PSYCHOMETRIC PROPERTIES OF THE RISK PERCEPTION SCALE FOR TECHNOLOGY USE IN CHILDREN AND ADOLESCENTS

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Abstract

The aim of this work is 1) to create a valid, reliable instrument with which to evaluate the risk perception of children and adolescents regarding their use of technology (cell phones, Internet, and video games); and 2) to analyze the frequency with which some risk behaviors occur in relation to perception, technology use and age. 807 children and adolescents from the province of Cordoba (Spain) answered an *ad hoc* questionnaire with several instruments: sociodemographic data; problematic use of cell phones, Internet, and video games; and risk perception with the Scale on Risk Perception of Technology Use for children and adolescents (EPRUT). The results obtained from the factor analysis reveal that the RPSTU has three dimensions, related to cell phones, Internet, and video games, respectively. Differences were observed in the relationship between age and risk perception, with older people having the highest risk perception. Assessing risk perception will favor the detection and development of prevention programs for the use of technology in children and adolescents.
KEY WORDS: *Internet, cell phone, sleep, eating, video games*.

Resumen

Los objetivos de esta investigación son: 1) crear un instrumento válido y fiable que permita evaluar la percepción del riesgo que tienen del uso de la tecnología (móvil, Internet y videojuegos) niños y adolescentes; y 2) analizar la frecuencia con la que se dan algunas conductas de riesgo en función de la percepción, el uso de la tecnología y la edad. 807 niños y adolescentes de la provincia de Córdoba (España) respondieron una batería *ad hoc* que recoge información sobre datos sociodemográficos; uso problemático del móvil, internet y videojuegos; y percepción de riesgo con la "Escala sobre percepción de riesgo del uso de la tecnología" para niños y adolescentes" (EPRUT). Los resultados indican que a partir del análisis factorial, la EPRUT cuenta con tres dimensiones que hacen referencia al móvil, Internet y videojuegos. Se han observado diferencias en función de la edad y la percepción de riesgo. Evaluar la percepción del riesgo favorecerá la detección y el desarrollo de programas de prevención de uso de la tecnología en niños y adolescentes.
PALABRAS CLAVE: *Internet, móvil, sueño, alimentación, videojuegos*.

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Introduction

Cyberspace has come to play a crucial role in our social, family and personal reality. The Internet offers many benefits, including the rapid, efficient exchange of information, the globalization of knowledge and the instant availability of information. But it also entails risks such as spending excessive time in front of the screen, establishing relationships with strangers, and taking up time that could otherwise be devoted to more important activities. Prensky (2001, cited in García-García & Rosado-Millán, 2012) coined the term digital natives to describe the generation born in the age of Information and Communication Technology (ICT) and brought up surrounded by cell phones, computers, music players, video cameras, consoles and video games. Thanks to such exposure, this 21st century generation sees technology as a way of life, but it is not known how aware they are that this situation may be changing the way they behave (García-García & Rosado-Millán, 2012; Olson et al., 2022; Urieta et al., 2022). Technology has gone from being a work tool to actually structuring the current social context in which children and adolescents develop (Castillo & Ruiz-Olivares, 2019). According to statistical data from Spain, adolescents are the second most frequent users of technology after young people between 17 and 24 years of age, with 95.1% of them being active Internet users who connect mainly from mobile devices (Instituto Nacional de Estadística, 2018). This indicates that they spend a large part of their day connected to the Internet. Depending on the use they make of it, this may be positive or negative. For some authors, indicators of problematic technology use include excessive time spent online and/or a loss of the sense of time; mood alterations, feelings of tolerance and abstinence; psychological dependence, feelings of lack of control and negative effects in daily life at a personal, social level; and cognitive distortions such as denial and minimization of obvious effects (Castro & Ponce de León, 2018; Cátedra para el Desarrollo Social, 2018; Panova & Carbonell, 2018; Pedrero-Pérez et al., 2019; Pedrero et al., 2021).

