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## A Comparative Study on Online Victimization Perceptions (Cyberbullying, Dating Violence, and Sexual Harassment) and Psychological Symptoms in Sexual and Gender Minority Youth

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### Abstract

*Experiencing worry or perceiving risks in online environments can be linked to undesirable psychological and social outcomes, potentially incrementing the unique challenges that sexual and gender minority (SGM) youths may face in online environments. The purpose of this study is to examine differential perceptions of the frequency of worry about and perceived risk of online victimization and psychological symptoms between sexual and gender minority youths and their non-sexual and gender minority counterparts. This is a cross-sectional study conducted between 2022 and 2023. The sample of 824 Spanish youths was composed by 48.3% females, 49.5% males and 1.8% gender non-binary, aged between 12 and 18 years old ( $M = 14.53$ ,  $SD = 1.48$ ). Participants responded to questionnaires based on validated tools to capture the perceived risk and the frequency of worry about three forms of online victimization (cyberbullying, dating violence, and sexual harassment), as well as psychological symptoms (Symptom Checklist-90-R). The data were analysed using one-way and two-way multivariate analysis of variance. The results showed that sexual and gender minority youth reported higher perceptions of risk and worry in relation to online victimization. On the other hand, gender minority participants were found to have significantly elevated levels in all the psychological symptom domains under study. Our results underscore the relevance of understanding psychological correlates in order to develop inclusive interventions and prevention programs addressing SGM-specific online safety concerns.*

**Keywords:** LGBT youth; sexual and gender minorities; fear of crime; risk perception; online harassment; cyberbullying

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## Introduction

Experiencing fear of crime and perceiving a risk of crime can lead to undesirable effects at individual and societal levels, potentially undermining people's sense of freedom and exacerbating their psychosocial distress (Alfaro-Beracoechea et al., 2018; Brands & Van Doorn, 2022). However, while fear of traditional in-person crime has been extensively studied, significantly less research has examined fear of crime in online settings (hereafter referred to as cybercrime for brevity; Guedes et al., 2025; Vozmediano et al., 2013).

Higher levels of fear related to cybercrime may lead people to adopt restrictive behaviours, such as reducing their social activities (Lorenc et al., 2013). In contrast, very low levels of fear may increase their exposure to online risks. A balanced perception of online risks is therefore likely to be the most beneficial. It enables users to enjoy the advantages of the Internet and digital technologies while still taking appropriate precautions and avoiding the hazards that come with either overestimating or underestimating online risks.

Certain segments of the population may be particularly vulnerable to online risks, including sexual and gender minorities (SGM). Research focusing specifically on this group is still limited, especially within the fear-of-crime and risk-perception literature and even more so among young people. Nevertheless, the studies that do exist show a clear link between SGM individuals' risk of victimization and their fear of crime (D. Meyer & Denise, 2014). Those who perceive a high risk of victimization tend to report higher levels of fear and psychological distress.

Despite these findings, the unique features of cybercrime victimization targeting SGM youth remain largely underexplored (Vogler et al., 2023). Addressing this gap is important, as the consequences of experiencing fear of cybercrime may be especially severe for SGM young people. They face distinct social challenges—such as higher rates of bullying, social isolation, targeted harassment, and hate-motivated victimization (D. Meyer & Denise, 2014)—which can heighten their vulnerability to online risks (Garaigordobil & Larrain, 2020). This study aims to address the existing knowledge gap by examining differences in perceived risk of online victimization and psychological symptomatology among sexual and gender minority (SGM) youths compared with their heterosexual and cisgender peers. Specifically, we compare both groups' perceptions of risk and levels of worry regarding three forms of online victimization: (1) cyberbullying, (2) sexual harassment, and (3) dating violence. In addition, we examine how perceived risk correlates to psychological symptomatology both within each group and between groups.

### From Fear of Crime to Fear of Cybercrime

While fear of (offline) crime has been widely researched, far fewer studies have examined worry or risk perception related to online crime (Savimäki et al., 2020). Although limited, the existing literature has identified similarities between fear of in-person victimization and fear of cybercrime (Vozmediano et al., 2013). For example, both have been associated with restricting certain behaviours, such as reducing social activities—whether online or offline.

To better understand fear of cybercrime, it is useful to consider key ideas from the broader fear-of-crime literature. Fear of crime is generally defined as an emotional response of anxiety that arises when crime is perceived as a personal threat (Ferraro, 1995; Vozmediano & San Juan, 2010). It is also considered a social issue, given its significant impact at multiple levels, including the individual, the community, and the broader environment (Savimäki et al., 2020). For instance, negative effects on physical and mental health have been documented when people avoid physical activity in public spaces or limit social interactions due to fear of crime (Marzbali et al., 2016). Substantial evidence shows that higher levels of fear of crime are associated with poorer mental health outcomes and reduced physical functioning (Lorenc et al., 2012). People who report greater fear of crime appear to be about 50% more likely to develop common mental disorder symptoms and nearly 90% more likely to experience depressive symptoms (Stafford et al., 2007).

Fear of crime can also negatively affect public health by reducing walking mobility and increasing reliance on private transportation, which in turn contributes to higher emissions (Foster et al., 2014). Some authors propose a cyclical model in which fear of crime harms mental and physical health, and these health declines, in turn, heighten fear of crime (Jackson & Stafford, 2009). Within this framework, worry or fear about potential victimization generates stress that produces measurable effects on health and well-being. Fear functions as a stressor through both behavioural and physiological mechanisms—either by triggering physiological responses that may cause cumulative damage to the nervous or immune systems or by promoting avoidance behaviours,

such as reduced social activity (Jackson & Stafford, 2009). A multifaceted understanding of fear of crime also recognises the role of cognitive judgment—specifically, perceived risk (Al-Shalan, 2006; Ferraro & Grange, 1987). Perceived risk refers to the individual's estimation of how likely they are to experience crime victimization, or cybercrime victimization in the case of fear of cybercrime (Guedes et al., 2023; Wolff et al., 2019). Although closely related, frequency of worry and perceived risk are not the same phenomenon (Brands & Van Doorn, 2022), and each is shaped by different predictors (Guedes et al., 2023). Nevertheless, prior research highlights the importance of considering both constructs when exploring victimization experiences (Lee & Kim, 2023), as they play essential roles in shaping how individuals understand and interact with virtual spaces (Marcos & Moreira, 2022). This becomes particularly relevant for the acquisition and maintenance of safety behaviours in online environments (Maier & DePrince, 2023; Ramos-Soler et al., 2018).

