Article

Self-Harm on the Internet Among Adolescents: Prevalence and Association With Depression, Anxiety, Family Cohesion, and Social Resources

Manuel Gámez-Guadix[1], Estíbaliz Mateos[2], Sebastian Wachs[3], and Marta Blanco[1]
[1] Universidad Autónoma de Madrid, [2] Universidad del País Vasco, and [3] University of Postdam

Abstract

Background: Using the internet to search for information or share images about self-harm is an emerging risk among young people. The aims of this study were (a) to analyze the prevalence of different types of self-harm on the internet and differences by sex and age, and (b) to examine the relationship of self-harm on the internet with intrapersonal factors (i.e., depression and anxiety) and interpersonal factors (i.e., family cohesion and social resources). **Method:** The sample consisted of 1,877 adolescents (946 girls) between 12 and 17 years old (Mage = 13.41, SD = 1.25) who completed self-report measures. **Results:** Approximately 11% of the participants had been involved in some type of self-harm on the internet. The prevalence was significantly higher among girls than boys and among adolescents older than 15 years old. Depression and anxiety increased the risk of self-harm on the internet, whereas family cohesion decreased the probability of self-harm on the internet. **Conclusions:** Self-harm on the internet is a relatively widespread phenomenon among Spanish adolescents. Prevention programs should include emotional regulation, coping skills, and resilience to reduce engagement in this behavior.

Keywords: Self-harm, self-injury, adolescence, depression, anxiety, family cohesion, social support.

Resumen

Autolesiones en Internet Entre Adolescentes: Prevalencia y Asociación con Depresión, Ansiedad, Cohesión Familiar y Recursos Sociales.
Antecedentes: el uso de Internet para buscar información o compartir imágenes sobre autolesiones físicas es un riesgo emergente entre jóvenes. Los objetivos de este estudio fueron: 1) analizar la prevalencia de diferentes conductas relacionadas con las autolesiones en Internet y las diferencias por sexo y edad; y 2) examinar la relación de las autolesiones en Internet con factores intrapersonales (depresión y ansiedad) e interpersonales (cohesión familiar, recursos sociales). **Método:** la muestra estuvo compuesta por 1.877 adolescentes (946 mujeres) entre 12 y 17 años (edad media = 13,41, DT = 1,255) que completaron medidas de autoinforme. **Resultados**: aproximadamente el 11% de la muestra se había implicado en algún tipo de autolesión en Internet. La prevalencia fue mayor entre las chicas y entre los adolescentes mayores de 15 años. La depresión y la ansiedad incrementaron el riesgo de autolesiones en Internet. La cohesión familiar fue un factor de protección contra las autolesiones en Internet. **Conclusiones:** el uso de Internet para compartir o buscar información sobre autolesiones es un problema relativamente frecuente entre adolescentes. Los programas de prevención deberían incluir habilidades de regulación emocional, afrontamiento y resiliencia para reducir la implicación en este comportamiento.

Palabras clave: autolesiones, adolescencia, depresión, ansiedad, cohesión familiar, apoyo social.

Information and communication technologies (ICTs) have facilitated individual, social, and economic development in a number of ways (e.g., promoting access to information, providing leisure and free time alternatives, and promoting interpersonal connection; Uhls et al., 2017). In turn, however, the internet has become a space in which different risks to health and psychosocial adjustment have arisen. This is the case with the increasingly well-known phenomena of cyberbullying, problematic internet use, online grooming, and cyberhate, to name a few (Gámez-Guadix et al., 2020; Hamby et al., 2018; Machimbarrena et al., 2018). An

important, growing risk, which has gained less research attention, is the use of the internet as a means of access to and distribution of physical self-harm content (Jacob et al., 2017).

We will use the term *self-harm on the internet* to refer to the use of ICTs to elaborate, send, or search for information or images about non-suicidal self-harm, which can include physical injuries, behaviors in which one causes pain to, or dangerous situations for oneself (Jacob et al., 2017; Seko et al., 2015). More specifically, self-harm on the internet includes behaviors such as causing injuries, cuts, or wounds in order to upload or share images of them on the internet; taking videos or photos of oneself in an annoying, painful, or dangerous situation and posting the images online; and searching for or sharing information on how to cause physical self-harm (Gámez-Guadix et al., 2020).

Non-suicidal self-harm is common among adolescents. In a systematic review of the research, Muehlenkamp et al. (2012) found that 18% of the adolescents engaged in non-suicidal self-

harm. Calvete et al. (2015) who found that approximately half of the adolescents had participated in self-harm in the past year, and approximately a third of whom reported severe self-harm (e.g., getting a cut or burn). In a meta-analysis, Gillies et al. (2018) found that approximately 17% of the adolescents engaged in self-harm. The mean age of initiation of self-harm behaviors was 13 years. Recently, Pérez et al. (2021) found that 24.6% of Spanish adolescents reported that they had self-harmed at least once; of those, 12.7% had self-injured using methods considered more serious (e.g., cutting, burning, pinching with needles, or stabbing).