The devices and activities most frequently used by children and adolescents are cell phones, the Internet and video games (Golpe-Ferreiro et al., 2017, Mora-Salgueiro et al., 2022; Oliva et al., 2012; Olson et al., 2022; Urieta et al., 2022). Cell phones provide a private, personal space where short distance contacts are established, and also offer instrumentality (alarms, calendars, pocket watches, notes, etc.) (Chacón-López et al., 2015). Internet, defined as the web of webs, is used by younger children fundamentally to establish contacts with their peers, thus overcoming distances, and as a space to express opinions and talk about specific topics (music, drawing, fashion, etc.) (Catalina et al., 2014). Video games, used by adolescents who are keen to experience stimulating emotions and virtual adventures without consequences in real life, offer a chance to demonstrate skills, competitiveness and the possibility of playing alone or in groups (Ameneiros & Ricoy, 2015).

Adolescence is a crucial period in anyone's life. It is the age when people begin to make their own decisions, live their own experiences, seek new sensations, etc. It is also the time when their personal identity is forged and consolidated from their self-image and from the value they are assigned by others, while, at the same time,

they adapt to new social requirements. Certain behaviors rooted in their stage of development may result in their being exposed to situations that threaten their physical or mental integrity: drug use, transgression of rules, peer group pressure, etc. According to the literature, the risks to which children and adolescents are exposed due to their use of technology include poor academic performance, family problems, social isolation, cyberbullying, and health-related risks such as difficulties in sleeping and loss of eating habits (Alfaro et al., 2015; Carbonell et al., 2012; Cátedra para el Desarrollo Social, 2018; Cerutti et al., 2016; Garmendia et al., 2016; Moral & Suárez, 2016; Ramos-Soler et al., 2018).

However, nothing is known about children's and adolescents' risk perceptions regarding the impact of technology use in their lives. For example, being in front of a screen talking online with another person constitutes a time investment that will reduce the possibility of talking to another person face to face, and of being able to perceive details of verbal and nonverbal communication. Some studies suggest that children and adolescents do not perceive the risk of being isolated and/or of their social relationships—for example, with the family—becoming inadequate (Catalina et al., 2014; Orosco & Pomasunco, 2020; Ramos-Soler et al., 2018).

Another risk to which children and adolescents are frequently exposed through the use of technology is cyberbullying (Alonso & Romero, 2020). Echeburúa and Requesens (2012) argue that the immediacy and reach of the Internet favor the creation of circumstances conducive to cyberbullying among peers, i.e., online bullying. In virtual space it is easy to insult, mock, spread rumors, disseminate compromising images or create false profiles because bullies are protected by their anonymity behind the screen (Catalina et al., 2014).

Poor school performance, too, is related to intensive and/or problematic use of technology by children and adolescents, who spend as much time as they can in front of screens. Sometimes, they lose control and have no awareness of time, or may even become obsessed with being connected at all times.

All this can influence both their academic responsibility and their leisure time (Catalina et al., 2014). Here, there is an indirect relationship with the time of use: i.e., the more time connected to the cell phone or computer, the less time dedicated to other activities like study, sports, going out with friends, etc. (Castillo & Ruiz-Olivares, 2019).

The problematic use of technology may also impact children's and adolescents' health, especially in areas like rest and eating habits (Besolí et al., 2018; Rial et al., 2014). Due to the secretion of melatonin during pubertal development, circadian cycles are delayed so there is a decrease in the desire to go to sleep. In combination with the fun of talking with friends or watching videos of their favorite youtubers, this can seriously interfere with adolescents' sleep habits. When answering chats is prioritized over eating, eating habits can also be affected. This may impact mealtimes or even result in a person forgetting some of their meals (Besolí et al., 2018; Castillo & Ruiz-Olivares, 2019; Catalina et al., 2014; Rial et al., 2014).

It is clear, then, that children and adolescents are exposed to a series of risks when they use technology intensively. But it is not so clear that they perceive such risks. Although the use of cell phones, Internet and video games may be affecting their daily activities, many of which are crucial for their proper development, it is

very likely that their risk perception is not very high. Risk perception is a highly complex, subjective cognitive process made up of a series of basic processes such as beliefs, attitudes, stereotypes or motivations that come into play when assessing certain situations. It is a value judgment where the cognitive distortions or false beliefs that a person builds up can lead them to make risky decisions. It is for this reason that, as children and adolescents entering adulthood become increasingly aware, they are expected to learn from experience, make better assessments of situations and, consequently, reduce their risk behaviors (García del Castillo, 2012).