While fear of cybercrime shares similarities with fear of offline crime, online environments introduce unique challenges. Prior research warns that because danger is less visible online, users may develop a false sense of security. When combined with low risk perception, this can increase exposure to risky online situations (Brands & Van Doorn, 2022). A high level of perceived cybercrime risk may discourage people from activities such as online shopping or social interaction (Vozmediano et al., 2013). Conversely, an overly strong sense of safety—despite real online risks—can lead to risky browsing habits and insufficient protective behaviours, ultimately increasing exposure to harmful situations (Vozmediano et al., 2013).

Thus, low levels of perceived cybercrime risk may heighten vulnerability by encouraging more time spent online (Riek et al., 2016), including greater use of unregulated social networks or online gaming platforms. Without adequate privacy protections (e.g., parental supervision), these digital environments can become particularly conducive to victimization, especially for minority youths.

## **Vulnerability: Sexual and Gender Minorities and Youth**

Among the explanatory perspectives on fear of crime, the vulnerability thesis (Jackson, 2009) argues that some demographic groups are more likely than others to perceive themselves as vulnerable to victimisation. Research has shown this to be the case, for example, among women (Ávila et al., 2015) and older adults (Köber, 2018; Marcos & Moreira, 2022). This perceived vulnerability is associated with greater concern about crime and higher levels of perceived risk.

Central to the vulnerability thesis is the idea of self-perceived vulnerability, which is often linked to a sense of limited control over potentially dangerous situations (see Köber, 2018 for a comprehensive review of the vulnerability thesis). However, this framework has paid comparatively little attention to other groups whose vulnerability is shaped by social marginalisation. In particular, individuals who fear discrimination based on skin colour, sexual orientation, or gender identity may anticipate distinct forms of risk that remain underexplored within the literature (Maher et al., 2024).

In this regard, the present study focuses on sexual and gender minority (SGM) individuals, with particular attention to adolescents. Within this group, adolescents face specific challenges linked to their membership of a historically highly victimised population (Laing & Davies, 2011). SGM individuals have frequently been subjected to discrimination for not conforming to dominant norms of gender and sexual orientation, which may exacerbate their perceptions of victimization and increase fear of future harm (Otis, 2007). When experiences of victimization are directly tied to discrimination, they have been shown to carry more persistent and long-term consequences (Mustanski et al., 2016).

The increasing use of digital technologies has heightened adolescents' risk of victimization (Marcos, Trinidad, & Seijo, 2024). Given the high prevalence of antisocial behaviours and online offenses—such as cyberbullying (Zhu et al., 2021; Zych et al., 2016), online sexual harassment (Montiel et al., 2016; Reed et al., 2019), and dating violence (Borrajo et al., 2015; Machimbarrena et al., 2018)—it is essential to examine how adolescents perceive the risk of online victimization.

This is particularly important for SGM youths, who face persistent risks in online environments where social stressors are often harder to avoid (Garaigordobil & Larrain, 2020). They are consistently more likely than their cisgender, heterosexual peers to experience cybervictimization, especially cyberbullying (Abreu & Kenny, 2017; Garaigordobil & Larrain, 2020; McNeal et al., 2018; Pérez-Albéniz, 2025). Beyond cyberbullying, SGM youths are also disproportionately exposed to other forms of online victimisation. They report higher levels of unwanted sexual attention and unauthorized access to digital accounts (Dank et al., 2014; Gámez-Guadix & Incera, 2021),

greater involvement in problematic sexting (Van Ouytsel et al., 2021), and elevated rates of online dating abuse compared to their heterosexual peers (Felmlee & Faris, 2016; Martínez-Soto & Ibabe, 2024) —phenomena that remain comparatively underexamined in this population (Vogler et al., 2023).

Therefore, a key question is whether—and to what extent—belonging to a minority group, such as SGM, shapes adolescents' perceptions of their risk of being victimized online.

## **Psychological Distress Symptoms Among SGM Population**

Beyond potential differences in perceived risk of online victimization between SGM and non-SGM adolescents, it is also important to consider the psychological processes through which such perceptions may affect well-being. Research on fear of crime indicates that perceived risk and worry are not merely cognitive appraisals but are closely tied to emotional responses that may contribute to psychological distress (Ferraro, 1995; Jackson, 2009). Drawing on stress and appraisal models, sustained perceptions of threat can heighten anxiety, stress, and related symptoms, particularly when individuals experience limited perceived control (Barlow, 2002; Lazarus & Folkman, 1984). In online contexts, where exposure to potential threats may be continuous, these processes may be especially salient for adolescents, and even more so for those who already experience heightened vulnerability due to social discrimination (Livingstone & Smith, 2014; Sinclair et al., 2012).

This heightened vulnerability is particularly relevant for SGM adolescents, who may be exposed to additional and parallel stressors from an early age, even in the absence of direct victimization experiences (Ilse & Hagerlid, 2024; Vázquez et al., 2021). According to I. H. Meyer's (2003) Minority Stress Model, SGM individuals face stressors that are distinct from, and additive to, the general life stressors typically experienced by cisgender heterosexual individuals. These ongoing, identity-related stressors—such as expectations of rejection, concealment, and internalized stigma—can accumulate over time and increase the risk of psychological distress across developmental stages (Drescher & Barber, 2012).

These minority-specific stress processes are reflected in well-documented mental health disparities between SGM and cisgender heterosexual populations. Extensive research shows that SGM individuals experience poorer mental health outcomes, including elevated psychological distress and a higher prevalence of mental disorders (Hatzenbuehler et al., 2024; Pickles, 2021). Higher rates of depression, anxiety, and posttraumatic stress disorder have been consistently reported (Cochran et al., 2003; Mongelli et al., 2019; Ronzón-Tirado et al., 2023; Russell & Fish, 2016), alongside increased risks of substance use and suicidality (Mongelli et al., 2019; Prairie et al., 2022; Ronzón-Tirado et al., 2023). Crucially, these disparities are not understood as the result of individual vulnerability alone, but as the cumulative outcome of chronic exposure to stressors linked to stigma, discrimination, and anticipated rejection, as articulated by the Minority Stress Model (I. H. Meyer, 2003).

Importantly, these processes emerge early in the life course. Mental health disparities between SGM and non-SGM populations are already evident during adolescence, a developmental period characterized by heightened sensitivity to social evaluation and threat. Compared with their cisgender heterosexual peers, SGM adolescents report higher levels of suicidal ideation, substance use, and academic difficulties (Abreu & Kenny, 2017; De Lange et al., 2022; Russell & Fish, 2016). Given that adolescence is also a stage marked by increased engagement with digital environments, fear-related cognitive and emotional responses to online victimization may represent a key pathway through which minority stress contributes to psychological distress. This is particularly relevant as experiences of cybervictimization among SGM youths have been linked to psychological symptoms (Abreu & Kenny, 2017; Garaigordobil & Larrain, 2020). Accordingly, examining how worry about cybercrime and perceived online risk relate to psychological distress among adolescents is therefore theoretically warranted and essential for understanding the mechanisms underlying observed mental health inequalities.