The internet can provide a space of anonymity and privacy in which to search for or post self-harm content. People involved in self-harm may feel a greater sense of control and social distance when showing self-harm on the internet compared to face-to-face interactions (Whitlock et al., 2006). In addition, virtual communities can function as a space for immediate social support and easy access to individuals and groups who offer acceptance, a sense of belonging, and support among people with shared experiences of self-harm (Mitchell & Ybarra, 2007).

Evidence suggests that the presence of self-harm on the internet is increasing (Daine et al., 2013; Gillies et al., 2018). O'Connor et al. (2014) found that 15% of girls and 26% of boys (18% of adolescents overall) acknowledged that the internet or social networking sites had influenced their self-injurious behavior. Gámez-Guadix et al. (2020) found that 7.9% of adolescents had caused self-harm and then posted it online. The review by Duggan and Whitlock (2012) suggests an increase in searches for the term "self-harm" on the internet, a greater number of forums and websites related to self-harm, and a considerable increase in videos dedicated to self-harm on the YouTube platform. Brown et al. (2018), by using the most frequent German hashtags for nonsuicidal self-harm, found the publication of more than 32,000 images over 4 weeks. Four out of ten images of self-injury were rated as mild (e.g., superficial cuts), 47% were rated as moderate (e.g., deeper cuts), and 12% were rated as severe.

Despite its importance, information on the prevalence of internet use to search or disseminate content related to self-harm is still scarce. Moreover, information related to differences in this type of behavior by sex and age is limited. Regarding physical self-harm, empirical evidence from meta-analysis suggests that the prevalence is higher among girls and increases throughout adolescence (Gillies et al., 2018).

According to the theoretical model of self-injury proposed by Nock (2010), a person develops and maintains self-injury because it works as an effective method for regulating emotional and cognitive states (i.e., intrapersonal factors) or because it influences the social environment in a determined way (i.e., interpersonal factors). At the empirical level, Taylor et al. (2018) carried out a meta-analysis of quantitative studies on the functions of nonsuicidal self-harm, both in clinical and community samples. Intrapersonal functions—especially those related to the regulation of emotions—were the most frequent among those who had been involved in self-harm. These functions included alleviating a negative mood, inducing a positive mood, and self-punishment (Taylor et al., 2018). Interpersonal functions were present in between one-third and one-half of the incidents of self-harm. The main purpose of interpersonal functions was the expression to others of the own suffering with the aim of obtaining help or compassion, influencing, or punishing others. Likewise, the

interpersonal function of self-harm could be to search for group belonging or identification (Duggan & Whitlock, 2012).

In relation to intrapersonal functions, research has found that self-harm is linked to higher levels of depression, anxiety, and psychological distress among adolescents. Marshall et al. (2013) found that depressive symptoms increased the probability of self-harm among adolescents after 1 year. Similarly, Monto et al. (2018) found that higher levels of depression were related to increased self-harm among adolescents. More recently, Zhu et al. (2021) found that anxiety symptoms increased the probability of self-harm after 6 months. A meta-analysis of 56 studies found that people with emotional problems (e.g., depression, anxiety, and post-traumatic stress disorder) were more likely to participate in self-harm (Bentley et al., 2015). The immediate relief of emotional distress as a consequence of self-harm may, in turn, increase the probability of self-harm in the future as an emotional regulation mechanism (Marshall et al., 2013).

Interpersonal factors also appear to play an important role in self-harm. Mitchell and Ybarra (2007) found that 41% of adolescents who harmed themselves (compared to 13% of those who did not harm themselves) had a high level of conflict with their parents. In addition, Johnson et al. (2002) found that interpersonal factors such as inappropriate parenting practices in the family, loneliness and isolation, or poor relationships with friends and peers significantly increased suicidal behavior during adolescence. In contrast, family involvement and cohesion and good communication with the family are protective factors against self-harm (Evans et al., 2004).

For those adolescents with lower social and family support, the internet could increase their perception of group belongingness and social support. Thus, the need for social and family support could be supplemented on the internet (Duggan & Whitlock, 2012). Whitlock et al. (2006) found—through the analysis of messages about self-harm published on the internet—that online interactions offered essential social support for adolescents who felt isolated. In turn, these interactions also could normalize and encourage self-harm by adding potentially injurious behaviors. Thus, it is common for young people who self-harmed to be more likely to participate in online spaces (e.g., websites or forums) where others support and reinforce self-harm behaviors (Jacob et al., 2017). Some of these young people participate in "challenges": competitions in which they try to outperform the self-harm shown by others, and then they are punished or reinforced, depending on whether they succeed (Jacob et al., 2017). A study by Gámez-Guadix et al. (2020) revealed that the main motivations for engaging in self-harm on the internet included seeking help or advice from others and observing how other people reacted to the publicly shared self-harm. The search for social acceptance through self-harm on the internet could be counterproductive when seeking support in specific forums to maintain self-harm, facilitating the exchange of information, and justifying these behaviors (Jacob et al., 2017).