Children and adolescents now spend a lot of time in front of screens. Most of them make intensive use of cell phones, the Internet and video games, but few question whether this use entails risks. Numerous studies have been carried out in the past to obtain data on the prevalence of technology use by children and adolescents, and to relate this data to the possibility of addiction or non-addiction (Beranuy et al., 2009; Echeburúa & De Corral, 2010; Golpe-Ferreiro et al., 2017; Mora-Salgueiro et al., 2022). Today, however, the consideration of intensive technology use as an addiction is being questioned in the literature (Panova and Carbonell, 2018). So far, the consensus is to talk about problematic tendencies in the use of technology rather than addiction (Carbonell et al., 2021; Castillo & Ruiz-Olivares, 2019; Panova & Carbonell, 2018).

Even so, hardly any studies have addressed children's and adolescents' own perception of the risks involved in their use of technology (Castillo & Ruiz-Olivares, 2019). Some works have focused on asking the adults around children and adolescents what risks they believe their children assume when using technology (Espinar & López, 2009; Martínez et al., 2013). In other qualitative studies, adolescents have been found to recognize the risks in children of their own age, but to have difficulties acknowledging that they themselves have a problematic relationship with technology use (Rial et al., 2014). In one study, adolescents admitted that they could run risks like experiencing online and offline bullying, neglecting their relationships with family and friends, and abandoning their academic responsibilities (Garmendia et al., 2016; Ramos-Soler et al., 2018). It therefore seems that, despite their intensive use of screens, adolescents are not aware of the proportional risks to which they are exposed (Labrador et al., 2018). The situation is complicated by a lack of instruments capable of reliably assessing their risk perception regarding their use of technology.

The present study therefore has two objectives: firstly, to create a valid, reliable instrument with which to assess risk perception regarding the use of technology (cell phone, Internet and video games) among children and adolescents; and secondly, to analyze the frequency with which some risk behaviors occur (behaviors related to sleep, food, bullying, leisure and free time, interpersonal relationships with friends, interpersonal relationships with family and academic results) as a function of risk perception (cell phone, Internet and video games), problematic use of technology and age.

Method

Participants

A total of 807 children and adolescents from 4 public schools in the province of Cordoba (Spain) participated in the study. 50.2% (*n*= 407) of the sample were female. Accessibility-based incidental sampling was used, covering an age range from 9 to 16 years (*M*= 13.24, *SD*= 2.33) (5th and 6th grades of primary school; 1st, 2nd, 3rd and 4th years of secondary school).

Instruments

An ad hoc battery was prepared with the following questionnaires:
a) *Sociodemographic Questionnaire*, collecting information on variables such as age, sex, year, hours of use.
b) *Mobile Phone Problem Use Scale for Adolescents* (MPPUSA; Bianchi & Phillips, 2005), Spanish adaptation by López-Fernández et al. (2012). This MPPUSA has 27 items scored on a Likert-type scale from 1 to 10 (1= never and 10= always). According to Cronbach's Alpha, the scale has a reliability index of .97. To determine the types of cell phone users, the following cut-off points are established: scores from 0 to 35, occasional users; from 36 to 173, habitual users; from 174 to 181, users at risk; and from 182 to 270, problematic users (López-Fernández et al., 2012).
c) *Internet-Related Experiences Questionnaire* (IREQ) ("Cuestionario de experiencias relacionadas con Internet"), short version by Beranuy et al. (2009). This questionnaire assesses Internet abuse and in its original version has 10 items that are answered between 1 (not at all) and 4 (very much). The higher the score, the higher the likelihood of problematic Internet use. For this study, the item "How often do you give up the things you are doing to spend more time online?" was modified by deleting the beginning of the question ("How often...?"). The final version used was left with 8 items (2, 3, 5, 6, 7, 8, 13 and 14), with dichotomous responses (yes or no). The original version of the IREQ has a reliability index of .79 for the total scale, for the intrapersonal factor alpha= .72 and for the interpersonal factor alpha= .64 (Casas et al., 2013).
d) *Internet Addiction Test* (d) "Test de adicción a Internet"; Echeburúa & Requesens, 2012). This test assesses possible addiction to the Internet and in its original version has 9 items that are answered in a dichotomous "yes/no" format. For this study, other items, for example "Are there areas or files on the net that you find difficult to resist?" and "Do you have problems controlling the impulse to buy products and services offered on the net?", were summarised because of their similarity into one item (item 12). Following these changes, six items (1, 4, 9, 10, 11 and 12) were chosen with dichotomous responses (yes/no).