## **The Present Study**

Despite evidence indicating that SGM youths are disproportionately exposed to multiple forms of online victimization, including cyberbullying, sexual harassment, and online dating violence, little is known about how these adolescents perceive such threats in terms of worry and risk assessment. This gap is particularly concerning given that SGM youths constitute a population with heightened vulnerability to online victimization, yet their subjective perceptions of online threats remain largely understudied.

Moreover, mental health disparities among SGM populations are known to emerge during adolescence (Russell & Fish, 2016), a developmental period characterized by increased psychological distress and heightened sensitivity to social stressors. While prior research has consistently documented elevated levels of psychological distress among SGM youths, considerably less is known about the role that fear-related processes in online contexts may play in shaping these outcomes. Drawing on fear-of-crime research, worry and perceived risk related to potential victimization may function as additional stressors that contribute to psychological distress beyond actual victimization experiences (Jackson & Stafford, 2009).

The present study addresses these gaps by examining how SGM youths perceive different forms of online victimization and how these perceptions differ from those of cisgender and heterosexual youths. Specifically, we focus on three prevalent forms of online victimization: cyberbullying, online sexual harassment, and online dating violence. The study also seeks to clarify whether the relationship between fear-related processes and psychological distress varies as a function of SGM identification. Therefore, our primary research questions are:

**RQ1:** How do SGM youths differ from their cisgender and heterosexual peers in their risk perception and frequency of worry of online victimization regarding cyberbullying, sexual harassment, and dating violence?

**RQ2:** To what extent do SGM youths differ from heterosexual and cisgender youths in their overall levels of psychological distress symptoms?

From a theoretical perspective, SGM identification may shape how fear-related appraisals are translated into psychological outcomes, given the accumulation of minority-specific stressors and heightened vulnerability to social threat. Consequently, examining whether perceived risk and frequency of worry about online victimization are associated with psychological distress in similar or different ways for SGM youths compared to their cisgender and heterosexual peers is essential. A between-group approach allows us to assess whether SGM status conditions the relationship between fear of cybercrime and mental health outcomes. Thus, we post:

**RQ2.1.:** To what extent are high frequency of worry and perceived risk of the three types of online victimization differentially associated with psychological distress symptoms between SGM youths and heterosexual and cisgender youths?

At the same time, between-group comparisons alone cannot rule out alternative explanations for observed disparities in psychological distress. In particular, elevated distress among SGM youths may reflect broader minority stress processes associated with SGM identity rather than the specific contribution of fear-related processes. To address this limitation, it is also necessary to examine variability within the SGM group itself. By comparing SGM youths who report high levels of worry and perceived risk of online victimization with those who report lower levels of concern, it becomes possible to evaluate whether fear of cybercrime contributes to psychological distress above and beyond the general effects of belonging to a stigmatized social group. This within-group perspective strengthens the interpretation of findings by helping to disentangle fear-related processes from identity-based sources of psychological distress. Therefore, our last question is:

**RQ2.2.:** To what extent do SGM youths who report high frequency of worry and perceived risk of online victimization differ in their psychological distress symptoms compared to those SGM youths who do not report such concerns?

## Methods

### Participants

A total of 824 Spanish youths participated in the cross-sectional study between 2022 and 2023. Regarding sample characteristics, 47.93% identified as female ( $n = 395$ ), 49.51% as male ( $n = 408$ ) and 1.8% as gender non-binary ( $n = 15$ ; missing cases  $n = 6$ , 0.72%). The youths' age was between 12–18 years old, with a mean age of 14.53 (standard deviation = 1.48). As for sexual orientation, and after removing the missing cases ( $n = 17$ , 2.06%),  $n = 670$  identified as heterosexual,  $n = 22$  as homosexual,  $n = 87$  as bisexual, and  $n = 28$  identified with "other" identity. This leaves a total of 807 cases for analysis, which were sorted into two comparison groups: those who fall within the SGM umbrella (non-binary and/or homosexual, bisexual or other), and those who did not. In other words, 16.98% of the participants identified as a sexual and gender minority ( $n = 137$ ), while 83.02% ( $n = 670$ ) of the sample identified as heterosexual and cisgender.

## Procedure

This study is part of a larger project called "Fear of Online Victimization in the Adolescent Population". The first paper from this project was published by Trinidad et al. (2025). This paper focuses on SGM youths, addressing research questions that are substantially different. The main results and data analysis methods presented here have not been previously published and are not currently under review.

To obtain the sample, first, a request was made to the schools. Seven schools from Galicia (northwest of Spain) were contacted with participation requests. Four schools agreed to participate in the study. Once the request was accepted, written authorization was obtained from each school as well as informed consent from the parents or legal guardians (mandatory for < 16 years old).

After giving informed consent, participants filled in the questionnaires, responding voluntarily, anonymously and individually, supervised by trained research personnel. The tests were administered to participants during school hours. The data collection was carried out between February and May 2023. To counterbalance a possible interaction effect of variables, the order of obtaining the measurements was counterbalanced following a standard rotation procedure. The collection, storage and treatment of the data was carried out according with the Spanish Data Protection Act (Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos Personales y Garantía de los Derechos Digitales., 05/12/2018). This study was approved by the Bioethics Committee of one of the Universities to which several members of the research team belong.

## Measure Instruments

### *Demographic Information*

Participants were asked to self-report their gender identity with categorical response options (woman, man, non-binary), sexual orientation (heterosexual, homosexual, bisexual, and other), age, school year, and school centre.