Although interest in using the internet to share or search for content on self-harm has increased in recent years, the empirical information on the prevalence and correlates of this phenomenon is still scarce. The present study pursued two related aims. The first aim was to analyze the prevalence of different forms of self-harm on the internet, including the differences by sex and age. Considering previous research on physical self-harm (e.g., Gillies et al., 2018), we hypothesize that self-harm on the internet will be more frequent among girls and among older adolescents.

A second aim consisted of analyzing the variables that could increase or reduce the probability of self-harm on the internet. Following the theoretical classification of intrapersonal and interpersonal factors involved in self-harm (Nock, 2010; Taylor et al., 2018), we examine the relationship of depression and anxiety (i.e., intrapersonal factors) and family cohesion and social resources (i.e., interpersonal factors) with self-harm on the internet. Considering the previous empirical evidence, we hypothesize that higher levels of depression and anxiety symptoms will increase the probability of using the internet to access or share self-harm content. In addition, we hypothesize that both higher family cohesion and social resources will act as protective factors that reduce the probability of self-harm on the internet.

Method

Participants

The study sample consisted of 1,877 adolescents between 12 and 17 years old (M_{age} = 13.41, SD_{age} = 1.255). Among them, 946 self-identified as girls, 823 as boys, and 6 as nonbinary; two did not indicate sex. Approximately one-third (37.7%) were in the first course of compulsory secondary education in the Spanish education system, 25.3% were in the second course, 22.8% were in the third course, and 14.2% were in the fourth course. Regarding birthplace, 84.5% were born in Spain, and the remaining participants were born in Latin America, North Africa, and Europe. The parents of most of the adolescents were married or living together (71.6%), while 23.8% were divorced or separated, 3% were single parents, and 1.6% were widowed. The educational levels completed by the parents were as follows: for mothers, 1.6% no studies, 3.4% primary studies, 13.3% middle school, 15% high school, 12.7% technical formation, 41.7% university studies, and 12.3% postdoctoral studies; for fathers: 2.2% no studies, 4.3% primary studies, 16.5% middle school, 15.7% high school, 16.3% technical formation, 32.7% university studies, and 12.2% postdoctoral studies.

Instruments

Self-Harm on the Internet. Considering the dearth of instruments to assess self-harm on the internet, we developed a measure based on the results of a previous qualitative study, which was composed of five items to assess the extent to which adolescents used the internet to share or search for information on self-harm (Gámez-Guadix et al., 2020). The five items are shown in Table 1. The adolescents had to indicate how often they had been involved in self-harm on the internet during the last 12 months using the following response scale: 0 = Never, 1 = 1 or 2 times, 3 = 3 or 4 times, and 4 = 5 or more times. We carried out an exploratory factor analysis on the items using the unweighted least squares method (considering the non-normal distribution of the variables). The results suggested an internal structure composed of a single factor (eigenvalues > 1 and inspection of the sedimentation graph). All items presented factor loadings greater than .345. The internal consistency of this scale (Cronbach's α) was .61 (ordinal α = .84).

Depression and Anxiety. The Depression and Anxiety Subscales of the Brief Symptom Inventory (BSI; Derogatis & Fitzpatrick, 2004; see Pereda et al., 2007, for the Spanish version) were used to assess intrapersonal variables of psychological adjustment. Each subscale included six items with a response format from 1

(not at all) to 5 (extremely). Participants were asked to indicate how often they had experienced each symptom of depression (e.g., "feeling sad") or anxiety (e.g., "nervousness or shakiness inside") during the past 2 weeks. The factor validity of depression and anxiety subscales among adolescents has been previously reported (Gámez-Guadix & Incera, 2021). In this sample, internal consistency (α) was .89 for the depression subscale and .87 for the anxiety subscale.

Family Cohesion and Social Resources. We used the Subscales of Family Cohesion (6 items) and Social Resources (4 items) of the Resilience Scale for Adolescents (von Soest et al., 2010). This measure has shown good psychometric properties among Spanish adolescents (Pérez-Fuentes et al., 2020). The family cohesion subscale assesses the extent to which the adolescent perceives her family as a source of support and affection (e.g., "We help each other in my family."). The social resources subscale assesses the perception of availability of social support (e.g., friends; "I always have somebody available when I need it."). The response scale has five response options from 0 (strongly disagree) to 4 (strongly agree). The internal consistency (α) in the present sample was .91 for the family cohesion subscale and .92 for the social resources subscale.