Finally, to establish the type of user, the items of the IREQ and the "Internet Addiction Test" (14 in total) were combined and, based on the criteria of the authors of the latter, the values were adapted as follows: from 0 to 4 affirmative responses indicated users without problems, from 5 to 10 affirmative responses indicated users at risk, and from 11 to 14 affirmative responses indicated users with problems. In this study, the internal consistency (Cronbach's alpha) index of this questionnaire was .70.

e) *Questionnaire on Problematic use of New Technologies* ("Cuestionario de uso problemático de nuevas tecnologías", UPNT; Labrador et al., 2013). This questionnaire measures the frequency of Internet, cell phone, video game, and television use, and the perception of possible problems triggered by their use. In this study, only the 9 items corresponding to the use of video games were used. The nomenclature of the qualitative to quantitative response scale was also changed, with the original values (never, sometimes, frequently and always) being replaced by a scale of ordered categories from 0 (never) to 3 (always). The reliability index (Cronbach's alpha) of this questionnaire was .75.

f) *Risk Perception Scale for the Use of Technology in Children and Adolescents* ("Escala percepción del riesgo para el uso de la tecnología en niños y adolescentes", EPRUT). This ad hoc scale assesses the extent to which the use of mobile phones, Internet and video games influences sleep (e.g. going to bed later than you should; difficulty falling asleep), eating (e.g. not finishing a meal to use some technology), bullying (e.g. experiencing violence such as fights, harassment), leisure time activities (e.g. having less time for leisure activities such as sports), family and personal relationships (e.g. arguing with your family and friends), experiencing violence such as fighting, bullying), leisure activities (e.g. having less time for leisure activities such as sports), family and personal relationships (e.g. arguing with your parents; going out less with your friends), and academic performance (e.g. getting bad grades or not doing your homework). It consists of 24 items with a 5-Likert response scale. The reliability coefficient (Cronbach's alpha) of the EPRUT in this study was .84 (see Appendix).

Procedure

This section summarizes each step in the development of the research. An *ex post facto* cross-sectional single-group research design was used, with data being collected at a single point in time. Before collecting the data, the appropriate permissions were obtained from the school management and the families. To control extraneous variables such as environmental quality, the questionnaires were completed in the presence of the authors of the article. This reinforced the reliability of the data and made it possible to clarify any doubts which might arise during the process. The importance of their participation in this study was explained to the students and they were asked to complete an informed consent form, thereby ensuring ethical aspects such as voluntariness, confidentiality and anonymity and complying with the Declaration of Helsinki and Spanish Organic Law 3/2018, of December 5, on Personal Data Protection and Guarantee of Digital Rights.

Data analysis

The sample was divided randomly into two equivalent half-samples (n= 403 and n= 404). In the metric study of the scale's items and dimensionality, an exploratory factor analysis (EFA) was performed using Hull's method and the scree plot value index was used to evaluate the optimal number of dimensions (Calderón Garrido et al., 2019; Lorenzo-Seva et al., 2011). One-dimensionality was also assessed using the unidimensional congruence (unique), explained common variance (ECV) and mean residual absolute item loadings (MRAIL) proxy indicators (Ferrando & Lorenzo-Seva, 2018). Direct oblimin rotation (satisfactory when correlation between factors is assumed or known) was also applied (Worthington & Whittaker, 2006). The suitability of the matrix for EFA was tested using the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity. Item response theory—more specifically, the multidimensional discrimination index proposed by Reckase (2009)— was applied to calculate item discrimination.

To analyze cross-validity, a confirmatory factor analysis (CFA) was performed on the second half of the sample to validate the factor structure obtained from the first half. The model was estimated using robust maximum likelihood, a method well-suited to the categorical nature of the variables under study (Flora & Curran, 2004). Model fit was tested with the following indices: the Satorra-Bentler scaled chi-square (χ^2S-B) (Satorra & Bentler, 2001), the comparative fit index (CFI) and the non-normality fit index (NNFI) ($\geq$ .90 is adequate; $\geq$ .95 is optimal); root mean square error of approximation (RMSEA) and root mean square residual (RMSR) ($\leq$ .08 is adequate; $\leq$ .05 is optimal) (Hu & Bentler, 1999). The SPSS v. 25 statistical package was used to perform three descriptive analyses by percentages for each of the questionnaire items, to determine the frequency with which adolescents perceived risk behaviors in each of the dimensions (cell phone, Internet and video games). Scores of 0 and 1 were considered as low risk perception and those from 2 (the cut-off point) up to 5 as high-risk perception. The data were handled and processed using Factor v. 10.10.03 (Lorenzo-Seva & Ferrando, 2006) and the Equations Software Multivariate EQS 6.3.