### *Psychological Distress*

The Symptom Checklist-90 (SCL-90-R) scale (Derogatis, 1994; González de Rivera et al., 1989) was used to measure participants' current psychological distress/ symptoms/alterations. This 90-item scale is evaluated and interpreted according to nine primary dimensions: somatization (e.g., experiencing alterations such as headaches); obsessive-compulsive symptoms (e.g., unwanted behaviours or thoughts that are difficult to avoid); interpersonal sensitivity (e.g., own's feelings being easily hurt or feeling discomfort in relationships); depression (e.g., anhedonia, feelings of being trapped, feeling low energy); anxiety (e.g., suddenly scared for now reason); anger-hostility (e.g., experiencing resentment or feeling easily annoyed or irritated); phobic anxiety (e.g., feeling afraid in open spaces or on the streets); paranoid ideation (e.g., suspiciousness or paranoid behaviour), and psychoticism (e.g., hearing voices other do not hear). The scale also includes seven additional items of clinical relevance that are not included in the aforementioned nine dimensions: (a) poor appetite, (b) trouble falling asleep, (c) thoughts of death or dying, (d) overeating, (e) awakening in the early morning, (f) restless or disturbed sleep, and (g) feelings of guilt. Every item is answered on a five-point scale (ranging from (0), total absence of symptoms, to (4), maximum intensity). The instrument has shown good validity and reliability, also with Spanish samples (Garaigordobil & Larrain, 2020). In the present study, the Cronbach's alpha coefficients for all dimensions also showed high internal consistency reliability (somatization  $\alpha = .91$ ; obsessive-compulsive symptoms  $\alpha = .90$ ; interpersonal sensitivity  $\alpha = .89$ ; depression  $\alpha = .93$ ; anxiety  $\alpha = .90$ ; anger-hostility  $\alpha = .84$ ; phobic-anxiety  $\alpha = .86$ ; paranoid ideation  $\alpha = .83$ ; psychoticism  $\alpha = .87$ ; additional items  $\alpha = .79$ ).

### *Frequency of Worry About Online Victimization and Risk Perception of Online Victimization*

A specially crafted questionnaire was created (Marcos & Moreira, 2022) based on validated victimization scales (Arce et al., 2014; Marcos, Seijo, et al., 2024), and it was used to assess participants' frequency of worry and risk perception of multiples forms of aggression in online contexts (Vozmediano et al., 2008). In this questionnaire, participants were asked about their perceived risk on a 5-point Likert scale (0 = *no risk*; 1 = *low risk*; 2 = *neither high nor low risk*; 3 = *some risk*; 4 = *high risk*); and the frequency of worry on a 6-point Likert scale (0 = *never*; 1 = *once or twice a year*; 2 = *once or twice in the last 6 months*; 3 = *once or twice in the last month*; 4 = *weekly*; 5 = *every day*) about

the following types of online victimization: a) cyberbullying; b) dating violence; and c) sexual harassment. Specifically, measure of frequency of worry regarding cyberbullying consisted of 11 items (e.g., frequency with which the person has felt fear/worry/anxiety about the possibility of receiving threats through social networks and apps), while risk perception of cyberbullying also included 11 items (e.g., risk of receiving threats through social networks and apps). As for dating violence measure, frequency of worry regarding dating violence comprised 9 items (e.g., frequency with which the person has felt fear/worry/anxiety about the possibility of receiving insults from your partner), with risk perception of dating violence also containing 9 items (e.g., risk of receiving insults from your partner). Similarly, frequency of worry regarding sexual harassment was measured with 9 items (e.g., frequency with which the person has felt fear/worry/anxiety about the possibility of someone writing sexual messages or sexually explicit drawings to you). Risk perception of sexual harassment also included 9 items (e.g., risk of someone writing sexual messages or drawings to me).

The internal consistency reliability was strong for all the explored online victimization types. Regarding the Frequency of Worry dimension, Cronbach's alpha coefficients were high for cyberbullying ( $\alpha = .92$ ), dating violence ( $\alpha = .88$ ), and sexual harassment ( $\alpha = .92$ ). Similarly, as for Risk Perception scale, Cronbach's alpha coefficients were also strong for cyberbullying ( $\alpha = .92$ ), dating violence ( $\alpha = .90$ ), and sexual harassment ( $\alpha = .91$ ).

### ***Analytic Approach***

All data analyses were conducted using R version 4.4.2. Complete R session information is available in the supplementary material at OSF: <https://osf.io/x45uv/>.

First of all, descriptive analyses reporting central tendency measures were conducted, such as means and standard deviations. Then, to address RQ1, bivariate analyses were performed. Chi-square ( $\chi^2$ ) tests were done to examine the differences between the SGM youths and the heterosexual and cisgender youths regarding the high frequency of worry and perceived risk of online victimization (Cronbach's alpha ranged between .88 and .92).

High frequency of worry scores were considered those youths with one standard deviation above the mean. We followed this criteria for defining high frequency of worry scores as it is a common practice in research when, in absence of theoretical reasons for choice of level of certain variables, the mean score, one standard deviation above, and one standard deviation below the mean are often employed to identify medium, high, and low levels of a variable, respectively. This approach would enable identifying participants whose scores are high and different from the average while avoiding the inclusion of outliers that may skew the results. Dichotomization of the variable (participants who showed high frequency of worry and those who did not) was then made according to this criteria to perform comparative analyses. In contrast, regarding risk perception scores, youths who perceived risk were those who reported three or more. Setting a cut-off for perceived risk at three or more also follows prior studies where scales are dichotomized at a certain level to distinguish between low and high scores. In the present study, dichotomization (participants who perceived risk, and those who did not) was based on the thresholds inherent to the scale itself, in which scores of 3 and 4 correspond to substantive levels of perceived risk ("some risk" and "high risk", respectively). The magnitude of the effect size calculating the Phi ( $\phi$ ) coefficient was analysed, as the mean percent difference.

Multivariate analyses of variance (MANOVA) were also conducted. First, a one-way MANOVA was estimated to compare the means of the explored psychological symptoms between the SGM and the heterosexual and cisgender youths, with the aim of exploring RQ2. Then, two-way MANOVA to compare the mean of psychological symptoms between groups scoring high frequency of worry and perceiving risk of online victimization were calculated, thereby addressing RQ2.1. Finally, and regarding RQ2.2., one-way MANOVA within SGM youths was analysed to compare differences in the psychological symptoms between those SGM youths reporting a high frequency of worry and perceived risk of online victimization. For multivariate contrasts, Pillai trace tests were estimated because it is a robust test for the departure of the homogeneous variance-covariance assumption. The partial eta-squared  $\eta_p^2$  as effect size for the multivariate contrast, and as the standardized mean differences with the Hedges' unbiased  $g$  were calculated. We interpreted effect sizes following Cohen's (Cohen, 1988) categories. Thus, large effect sizes were defined as those with  $\eta_p^2$  values of 0.14 or greater, and  $g$  values of 0.80 or greater. Moderate effect sizes were defined with  $\eta_p^2$  values between 0.06 and 0.14, and  $g$  values between 0.5 and 0.8. Similarly, small effect sizes were considered those with  $\eta_p^2$  values between 0.01 and 0.06, and  $g$  values between 0.20 and 0.50.

# Results

## Sample Characteristics

Table 1 provides the descriptive analysis of the explored psychological symptoms, as well as the missing data for each variable. Table 1 also contains the analysis of the additional items of clinical relevance measured by the SCL-90-R as well as the descriptive results of the variables assessing the frequency of worry and risk perception for each of the three types of online victimization under study. The high number of missing percentages in the variables measuring the worry and risk perception regarding dating violence could be explained by the absence of partners among some of the respondents.

