawbacks associated with questionnaires would somewhat attenuate the significance of the relations we found, thereby leading to the need for additional research with methods such as observation, interviews, or behavior tests that would help to reinforce these results' reliability and validity. In spite of these limitations, our study provides an important contribution to research, since it is the first investigation to specifically deal with the influence of an online environment on socio-emotional competencies. Lastly, this study provides evolutionary data that help us better understand the nature and manifestation of these new habitual behaviors (Gabriels & De Backer, 2016), thereby highlighting the need to encourage responsible use of social networks by implementing integral prevention programs against abusive behavior.

Credit author statement

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