Pearson correlations were also performed to relate risk perception to hours of use and problematic use of technology, and an analysis of variance was performed to risk perception differences by age group (the age groups established were 10-12; 13-15; and 16+).

Results

Exploratory factor analysis of the Risk Perception Scale for the Use of Technology in Children and Adolescents

The EFA was carried out with a three-factor structure corresponding to the use of each technology: mobile, Internet and video games, and each factor consisted of 8 items. The results showed a multivariate kurtosis of Mardia's (1970) coefficient of 3638.90. The Bartlett's statistic was χ^2=9592.1 (*df*= 561; p<.001) and the KMO was .902. The adequacy of the factorial solution was found for three factors, explaining

62.4% of the cumulative variance (F1= 25.6%; F2= 20.8%; F3= 16%;). The scree plot returned a value of 3.02, indicating 3 dimensions as the best multidimensional solution. The UniCo, ECV, and MIREAL indices of .83, .67, and .21, respectively, indicated optimal levels for not being considered unidimensional. The Hull method fit indices showed optimal values of CFI= .98 and GFI= .98. The values of the communality and factor loadings (Table 1), together with the multidimensional discrimination index (Reckase, 2009), exceeded .20, indicating true item discrimination. Correlation between items was adequate, with values ranging from .14 to .43. With regard to reliability, the scale's overall reliability was α= .84 (Factor 1, cell phone: α= .85. Factor 2, Internet: α= .83. Factor 3, video games: α= .81).

Table 1

Exploratory factor analysis and adjustment indices of the Risk Perception Scale for the Use of Technology in Children and Adolescents

	F1. Cell phone	F2. Internet	F3. Video games	Communality	MDISC	Cronbach's α if without item
Item 1	.62			.47	.88	.79
Item 2	.47			.38	.71	.80
Item 3	.64			.45	.88	.79
Item 4	.51			.35	.69	.79
Item 5	.59			.58	1.07	.79
Item 6	.66			.61	1.20	.76
Item 7	.48			.48	.68	.80
Item 8	.51			.47	.97	.81
Item 9		.57		.43	.83	.79
Item 10		.50		.44	.80	.80
Item 11		.86		.76	1.79	.79
Item 12		.72		.58	1.19	.79
Item 13		.71		.59	1.13	.79
Item 14		.43		.41	.61	.81
Item 15		.61		.55	1.03	.79
Item 16		.45		.44	.69	.80
Item 17			.60	.56	1.05	.79
Item 18			.82	.78	1.81	.79
Item 19			.83	.71	1.58	.77
Item 20			.64	.59	1.05	.80
Item 21			.86	.64	1.21	.79
Item 22			.72	.67	1.25	.79
Item 23			.71	.57	1.04	.79
Item 24			.46	.52	.97	.81

Note: MDISC= multidimensional discrimination index

Confirmatory factor analysis of the scale

The AFE shows the good fit of the 3-factor risk perception model. It shows adequate fit indices (χ^2 SB= 42.51, *gl*= 20, *p*= 16.02, CFI= .98, NNFI= .98, RMSEA= .03 [CI .02-.05]). Factor saturations and errors also show adequate values (Figure 1).