In addition, we measured participants' exposure to negative online experiences or situations through a single item asking "Have you ever experienced a negative or unwanted situation using social media or messaging apps in the last year?", to which they responded either 0 = *no*, or 1 = *yes* (Table 1). In relation to this, we tested whether the variable related to having lived a negative experience had an interaction with the main variables under study (see Supplementary Table S1). In this sense, when exploring whether SGM status significantly increased the likelihood of online negative experiences, the logistic regression model revealed differences between SGM and cisgender and heterosexual participants, with SGM youths showing a greater probability of reporting negative online experiences. However, when assessing the interaction between SGM status and online negative experiences on multiple psychological symptom outcomes, the results of the MANOVA analysis (see Supplementary Table S1) showed a non-significant interaction effect between SGM status and online negative experiences. This suggests that the impact of minority status on psychological symptoms does not vary based on having an online negative experience. Therefore, although SGM and cisgender and heterosexual participants differed in their reports of negative online experiences, this (experiences of negative situation) does not mediate and, thus, is independent of the association of SGM status and psychological outcomes.

**Table 1.** Descriptive Analysis (Before Removing Missing Data).

Variable	Mean/%	Standard deviation	Missing percentage
Somatization	1.09	0.90	0.85
Obsessive-compulsive	1.47	1.00	0.85
Interpersonal sensibility	1.23	0.99	0.85
Depression	1.33	1.02	0.85
Anxiety	1.00	0.91	0.85
Anger-hostility	1.08	0.97	0.85
Phobic-anxiety	0.82	0.90	0.85
Paranoid ideation	1.25	0.99	0.85
Psychoticism	0.79	0.81	0.85
Additional items	6.77	1.03	0.00
Having experienced a negative situation	0.23	0.42	1.58
Frequency of Worry about Cyberbullying	1.11	1.09	0.61
Risk Perception regarding Cyberbullying	1.23	0.91	1.70
Frequency of Worry about Dating Violence	0.65	0.90	42.72
Risk Perception regarding Dating Violence	0.75	0.88	43.45
Frequency of Worry about Sexual Harassment	0.76	1.03	0.85
Risk Perception Regarding Sexual Harassment	1.02	0.98	2.31

## Risk Perception and Worry of Online Victimization

The bivariate analysis revealed that SGM students and heterosexual and cisgender youths differed in the level of frequency of worry and the level of perceived risk of online victimization. SGM youth report heightened perceptions of risk and worry regarding online victimization in some of the dimensions explored. Worry about

cyberbullying showed the highest differences between-groups. Significant differences were found as a function of sexual orientation on the high frequency of worry about cyberbullying, dating violence and sexual harassment, as well as on the perceived risk regarding sexual harassment (see Table 2 and its corresponding Figure in the Supplementary Figure S2).

Specifically, concerning the differences in worry about online victimization, SGM students reported a significantly higher frequency of worry than heterosexual and cisgender students in all of the explored dimensions. More concretely, the percentage of students who reported a high frequency of worry about cyberbullying was higher for the SGM group (30.66%) than for the heterosexual and cisgender (11.84%;  $\chi^2(1, N = 804) = 30.01, p < .001, \phi = .19, 95\% \text{ CI } [.13, .27]$ ).

As for dating violence, SGM participants also reported a higher frequency of worry (20.69%) than heterosexual and cisgender (11.05%;  $\chi^2(1, N = 467) = 5.04, p = .025, \phi = .11, 95\% \text{ CI } [.02, .20]$ ). Similar results were found for the sexual harassment dimension: SGM students reported a significantly higher frequency of worry about online sexual harassment (25.55%) than heterosexual and cisgender (11.86%;  $\chi^2(1, N = 803) = 16.37, p < .001, \phi = .14, 95\% \text{ CI } [.08, .22]$ ).

As for the risk perception regarding online victimization, the analysis showed a significant although weak difference in the sexual harassment dimension between the percentages of perceived risk of the SGM and the heterosexual and cisgender group ( $\chi^2(1, N = 791) = 4.63, p = .031, \phi = .08, 95\% \text{ CI } [.01, .15]$ ), with SGM students reporting a heightened risk perception (9.63%) than heterosexual and cisgender students (4.57%) of being targets of this type of online victimization. Statistically significant differences in the perceptions of risk regarding online bullying were not found ( $\chi^2(1, N = 795) = 0.84, p = .359, \phi = .04, 95\% \text{ CI } [.00, .11]$ ), neither in the risk perception of dating violence ( $\chi^2(1, N = 461) = 0.00, p = .955, \phi = .01, 95\% \text{ CI } [.00, .11]$ ).

**Table 2.** *Bivariate Analysis Results of Online Victimization Perception Conditioning on Being Part of a Sexual and Gender Minority. Between-Group Effects.*

Variable	<i>n</i>	Total (%)	HC (%)	SGM (%)	$\chi^2$	<i>p</i>	$\phi$	95% CI
Frequency of Worry about Cyberbullying	804	26.25	11.84	30.66	3.01	< .001	.20	[.13, .27]
Risk Perception regarding Cyberbullying	795	9.33	5.00	7.41	0.84	.355	.04	[.00, .11]
Frequency of Worry about Dating Violence	467	13.02	11.05	20.69	5.04	.025	.11	[.02, .20]
Risk Perception regarding Dating Violence	461	3.04	3.19	2.35	0.00	.955	.02	[.00, .11]
Frequency of Worry about Sexual Harassment	803	24.73	11.86	25.55	16.36	< .001	.15	[.08, .22]
Risk Perception Regarding Sexual Harassment	791	9.23	4.57	9.63	4.63	.031	.08	[.01, .15]

*Note.* *n* = number of adolescents; HC = heterosexual and cisgender; SGM = sexual and gender minority;  $\chi^2$  = Chi-square test;  $\phi$  = Phi coefficient; CI = confidence intervals.

### ***Differences in Psychological Symptoms***

The results of the one-way MANOVA showed that the SGM group reported more psychological symptoms (see Table 3), explaining 17% of the variance ( $F(9, 792) = 18.15, p < .001, \eta_p^2 = .17, 95\% \text{ CI } [.12, .21]$ ). Large univariate effects were exhibited (*g* ranged: 0.86–1.13), observing the major mean differences for *Anxiety* ( $F(1, 807) = 177.24, g = 1.13, 95\% \text{ CI } [0.94, 1.32]$ ).