Procedure

Sixty-two schools in the Community of Madrid were randomly selected and initially contacted. From those, 10 schools, including eight public schools and two private schools, participated in the study. The parents of the adolescents received a document requesting their explicit signed consent for their children's participation in the study. Around 65% of the parents returned the authorization allowing their children to participate in the study.

The participants received an informed consent document with all the information about the study. The adolescents were informed that the responses were confidential and that their participation was voluntary. The adolescents were told that they could choose not to answer some questions or discontinue their participation in the study at any time and for any reason without consequence. After completing the questionnaire, the participants received a document that contained both the researchers' email addresses and help resources in the community. This study followed the ethical standards and norms of the Declaration of Helsinki, and it is part of a larger research project on online risks among adolescents, which was approved by the Autonomous University of Madrid Ethics Committee.

Data Analysis

First, we performed confirmatory factor analyses using EQS 6.1 (Bentler & Wu, 2005) on the measures used in this study: self-harm on the internet, intrapersonal factors (i.e., depression and anxiety) and interpersonal factors (i.e., family cohesion and social resources). For these analyses, we used the robust maximum likelihood (ML) estimation method, which includes the Satorra-Bentler scaled χ^2 index (S – B χ^2) and other corrected statistics. Goodness of fit was assessed using the comparative fit index (CFI > .90), the root mean square error of approximation (RMSEA < .08), and the standardized root mean square residual (SRMR < .08). Second, we estimated the prevalence of self-harm on the internet, including differences by sex and age, using Pearson's Chi-square (χ^2) test. Next, due to the non-normal distribution of

the variables, we calculated the Spearman correlations of self-harm on the internet with depression, anxiety, family cohesion, and social resources. Finally, we carried out a binary logistic regression to analyze the predictors of self-harm on the internet. For this purpose, self-harm on the internet was dichotomized (0 = has never occurred; 1 = has occurred at least once). Sex, age, and sexual orientation were included as control variables in the logistic regression model.

Results

Confirmatory Factor Analyses

Items of self-harm on the internet were hypothesized to be explained by a one-factor structure. This measurement model showed good fit indexes: S-B χ^2 (5, $N = 1789$) = 5.252, $p = 0.385$, CFI = 0.99, RMSEA = 0.066, and SRMR = 0.063. Regarding the intrapersonal factors (i.e., depression and anxiety), we estimated a model with the correlated depression and anxiety factors. This model showed adequate fit indices: S-B χ^2 (53, $N = 1710$) = 476.85, $p < .001$, CFI = 0.91, RMSEA = 0.068, and SRMR = 0.044. Finally, a model for interpersonal factors (correlated subscales of family cohesion and social resources) was estimated. The model showed a good fit: S-B χ^2 (34, $N = 1712$) = 120.82, $p < .001$, CFI = 0.98, RMSEA = 0.039, and SRMR = 0.044.

Prevalence of Self-Harm on the Internet

The results on the prevalence of self-harm on the internet are presented in Table 1. The findings revealed that the most frequent behaviors of self-harm for this sample were: (a) searching for information on the internet about how to self-harm and (b) causing some self-harm and telling about it on the internet, with prevalence rates of 5.3% and 3.5%, respectively. The total prevalence of some type of self-harm on the internet was 11.4%.

Regarding the differences by sex, more boys than girls had recorded themselves doing something dangerous and then published it on the internet (4.2% of boys and 2.3% of girls; χ^2 (1, $N = 1783$) = 4.98, $p < .05$); however, more girls than boys had searched for information on the internet about how to harm themselves (8.3% of girls and 2.2% of boys; χ^2 (1, $N = 1784$) = 32.85, $p < .001$). Regarding the total prevalence rates, more girls than boys were involved in some type of self-harm on the internet (13.1% of girls and 9.6% of boys; χ^2 (1, $N = 1783$) = 5.49, $p < .05$).

To analyze prevalence as a function of age, we divided the sample between younger teenagers (12-14 years) and older teenagers (15-17 years) by following the classification of Centers for Disease Control and Prevention (CDC, 2021). Only one individual behavior showed differences between younger and older adolescents—searching for information on the internet about how to harm oneself—which was more prevalent among older adolescents (8.7% older vs 4.4% younger; χ^2 (1, $N = 1783$) = 1.92, $p < .01$). The total prevalence (the sum of all items) was significantly higher for older adolescents compared to younger adolescents (15.3% and 10.3%, respectively; χ^2 (1, $N = 1776$) = 7.62, $p < .01$) (see Table 1).