Figure 1
Graphical solution of the model with three factors or dimensions
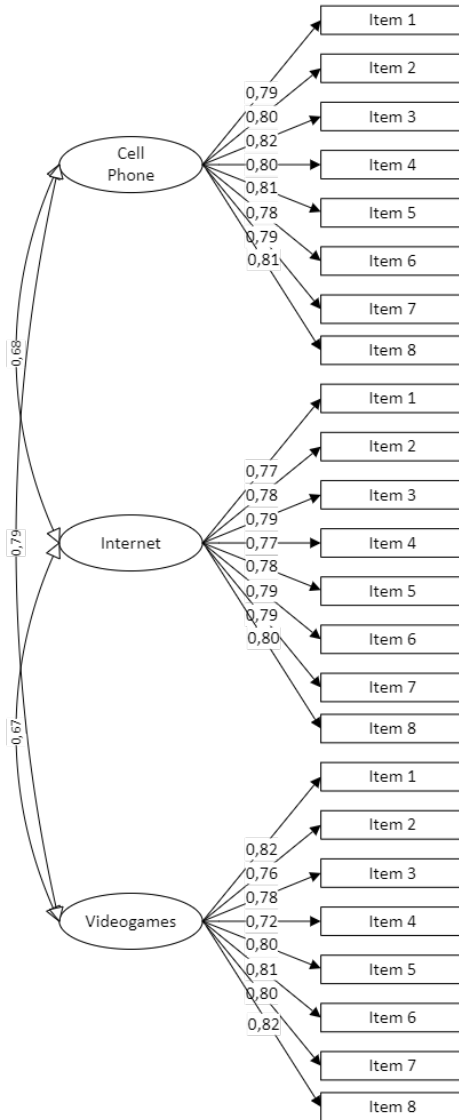
Analysis of descriptive statistics

To address the second objective, that of analyzing the frequency with which some risk behaviors occur (behaviors related to sleep, food, school bullying, leisure and free time, interpersonal relationships with friends, interpersonal relationships with family and academic results) as a function of risk perception (cell phone, Internet and video games), technology use and age were analyzed descriptively.

Percentages of choice for each of the items were analyzed. Table 2 shows each risk behavior in more detail. It can be seen, for example, that the use of cell phones and the Internet are perceived similarly. In both cases, children and adolescents consider that sleeping time (25.1%, 24.5%) and eating (19.3%, 8.8%) are the behaviors most likely to be affected using technology. They also agree on the behaviors where the least risk is perceived: social relationships (68.7%, 73.1%) and bullying (72.8%, 80.1%). However, behaviors perceived to be at risk due to the use of video games were not so evident. Here, the highest percentages were found in academic results, with 4.3%, 83.0% and 77.5% of children and adolescents considering that insomnia and bullying are not perceived risks when using video games.

Table 2
Percentages of each of the items with respect to the cell phone, Internet and video game use dimensions

Dimensions	ítems	M (SD)	Frecuency					
			0	1	2	3	4	5
Cell phone	1	2.56 (1.85)	15.5	26.2	7.6	13.4	12.2	25.1
	2	1.52 (1.47)	18.8	54.6	5.7	7.5	3.8	9.6
	3	2.00 (1.77)	18.5	39.4	8.2	10.1	4.4	19.3
	4	.95 (.80)	20.4	72.8	2.5	2.0	.50	1.8
	5	1.43 (1.34)	18.1	56.3	7.7	7.3	3.3	7.2
	6	1.47 (1.37)	18.5	52.3	10.9	7.1	3.8	7.4
	7	1.06 (1.00)	20.0	68.7	4.1	2.8	1.0	3.4
	8	1.34 (1.30)	20.0	57.7	5.7	7.6	2.7	6.3
Internet	9	2.08 (1.62)	15.5	25.6	7.4	13.1	12.0	24.5
	10	1.28 (1.10)	13.6	67.3	6.5	6.5	2.0	4.1
	11	1.57 (1.40)	14.1	55.4	11.1	6.5	4.1	8.8
	12	1.00 (.71)	13.9	80.1	2.4	1.9	1.7	.00
	13	1.37 (1.21)	14.3	62.5	8.9	6.5	1.9	6.0
	14	1.32 (1.12)	13.6	64.0	9.8	5.8	2.7	4.1
	15	1.16 (1.00)	13.8	73.1	5.4	2.6	1.2	3.9
	16	1.38 (1.22)	13.4	63.8	8.7	5.8	2.0	6.3
Video games	17	1.21 (1.04)	13.8	70.6	5.1	5.4	1.2	3.9
	18	1.06 (.86)	14.1	77.5	2.6	2.7	.30	2.7
	19	1.07 (.87)	14.1	77.1	3.4	2.0	.30	3.1
	20	.91 (.50)	14.3	83.0	1.5	.30	.70	.20
	21	1.18 (1.05)	13.9	73.5	3.4	2.9	2.0	4.2
	22	1.09 (.91)	14.6	74.7	4.4	2.7	.50	3.1
	23	1.04 (.82)	14.1	77.1	4.8	1.0	.50	2.5

24	1.15 (1.02)	14.3	74.1	4.3	1.4	1.7	4.3

To relate risk perception to variables such as hours of use or problematic use of technology, a Pearson correlation was performed (Table 3). In this case, it can be said that children's and adolescents' risk perception rise proportionally to the increase in the number of hours that they use cell phones ($p<$ .01), Internet ($p<$ .01) and video games ($p<$ .05). With regard to the relationship between risk perception and the problematic use of technology, the greater the use, the higher the risk perception (cell phones, $p<$ .01, Internet, $p<$ .01, and video games, $p<$ .01).