Additionally, a series of two-way MANOVA tests were performed to compare the means of SGM and heterosexual and cisgender participants regarding psychological symptoms under the condition of exhibiting a high frequency of worry and risk perception. However, these interactions did not show differences between SGM and heterosexual and cisgender participants (see Supplementary Tables S3–S8).

**Table 3.** One-Way MANOVA Post-Hoc Partial Analysis Results for the Sexual and Gender Minority Compared to Heterosexual and Cisgender Group.

Psychological Symptoms	<i>F</i>	<i>g</i> [95% CI]	<i>M</i> <sub>SGM</sub>	<i>M</i> <sub>HC</sub>
Somatization	179.51***	0.93 [0.74, 1.12]	1.76	0.96
Obsessive-compulsive	199.15***	0.98 [0.79, 1.17]	2.24	1.32
Interpersonal sensibility	198.05***	1.02 [0.83, 1.21]	2.03	1.08
Depression	199.83***	1.01 [0.82, 1.20]	2.14	1.17
Anxiety	177.24***	1.13 [0.94, 1.32]	1.80	0.85
Anger-hostility	188.41***	0.86 [0.67, 1.05]	1.75	0.95
Phobic-anxiety	173.23***	1.01 [0.82, 1.20]	1.53	0.68
Paranoid ideation	188.44***	0.90 [0.71, 1.09]	1.95	1.11
Psychoticism	179.39***	1.06 [0.87, 1.25]	1.46	0.66

Note. Degrees of freedom = 1; *N* = 807; *F* = approximate F-value; CI = confidence intervals; *g* = Hedges' *g*; *M*<sub>SGM</sub> = mean of the sexual and gender minority group; *M*<sub>HC</sub> = mean of the heterosexual and cisgender group. \*\*\**p* < .001.

Finally, one-way MANOVA within the SGM youth, psychological symptoms, and frequency of worry and risk perception of the online victimizations were conducted (see Supplementary Tables S9–S14). The analysis revealed some significant differences in the explored psychological distress symptoms between SGM participants who reported high levels of frequency of worry when compared to SGM participants who did not experience high frequency of worry.

In particular, the major differences between youths who reported a high frequency of worry about cyberbullying ( $F(9, 127) = 6.5, p < .001, \eta_p^2 = .32, 95\% \text{ CI } [.15, .41]$ ) and sexual harassment ( $F(9, 127) = 4.61, p < .001, \eta_p^2 = .25, 95\% \text{ CI } [.09, .33]$ ) was corroborated (see Supplementary Table S9 and Table S13), explaining 32% and 25% of the variance respectively. The univariates ranged between moderate and large effects ( $0.66 < g < 1.28$ ) for both types of worry about victimization. Nevertheless, as for dating violence, SGM youths reporting a high frequency of worry about dating violence (see Supplementary Table S11) only showed statistical differences ( $F(9, 77) = 2.65, p = .010, \eta_p^2 = .24, 95\% \text{ CI } [.02, .34]$ ) in some psychological symptoms in comparison to those who did not report high worry. Specifically, those youths with higher worry reported more *Somatization*, *Obsessive-compulsive*, *Interpersonal sensibility*, and *Phobic anxiety* than SGM youth without high worry, showing small ( $g = 0.44$  for *Somatization*), moderate ( $g = 0.66$  for *Interpersonal sensibility*, and  $g = 0.68$  for *Phobic anxiety*), and large ( $g = 0.81$  for *Obsessive-compulsive*) effects.

As for the analyses regarding risk perception, multivariate tests did not show statistically significant differences between those SGM youths who perceived the risk of online victimization in any of the three domains and those who did not perceived risk (see Tables S10, S12, and S14).

## Discussion

The present study aimed to advance research on fear of online victimization by examining differences between sexual and gender minority (SGM) and cisgender heterosexual adolescents in their levels of worry and perceived risk, and by investigating how these fear-related processes are associated with psychological distress. By extending fear-of-crime frameworks to digital contexts and focusing on an underrepresented population, the study provides new insights into adolescents' experiences of school-related cyberbullying, online sexual harassment, and online dating violence.

In response to RQ1, inquiring about differences in frequency of worry and risk perception across both groups, the results showed that SGM youths reported higher levels of worry compared to heterosexual and cisgender youths across all types of victimization examined. In this regard, previous studies addressing fear of online victimization in our specific context were not found. Nevertheless, our findings align with fear of offline crime research indicating that SGM individuals exhibit greater fear of specific types of offline victimization compared to non-SGM individuals (Maher et al., 2024; D. Meyer & Denise, 2014).

Consistent with the vulnerability-based and stress-related frameworks discussed in the Introduction (Jackson, 2009; Lazarus & Folkman, 1984; I. H. Meyer, 2003), socially discriminated groups may experience heightened fear

and threat perceptions that are not solely dependent on direct victimization. In the present study, differences between SGM and non-SGM adolescents in perceived online risk were observed at a descriptive level. However, given the study design, these findings should be interpreted cautiously, as it is not possible to rule out alternative explanations or establish unbiased estimates of the association.

One plausible explanation for these observed patterns is that SGM adolescents may indirectly learn about bias-motivated victimization incidents targeting other SGM individuals (e.g., hate crimes), which could increase worry about the possibility of similar events occurring to them. In this sense, SGM individuals may be exposed to additional, parallel stressors in their daily lives regardless of whether they have experienced direct victimization or have been in close proximity to discriminatory events (Ilse & Hagerlid, 2024). Such indirect exposure to bias-related harm may contribute to a heightened sense of vulnerability and fear of future victimization at the community level (Walters et al., 2020).

Regarding risk perception, the results revealed that SGM youths perceived a higher risk of being targets of sexual harassment than non-SGM youths, but no statistically significant differences were found in risk perceptions of cyberbullying and online dating violence. In this regard, it should be mentioned that risk perception does not necessarily correspond to objective victimization risk rates. In fact, previous research indicates that SGM individuals are at greater risk of experiencing all three online victimization types explored in the present study (Gámez-Guadix & Incera, 2021; Wongsomboon et al., 2025), particularly cyberbullying (Garaigordobil & Larrain, 2020). In addition to being more vulnerable to multiple forms of (online) victimization, such experiences may be distinct for SGM youth compared to their non-SGM counterparts. For instance, unlike cisgender and heterosexual realities, the prevalence of intimate partner violence among SGM youth remains stable across age rather than declining in adulthood (Whitton et al., 2019). In addition, SGM-specific forms of dating violence tactics have been found in previous studies, such as questioning or outing partners' identities (Yan et al., 2024).