Intrapersonal and Interpersonal Factors and Self-Harm on the Internet

Next, we analyzed the relationships of intrapersonal factors (i.e., depression and anxiety) and interpersonal factors (i.e., family

---

Table 1
Prevalence of Self-Harm on the Internet by Gender and Age

Self-harm Items	Total	Girls	Boys	X²	p	Young teens (12-14 years)	Teenagers (15-17 years)	X²	p
1. I have caused myself self-harm and I have talked about it on the internet	3.5%	3.8%	3.2%	.45	.50	3.1%	5.1%	3.52	.06
2. I have recorded myself doing something dangerous and have posted it on the internet	3.2%	2.3%	4.2%	4.98	< .05	3.1%	3.3%	.04	.84
3. I have participated in some internet challenge that consists of hurting oneself	1.6%	1.7%	1.5%	.17	.68	1.4%	2.3%	1.36	.24
4. I have searched on the internet for information on how to self-harm	5.3%	8.3%	2.2%	32.85	< .001	4.4%	8.7%	10.92	< .001
5. I have exchanged or shared information through forums on how to self-harm	1%	1.4%	.6%	3.16	.76	.9%	1.5%	1.33	.25
Total	11.4%	13.1%	9.6%	5.49	< .05	10.3%	15.3%	7.62	< .01

Table 2
Bivariate Spearman Correlations Between Study Variables

Variable	1	2	3	4	5	6	7
1. Gender (1 = girl; 2 = boy)							
2. Age	-.003						
3. Sexual orientation (1 = heterosexual; 2 = sexual minority)	-.118***	-.020					
4. Depression symptoms	-.205***	-.139***	.188***				
5. Anxiety symptoms	-.165***	.118***	.148***	.732***			
6. Social resources	-.063**	-.050*	-.083***	-.196***	-.135***		
7. Family cohesion	.023	-.080**	-.109***	-.296***	-.231***	.590***	
8. Self-harm on the internet	.056*	.065**	.127***	-.309***	.282***	-.196***	-.115***

* $p < .05$; ** $p < .01$; *** $p < .001$

cohesion and social resources) with self-harm on the internet. As shown in Table 2, the correlations of self-harm on the internet with depression, anxiety, family cohesion, and social resources were significant and were in the expected direction. These correlations were of medium size (i.e., close to .30) for intrapersonal variables, and small (i.e., between .11 and .21) for interpersonal variables.

Finally, the results of the binary logistic regression to predict self-harm on the internet are presented in Table 3. Regarding intrapersonal factors, more depressive symptoms ($OR = 2.28$, CI 95%: $1.835 - 2.842$, $p < .001$) and anxiety symptoms ($OR = 1.299$, CI 95%: $1.045 - 1.614$, $p < .05$) were significantly associated with a higher likelihood of self-harm on the internet. On the other hand, greater family cohesion was associated with a lower probability of self-harm on the internet ($OR = .716$, CI 95%: $576 - .890$, $p < .01$). However, social resources were not significantly related to the probability of self-harm on the internet after controlling for the effect of the rest of the variables in the equation (see Table 3).

Discussion

The objective of this study was to analyze an emerging and scarcely studied online risk: self-harm on the internet. The results showed that approximately one in ten adolescents had either used the internet to search or share information about self-harm or had participated in some online "challenge" that consisted of causing self-harm.

As previously noted, various systematic reviews and meta-analyses have found a mean prevalence of self-harm in adolescence of between 16-18% (Gillies et al., 2018; Muehlenkamp et al., 2012). Taking these figures as a reference, according to the results of our study (total prevalence estimates of 11%), more than half of the adolescents who have been involved in self-harm would have used the internet to search for information or share self-harm content. Future studies should delve into the relationship between information-seeking behaviors about self-harm on the internet and the actual practice of self-harming behaviors.

The overall prevalence of self-harm on the internet was significantly higher for girls than for boys. These results are consistent with the findings of previous studies (Gillies et al., 2018). The higher frequency of internalizing problems among girls (e.g., depressive symptoms) and the greater tendency of girls to seek social support could explain why a higher percentage of girls than boys engage in self-harm on the internet (Whitlock et al., 2006). Regarding age, the results showed a higher prevalence of self-harm on the internet among older adolescents compared

to younger adolescents. These results are consistent with previous research that documented a progressive increase in self-harm throughout adolescence from the age of 13 (Gillies et al., 2018). However, the considerable proportion of younger adolescents who were involved in self-harm on the internet (around 10%) highlights the need to implement early prevention strategies to prevent this online risk.

The results concerning the relationship between intrapersonal factors and self-harm on the internet showed that higher depression and anxiety symptoms significantly increased the probability of adolescents reporting self-harm on the internet. These results are consistent with previous research that found self-harm could play a role in emotion regulation (Hasking et al., 2017; Taylor et al., 2018). Thus, adolescents with more depression or anxiety symptoms could engage in self-harm as a way to alleviate distress (Marshall et al., 2013; Zhu et al., 2021). These results are consistent with previous qualitative findings (Gámez-Guadix et al., 2020).