For the age variable, an analysis of variance was performed. The results indicate that the older the children/adolescents, the greater their perception of risk, cell phone, $F(2.781)= 75.618$, $p<$ .05; Internet, $F(2.584)= 19.701$, $p<$ .05; and video games, $F(2.584)= 3.603$, $p<$ .05 (Table 4).

Table 3
Pearson correlation between risk perception, hours of use and problematic use of technology (cell phone, Internet, and video games)

	1	2	3	4	5	6	7	8	9
1	--								
2	.815**	--							
3	.645**	.728**	--						
4	.932**	.936**	.841**	--					
5	.357**	.257**	.098*	.264**	--				
6	.167**	.244**	.176**	.248**	.418**	--			
7	-.029	.003	.108*	.004	.079	.939**	--		
8	.409**	.300**	.120**	.310**	.456**	.142**	-.050	--	
9	.289**	.372**	.190**	.319**	.269**	.305**	.109	.646**	--
10	-.017	.061	.272**	.102*	-.048	.856**	.736	-.022	.252**

Notes: 1) Perceived risk of cell phone use; 2) Perceived risk of Internet use; 3) Perceived risk of video game use; 4) Perceived total risk; 5) Hours of cell phone use; 6) Hours of Internet use; 7) Hours of video game use; 8) Problematic cell phone use; 9) Problematic Internet use; 10) Problematic video game use. **$p<$ .01, *$p<$ .05.

Table 4
Analysis of variance between risk perception and age

Risk perception	Age	*M*	*F*	*p*
Cell phone	9-12	1.0909	75.618	.000*
	13-15	1.7283		
	16+	2.1435		
Internet	9-12	.9692	19.701	.000*
	13-15	1.1829		
	16+	1.5218		
Video games	9-12	.8567	3.603	.028*
	13-15	.9450		
	16+	1.0581		

Discussion

The first objective of this study, that of validating an instrument that makes it possible to evaluate children's and adolescents' perception of the risks associated with their use of technology (cell phones, Internet and video games), can be said to have been satisfactorily fulfilled. After the exploratory and confirmatory factor analyses, it was verified that the three-dimension scale (Internet, cell phone and video games) has adequate psychometric properties in terms of validity and reliability fit indices. It therefore seems logical to assume, firstly, that risk perception varies depending on whether it is the use of cell phones, Internet or video games that is being considered. Each of these types of technology use constitutes a dimension made up of eight items referencing risk behaviors associated with sleep, food, school bullying, leisure and free time, interpersonal relationships with friends, interpersonal relationships with family and academic results. Secondly, the scale used in this study can be said to validly and reliably assess risk perception in the use of technology. The fact that the factor structures were similar in the three dimensions supports the coherence of the models, taking into account the different uses that children and adolescents make of cell phones, the Internet and video games.

With regard to the second objective, that of analyzing the frequency with which some risk behaviors occur (behaviors associated with sleep, food, school bullying, leisure and free time, interpersonal relationships with friends, interpersonal relationships with family and academic results) as a function of risk perception, problematic use of technology and age, some interesting results were obtained.

For example, children and adolescents were found to perceive some risky behaviors differently from others, depending on the technology being considered. In general, they have low risk scores, with mean scores below 2.2 (note that the response range was from 1 to 5). More specifically, it can be observed that the cell phone and the Internet are perceived similarly, leading children and adolescents to make certain decisions related to rest time and eating habits. That is to say, the use of the cell phone and the Internet seems to decrease their sleeping hours and increase the time they spend eating. These results are similar to those obtained by the authors of previous studies who consider that technology use takes time away from children and adolescents and interferes with other activities important for their development. The novelty in this case, however, is that it is the children and adolescents themselves who perceive or fail to perceive those risks (Castillo & Ruiz-Olivares, 2019; Catalina et al., 2014; García del Castillo, 2012; Martínez et al., 2013; Oliva et al., 2012). With respect to video games, children and adolescents perceive their use as having little risk (Ameneiros & Ricoy, 2015). The scarcity of literature on this topic, which to date has been limited to the more recreational aspects of video games, precludes any extensive discussion of these results.