While these findings emphasize the unique experiences of victimization among SGM youth, it is noteworthy that our SGM sample showed a low perception of risk. These results corroborate previous evidence on SGM students' perceptions of dating violence and sexual assault in real-life settings (Ollen et al., 2017), indicating that young SGM people tend to perceive such forms of victimization to be less common among SGM individuals compared to their non-SGM counterparts. In this sense, we could argue that SGM youths not reporting a heightened risk perception of online dating violence and cyberbullying could be related to the possibility that, for these youth, perception or awareness of such forms of online victimization may be limited to the heterosexual and cisgender population (Ollen et al., 2017). This lack of awareness—rooted in social discourses framing dating violence and cyberbullying as issues predominantly affecting heterosexual and cisgender populations—contribute to the invisibility of these concerns among SGM youth, which is often indicative of marginalization of this population (Ollen et al., 2017). In a similar vein, the lack of a heightened risk perception among SGM youth could also be associated with a form of “normalisation” of violence. This refers to a term often employed in anti-SGM victimization literature to describe the process of perceiving biased incidents against SGM people as “ordinary” or unremarkable acts (Haynes et al., 2023), or as a normal part of the daily lives of SGM individuals. Future studies should explore these hypotheses.

We could also argue about why SGM youths express greater worry than cisgender and heterosexual youths despite showing no significant differences in risk perception, with the notable exception of sexual harassment. On the one hand, there are some methodological concerns regarding measurement and conceptual differentiation between worry and risk perception as similar but distinct psychological constructs. From this perspective, some authors highlight that worry and risk perception, while closely related, are not the same phenomena (Brands & Van Doorn, 2022), and thus reflect different processes and underlying predictors (Guedes et al., 2023). Risk perception is about judging the danger, while worry refers to how often a person feels anxious about situations associated with victimization events. In addition, emotional responses and risk perception do not necessarily correspond to objective rates of victimization risk.

In this regard, prior research suggests that people may feel worried about a certain risk while not perceiving it as particularly high (Sjöberg, 1998). According to the risk sensitivity model of fear of crime, when people perceive crime as having particularly severe outcomes, a lower level of perceived likelihood or risk perception would be needed to experience some level of fear (Jackson, 2013). Thus, people may exhibit higher sensitivity to a given level of risk when they believe that the impact or the consequences of the victimization are especially serious, but without necessarily perceiving a high likelihood of actually being victimized. In other words, when people view victimization experiences as largely uncontrollable events and linked to significant and serious personal outcomes, they may report high levels of worry despite perceiving the probability of risk as low.

However, given the limitations of our cross-sectional data, additional direct empirical testing would be required in order to provide valid explanations on the causality of the worry-risk perception relationship. There is a special need to continue examining the structures of risk perception and worry about victimization, and, especially, to explore the relationships between both factors. Explaining the complex emotional and cognitive processes underlying fear of crime and risk assessment is essential to understand why and how particularly vulnerabilized people may become worried about victimization and to inform effective policies and interventions (Mellberg et al., 2022).

With respect to RQ2, our findings also showed that SGM youths report more psychological distress symptoms compared to their heterosexual and cisgender counterparts. These results add further weight to previous research that also found elevated psychological symptoms within sexual and gender minority youth samples (Abreu & Kenny, 2017; Adelson et al., 2016; Garaigordobil & Larrain, 2020; Prairie et al., 2022). This is also consistent with recent surveys exploring mental health among SGM youth, which becomes particularly relevant as psychological distress appears to be increasing among this population (Nath et al., 2025).

However, the analysis addressing RQ2.1. regarding the interaction effects of high frequency of worry and risk perception on psychological symptoms did not show significant differences across the two groups. In essence, when both SGM and heterosexual and cisgender youths experienced high levels of worry and risk perception, they exhibited similar psychological distress. This suggests that high worry and risk perception appears to have comparable mental health impacts regardless of sexual orientation or gender identities. Therefore, under these specific conditions (of experiencing high worry and risk perception levels), holding s SGM status did not make participants more or less vulnerable to developing certain psychological distress symptoms.

At first glance, these results may appear to diverge from predictions based on the vulnerability hypothesis on fear of crime, or on theories like the Minority Stress Model (I. H. Meyer, 2003), which posits that SGM youth may be particularly vulnerable to adverse mental health outcomes by experiencing distinctive minority stressors in addition to general life stressors. From such perspective, SGM participants would be expected to report higher psychological distress symptoms than their cisgender and heterosexual peers. However, our results showed a lack of disparities between both groups. This may be because, when worry and risk perception reach high levels, these factors may exert such a strong influence on psychological distress that they may overshadow the cumulative burden of minority stress. Therefore, under conditions of high worry or risk perceptions, such additional layer of minority stress may become less distinguishable in its impact on psychological distress outcomes.

Focusing on specific characteristics of our target population, one possible explanation of this phenomenon may be related to theories on the positive effects of resilience and protective factors among SGM youth on their mental health and psychological stress levels. In this sense, there is ample evidence suggesting that having supportive relationships (Birkett et al., 2015), feeling connected to the SGM community and experiencing "identity pride" provide SGM youth with protection against possible psychological distress issues derived from stigma. In fact, a recent study showed that, in the case of gender-specific minority stress, factors related to gender minority resilience (like community-connectedness) may buffer the impact of distal stressors (experiencing stigma or discrimination) on their psychological stress levels (Miller-Perusse et al., 2024). In other words, resilience factors may function as protective mechanism that are activated in response to experiences of anti-SGM discrimination. As such, we could argue that resilience and protective factors developed among SGM youths may act as a buffer against the risks of developing elevated or exaggerated psychological distress symptoms derived from high worry and risk perception. Future studies should test this hypothesis by including measures of resilience and other protective factors.

Another explanation for the absence of differences across both samples may involve statistical power limitations. In this regard, capturing significant interaction effects between explored variables often require larger samples. Thus, the relatively small number of SGM participants in our sample might have limited the statistical power of our analyses to detect interaction effects, even if significant differences actually exist in the population.

Finally, concerning RQ2.2., our analysis revealed notable differences in psychological distress symptoms among SGM youth based on their level of worry about the three types of online victimization, with SGM youth with high frequency of worry exhibiting more psychological symptoms than those who did not appear frequently worried. These results may suggest that worry about online victimization may function as an additional stressor for SGM youths due to its relevant mental health outcomes. This observation extends previous research evidencing that people experiencing heightened levels of traditional fear of crime might exhibit more psychological distress symptoms (Stafford et al., 2007). In the case of SGM people, fear and worry about victimization have also been

associated with increased anxiety and depression (Grinshteyn et al., 2022) and other variables related to psychological adjustment issues. In fact, SGM people cope from a young age with ongoing stressors related to their identities, which could facilitate the onset of psychological distress symptoms (Drescher & Barber, 2012). In particular, SGM youth navigate multiple simultaneous challenges that are related to their having to manage stigmatization surrounding their identities or integrating their minority identities within predominantly hostile environments (Vázquez et al., 2021). In light of our current findings, we could theorise that these complex interplay of challenges may even transfer to digital environments (Garaigordobil & Larrain, 2020), where worry about online victimization emerges as yet another stressor with significant impact on their psychological well-being.