The results also showed that family cohesion was a protective factor against participating in self-harm on the internet. Affection, support, and closeness from the family reduced the probability of self-harm by adolescents on the internet. This finding is consistent with previous studies that found that family maladjustment is associated with greater physical self-harm behaviors (Johnson et al., 2002; Mitchell & Ybarra, 2007). Likewise, these results are consistent with the idea that self-harm may have an interpersonal component, such as seeking attention and support from others (Taylor et al., 2018). Teenagers with low family support may use self-harm on the internet as a way to seek this support. Fostering open dialogue, support, understanding, and family affection could make a significant contribution to preventing adolescents' self-harm on the internet (Evans et al., 2004). This is consistent with the results on the role of the family in relation to other online risks (Wright et al., 2021).

Although social resources showed a significant bivariate correlation with self-harm on the internet, this relationship was not significant in the multivariate regression model. It is possible that, due to the shared variance between social resources and other variables (e.g., family cohesion or depression), social resources became nonsignificant when predicting self-harm on the internet. It should also be noted that, although the instrument used to measure social resources showed adequate validity and reliability, the small number of items in this measure may not have captured the complex nature of social resources in risk situations. Therefore, caution is advised when interpreting these results. Future studies should conduct a more exhaustive analysis of the relationship between social resources (e.g., support from friends) and self-harm on the internet.

This study has some limitations that should be considered. First, although the sample is large, it is not representative of Spanish adolescents. Second, this study is cross-sectional in nature, so it is not possible to establish temporal relationships between the analyzed variables. Future studies should examine the reciprocal relationships between self-harm on the internet, intrapersonal factors, and interpersonal factors to determine the temporal sequence between these variables. Third, this study was based exclusively on participant self-reports. Future studies should include reports by others (e.g., the parents' report on family cohesion) and other assessment techniques (e.g., peer nomination).

In conclusion, the present study is one of the few studies so far that has focused on exploring the prevalence and variables

Table 3
Logistic Regression to Predict Self-Harm on the Internet

Variables	B	SE	OR (CI $_{95\%}$)	p
Control variables				
Sex	.189	.179	1.208 (.85 – 1.717)	.291
Age	.109	.067	1.115 (.977 – 1.273)	.106
Sexual orientation	.273	.240	1.314 (.821 – 2.102)	.255
Predictor variables				
Depression	.826	.112	2.284 (1.835 – 2.842)	< .001
Anxiety	.262	.111	1.299 (1.045 – 1.614)	< .05
Family cohesion	-0.33	.111	.716 (.576 – .890)	< .01
Social resources	0.091	0.111	1.10 (0.882 – 1.361)	.41
Constant	-5.399	0.981	.005	< .002

associated with the phenomenon of self-harm on the internet. The specific prevention of self-harm should focus on promoting emotional regulation strategies in adolescents. In addition, ensuring that adolescents learn specific coping strategies that allow dealing with different problems can make a considerable contribution to preventing online risks, including self-harm on the internet (Wachs et al., 2020). Future research should also analyze the positive effects of utilizing the internet to reduce self-harm (e.g., providing positive social support). Moreover, the relevance of the different factors evaluated (e.g., symptoms of anxiety and depression,

family cohesion) as related to the functions of self-harm (e.g., seeking attention, relief of discomfort, self-punishment) should be also analyzed. Finally, promoting specific resilience aspects, such as family cohesion and support (Santos et al., 2020), could help prevent self-harm on the internet and other online risks.

Acknowledgements

References

Bentler, P. M., & Wu, E. J. (2005). *EQS 6.1 for Windows*. Multivariate Software Inc.

Bentley, K. H., Cassiello-Robbins, C. F., Vittorio, L., Sauer-Zavala, S., & Barlow, D. H. (2015). The association between nonsuicidal self-injury and the emotional disorders: A meta-analytic review. *Clinical Psychology Review*, *37*, 72-88. https://doi.org/10.1016/j.cpr.2015.02.006

Brown, R. C., Fischer, T., Goldwich, A. D., Keller, F., Young, R., & Plener, P. L. (2018). #cutting: Non-suicidal self-injury (NSSI) on Instagram. *Psychological Medicine*, *48*(2), 337-346. https://doi.org/10.1017/S0033291717001751

Calvete, E., Orue, I., Aizpuru, L., & Brotherton, H. (2015). Prevalence and functions of non-suicidal self-injury in Spanish adolescents. *Psicothema*, *27*(3), 223-228. https://doi.org/10.7334/psicothema2014.262

Centers for Disease Control and Prevention (CDC, 2021). Child Development. Retrieved October 30, 2021, from: www.cdc.gov/ncbddd/childdevelopment/positiveparenting/index.html

Daine, K., Hawton, K., Singaravelu, V., Stewart, A., Simkin, S., & Montgomery, P. (2013). The power of the web: A systematic review of studies of the influence of the internet on self-harm and suicide in young people. *Plos One*, *8*(10), e77555. https://doi.org/10.1371/journal.pone.0077555

Derogatis, L. R., & Fitzpatrick, M. (2004). The SCL-90-R, the Brief Symptom Inventory (BSI), and the BSI-18. In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment: Instruments for adults* (pp. 1-41). Lawrence Erlbaum Associates Publishers.