Regarding the relationship between risk perception, hours of use and problematic use of technology, it was interesting to observe that the more the hours of use, the greater the perception of risk in each of the dimensions (cell phone, Internet and video games). The same was observed when risk perception was related to problematic use of technology: the greater the perception, the greater the problematic use. As already mentioned, there are hardly any studies in the literature

with which to compare and discuss these results. This, together with age, which may affect the evolution of risk perception (García del Castillo, 2012), and the low scores that children and adolescents generally assign to each risk, may influence results. It was therefore considered convenient to relate age to risk perception, and it was found that the older age group was the one with the highest risk perception compared to the other, younger age groups. In this regard, some studies do exist which point out that younger adolescents (under 12 years) perceive less risk than older adolescents, because they have used their cell phones for less time, know less about its functions, are not sufficiently alerted by their relatives, etc. (Besolí et al., 2018). Here, it may perhaps be that the construction of such risk perception is not being adequately sustained by the people close to the adolescents in question (Castillo & Ruiz-Olivares, 2019). This suggests the need to include the risk perception variable in prevention programs in order to ensure the appropriate use of technology.

Despite finding significant data, this study was also constrained by a series of limitations. In the first place, it is necessary to take into account the normalization of technology usage. That is to say, using technology is socially accepted and habitual not only among adults but also among children and adolescents. It is even encouraged by marketing campaigns. This makes it difficult to perceive the risks associated with such practice. It is also important to consider the difficulty of universalizing essentially subjective processes such as risk perception (García del Castillo, 2012). It would be very interesting to use this scale to test, for example, the effectiveness of intervention programs in the appropriate use of technology. Work also needs to be done to examine the relationship between risk perception and other variables that can provide greater specificity to this phenomenon. This should be taken into account for future research.

In conclusion, this study provides a good starting point from which to further the scientific study of risk perception and to better understand the screen-related behaviors of children and adolescents. A high-risk perception and, consequently, good value judgment may imply the ability to detect, identify and react to risk situations (Ramos-Soler et al., 2018). This would be a key consideration in the field of health psychology and would serve as a basis for the promotion of safe behavior in online activity and the prevention of risks associated with the inappropriate use of technology.

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Appendix

"Risk Perception Scale for the Use of Technology in Children and Adolescents "
(RPSUT)

From 1 to 5 (from lowest to highest), do you consider that the use of these technologies can cause you the following situations?

Cell phone					
1. Going to sleep later than I should.	1	2	3	4	5
2. I have difficulty falling asleep.	1	2	3	4	5
3. It takes me longer to eat when I am using...	1	2	3	4	5
4. I suffer from violence such as fights, bullying....	1	2	3	4	5
5. I have less time to do my leisure activities such as sports...	1	2	3	4	5
6. I argue with my parents.	1	2	3	4	5
7. I go out less with my friends.	1	2	3	4	5
8. I get bad grades, I don't do my homework...	1	2	3	4	5
Internet					
9. Going to sleep later than I should.	1	2	3	4	5
10. I have difficulty falling asleep.	1	2	3	4	5
11. It takes me longer to eat when I am using...	1	2	3	4	5
12. I suffer from violence such as fights, bullying....	1	2	3	4	5
13. I have less time to do my leisure activities such as sports...	1	2	3	4	5
14. I argue with my parents.	1	2	3	4	5
15. I go out less with my friends.	1	2	3	4	5
16. I get bad grades, I don't do my homework...	1	2	3	4	5
Video games					
17. Going to sleep later than I should.	1	2	3	4	5
18. I have difficulty falling asleep.	1	2	3	4	5
19. It takes me longer to eat when I am using...	1	2	3	4	5
20. I suffer from violence such as fights, bullying....	1	2	3	4	5
21. I have less time to do my leisure activities such as sports...	1	2	3	4	5
22. I argue with my parents.	1	2	3	4	5
23. I go out less with my friends.	1	2	3	4	5
24. I get bad grades, I don't do my homework...	1	2	3	4	5