Duggan, J. M., & Whitlock, J. (2012). Self-injury behaviors in cyber space. *Encyclopedia of Cyber Behavior*, *1*, 768-781. https://doi.org/10.4018/978-1-4666-0315-8.ch064

Evans, E., Hawton, K., & Rodham, K. (2004). Factors associated with suicidal phenomena in adolescents: A systematic review of population-based studies. *Clinical Psychology Review*, *24*(8), 957-979. https://doi.org/10.1016/j.cpr.2004.04.005

Gámez-Guadix, M., Almendros, C., Mondragón, L. R., & Mateos-Pérez, E. (2020). Autolesiones online entre adolescentes españoles: análisis de la prevalencia y de las motivaciones [Online self-harm among Spanish adolescents: Analysis of prevalence and motivations]. *Revista de Psicología Clínica con Niños y Adolescentes*, *7*(1), 9-15. https://doi.org/10.21134/rpcna.2020.07.1.1

Gámez-Guadix, M., & Incera, D. (2021). Homophobia is online: Sexual victimization and risks on the internet and mental health among bisexual, homosexual, pansexual, asexual, and queer adolescents. *Computers in Human Behavior*, *119*, 106728. https://doi.org/10.1016/j.chb.2021.106728

Gámez Guadix, M., Wachs, S., & Wright, M. (2020). "Haters back off!" Psychometric properties of the coping with cyberhate questionnaire and relationship with well-being in Spanish adolescents. *Psicothema, 32*, 567-574. https://doi.org/10.7334/psicothema2020.219

Gillies, D., Christou, M. A., Dixon, A. C., Featherston, O. J., Rapti, I., García-Anguita, A., Villasis-Keever, M., Reebye, P., Christou, E., & Al Kabir, N. (2018). Prevalence and characteristics of self-harm in adolescents: Meta-analyses of community-based studies 1990-2015. *Journal of the American Academy of Child and Adolescent Psychiatry*, *57*(10), 733-741. https://doi.org/10.1016/j.jaac.2018.06.018

Hamby, S., Blount, Z., Smith, A., Jones, L., Mitchell, K., & Taylor, E. (2018). Digital poly-victimization: The increasing importance of online crime and harassment to the burden of victimization. *Journal of Trauma & Dissociation: The Official Journal of the International Society for the Study of Dissociation (ISSD)*, *19*(3), 382-398. https://doi.org/10.1080/15299732.2018.1441357

Hasking, P., Whitlock, J., Voon, D., & Rose, A. (2017). A cognitive-emotional model of NSSI: Using emotion regulation and cognitive processes to explain why people self-injure. *Cognition and Emotion*, *31*(8), 1543-1556. https://doi.org/10.1080/02699931.2016.1241219

Jacob, N., Evans, R., & Scourfield, J. (2017). The influence of online images on self-harm: A qualitative study of young people aged 16-24. *Journal of Adolescence*, *60*, 140-147. https://doi.org/10.1016/j.adolescence.2017.08.001

Johnson, J. G., Cohen, P., Gould, M. S., Kasen, S., Brown, J., & Brook, J. S. (2002). Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood. *Archives of General Psychiatry*, *59*(8), 741-749. https://doi.org/10.1001/archpsyc.59.8.741

Machimbarrena, J. M., Calvete, E., Fernández-González, L., Álvarez-Bardón, A., Álvarez-Fernández, L., & González-Cabrera, J. (2018). Internet risks: An overview of victimization in cyberbullying, cyber dating abuse, sexting, online grooming and problematic internet use. *International Journal of Environmental Research and Public Health, 15*(11), 2471-2485. https://doi.org/10.3390/ijerph15112471

Marshall, S., Tilton-Weaver, L., & Stattin, H. (2013). Non-suicidal self-injury and depressive symptoms during middle adolescence: A longitudinal analysis. *Journal of Youth and Adolescence*, *42*(8), 1234-1242. https://doi.org/10.1007/s10964-013-9919-3

Mitchell, K. J., & Ybarra, M. L. (2007). Online behavior of youth who engage in self-harm provides clues for preventive intervention. *Preventive Medicine*, *45*(5), 392-396. https://doi.org/10.1016/j.ypmed.2007.05.008

Monto, M. A., McRee, N., & Deryck, F. S. (2018). Nonsuicidal self-injury among a representative sample of US adolescents, 2015. *American Journal of Public Health*, *108*(8), 1042-1048. https://doi.org/10.2105/AJPH.2018.304470

Muehlenkamp, J. J., Claes, L., Havertape, L., & Plener, P. L. (2012). International prevalence of adolescent non-suicidal self-injury and deliberate self-harm. *Child and Adolescent Psychiatry and Mental Health*, *6*(1), 10. https://doi.org/10.1186/1753-2000-6-10

Nock, M. K. (2010). Self-injury. *Annual Review of Clinical Psychology, 6*, 339-363. https://doi.org/10.1146/annurev.clinpsy.121208.131258

O'Connor, R. C., Rasmussen, S., & Hawton, K. (2014). Adolescent self-harm: A school-based study in Northern Ireland. *Journal of Affective Disorders*, *159*, 46-52. https://doi.org/10.1016/j.jad.2014.02.015

Pereda, N., Forns, M., & Peró, M. (2007). Dimensional structure of the Brief Symptom Inventory with Spanish college students. *Psicothema*, *19*(4), 634-639.

Pérez, S., García-Alandete, J., Gallego, B., &Marco J. H. (2021). Characteristics and unidimensionality of non-suicidal self-injury in a community sample of Spanish adolescents. *Psicothema, 33*(2), 251-258. https://doi.org/10.7334/psicothema2020.249

Pérez-Fuentes, M. D. C., Molero Jurado, M. D. M., Barragán Martín, A. B., Mercader Rubio, I., & Gazquez Linares, J. J. (2020). Validation of the resilience scale for adolescents in high school in a Spanish population. *Sustainability, 12*, 2943. https://doi.org/10.3390/su12072943

Santos, D., Mateos-Pérez, E., Cantero, M., & Gámez-Guadix, M. (2020). Cyberbullying in adolescents: Resilience as a protective factor of mental health outcomes. *Cyberpsychology, Behavior, and Social Networking, 24*, 414-420. https://doi.org/10.1089/cyber.2020.0337

Sánchez, D., Robles, M. A., & Camacho, J. A. (2020). Self-inflicted injuries in adolescents and young adults: A longitudinal approach. *Psicothema, 32*, 322-328. https://doi.org/ 10.7334/psicothema2019.347

Seko, Y., Kidd, S. A., Wiljer, D., & McKenzie, K. J. (2015). On the creative edge: Exploring motivations for creating non-suicidal self-injury content online. *Qualitative Health Research, 25*(10), 1334-1346. https://doi.org/10.1177/1049732315570134

Taylor, P. J., Jomar, K., Dhingra, K., Forrester, R., Shahmalak, U., & Dickson, J. M. (2018). A meta-analysis of the prevalence of different functions of non-suicidal self-injury. *Journal of Affective Disorders, 227*, 759-769. https://doi.org/10.1016/j.jad.2017.11.073

Uhls, Y. T., Ellison, N. B., & Subrahmanyam, K. (2017). Benefits and costs of social media in adolescence. *Pediatrics, 140*(Supplement 2), S67-S70. https://doi.org/10.1542/peds.2016-1758E

von Soest, T., Mossige, S., Stefansen, K., & Hjemdal, O. (2010). A validation study of the resilience scale for adolescents (READ). *Journal of Psychopathology and Behavioral Assessment, 32*(2), 215-225. https://doi.org/10.1007/s10862-009-9149-x

Wachs, S., Gámez-Guadix, M., Wright, M. F., Görzig, A., & Schubarth, W. (2020). How do adolescents cope with cyberhate? Psychometric properties and socio-demographic differences of a coping with cyberhate scale. *Computers in Human Behavior, 104*, 106167. https://doi.org/10.1016/j.chb.2019.106167

Whitlock, J. L., Powers, J. L., & Eckenrode, J. (2006). The virtual cutting edge: The Internet and adolescent self-injury. *Developmental Psychology, 42*(3), 407-417. https://doi.org/10.1037/0012-1649.42.3.407

Wright, M. F., Wachs, S., & Gámez-Guadix, M. (2021). Youths' coping with cyberhate: Roles of parental mediation and family support. *Comunicar, 29*(67). https://doi.org/10.3916/c67-2021-02

Zhu, J., Chen, Y., Su, B., & Zhang, W. (2021). Anxiety symptoms mediates the influence of cybervictimization on adolescent non-suicidal self-injury: The moderating effect of self-control. *Journal of Affective Disorders, 285*, 144-151. https://doi.org/10.1016/j.jad.2021.01.004