However, no significant differences were found regarding psychological distress symptoms between those SGM youths who perceived risk of online victimization and those who did not. Despite this, it would be interesting for interventions or policies targeting online victimization to examine how SGM youths perceive such risks as it becomes part of their social experience within virtual environments. In fact, evaluating young people's and, in particular, SGM youths' views on the origin and maintenance of such forms of victimization and understanding how they perceive it within a broader societal and cultural context is the first step for the effective implementation of preventive and intervention efforts (Soliman et al., 2020). Perhaps a qualitative approach could address this issue by allowing a more nuanced exploration of these youths' risk perceptions on online victimization.

The novelty of our contribution lies in its focus on a largely overlooked population in mainstream victimological literature. Additionally, in the exploration of factors associated with fear of online victimization that have been traditionally studied in offline contexts (Vozmediano et al., 2013). This study also represents an advance in the systematic review studies of fear of cybercrime (Brands & Van Doorn, 2022) by incorporating the exploration of psychological variables, which previous studies have largely overlooked, despite clear evidence that worry about crime and cybercrime is linked to adverse mental health outcomes.

Our study also contributes to the sexual and gender minority victimization literature by pointing out notable differences among sexual and gender minority and non-minoritized groups (Vogler et al., 2023). This finding is of great relevance for the creation, development and implementation of action plans aimed at improving the well-being of this population (Marcos et al., 2023), taking into account the risk of higher levels of discomfort among minoritized groups.

Our findings highlight the need to systematically gather data regarding worry and risk perceptions in order to guide targeted intervention and policies. In this sense, any approach such as educational programmes or policies addressing risky online behaviours among youths should consider SGM-specific safety concerns, with staff specially trained in this area. Previous research recognizes the importance of developing early prevention activities. These include psychoeducation on safety vulnerabilities concerning SGM youths, fostering both informal and formal spaces for communication and education in offline and in-person contexts (Martin-Storey et al., 2022), and increasing competency of authority figures (e.g., teachers, parents or administrative staff) sensitive to the concerns and specific needs of SGM youths (Ollen et al., 2017). In fact, feeling powerless and fearful of their identities being disclosed, and experiencing concerns that staff or authority figures may not accurately handle their needs are some of the main reasons why SGM youth do not report online victimization incidents and seek help (Abreu & Kenny, 2017). Therefore, addressing the complexities regarding the psychological implications of online victimization concerns among SGM youth is essential to develop effective strategies.

Moreover, while previous research has found a positive connection between perceiving fear of traditional crime and experiencing fear of cybercrime, it has also been suggested that experiencing victimization in online settings can shape how people perceive risk and safety in real-world environments, often leading to diminished safety perceptions offline (Khaleghipour et al., 2025). Likewise, efforts to prevent or tackle harmful effects of online victimization perceptions among SGM youth should consider the possible overlaps between the online and real-world victimization, as addressing these issues may also improve perceptions of safety and quality of life beyond digital environments.

## **Limitations**

This research is subject to limitations in its generalizability, which should be borne in mind. First, the study could only assess participant's data regarding participants' current sexual orientation and gender identity (man/woman/non-binary), but not the gender identity assigned at birth, so data regarding gender minority status (transgender) may be limited. Second, related to sample size issues, some limitations were identified when

conducting analyses. Disaggregation by sexual orientation and gender identity was not performed within the sexual and gender minority sample as the sample size would be too small and, thus, not adequate to proceed with the analyses. A larger sample size would be needed for future research. Third, response bias may be expected from the participants due to the utilized measurement method being self-report. Both social desirability in responses and denial of harm are suspected. Fourth, an inter-subject measurement design (as opposed to a repeated measures design) was used, which does not allow us to understand the evolution of psychological adjustment in victimized individuals from the perspective of individual development during youth. Fifth, the influence of other types of variables not assessed in this research could have mediating effects on the variables under study.

A further methodological limitation concerns the measurement of worry and risk perception. Some authors argue that measures of risk perception may be influenced by diverse heuristics and biases via item wording when describing the hazard (Wolff et al., 2019). For instance, when it comes to estimating future risks, people tend to overestimate the durability and intensity of their emotional reaction to such events (also known as the impact bias), thereby exaggerating future risks compared to present ones. They also tend to overestimate their likelihood of experiencing positive events while underestimating their chances of experiencing negative events relative to others (also known as the optimistic bias). In other words, it is a difficult task to measure the exact risk perception of a hazard since the assessment of whether an event is perceived as risky or not very risky depends, at least partly, on how the question is framed (Wolff et al., 2019). Thus, different phrasing between worry and risk perception measurement items may elicit different response tendencies from participants.

Similarly, the considerable overlap in wording between items measuring worry frequency and risk perception, with minimal variation, may cause participants to confuse these distinct psychological constructs. This confusion could lead to response patterns that do not accurately reflect participants' true experiences, resulting in underestimation or overestimation effects and masking genuine differences between these variables.

## **Conclusion**

This study offers valuable insights into the complexities of the realities that sexual and gender minority youths encounter in online environments. By examining the intricate experiences and psychological correlates related to some of the manifestations of online victimization, this research contributes to a more holistic understanding of the issue. Despite the limitations, our findings can shed light for future research and practical implications. Even though research body on sexual and gender minority specific violence appears now to be growing, transferable knowledge to the general public is still much needed (Workman & Dune, 2019). Evidence-based knowledge such as the contributions generated from our study needs to be integrated within online victimization detection and intervention programs aimed specifically at SGM youths.

So, we call for specific targeted action and tailored interventions towards these minorities, as pointed out in previous research (Whitton et al., 2019), since differentiated efforts to mitigate worry and perceived risk (Ilse, 2022) could reduce the psychological distress in SGM population. Current prevention frameworks tend to leave out factors such as worry or risk perception, which could miss out explanatory factors for potential behaviours. Future research should consider in further detail these factors given its role in the promotion of safer online environments for everyone, and especially vulnerable groups such as sexual and gender minority youth.

## **Conflict of Interest**

The authors have no conflicts of interest to declare.

## **Use of AI Services**

The authors declare they have used AI services, specifically Claude AI, for grammar correction and minor style refinements. They carefully reviewed all suggestions from these services to ensure the original meaning and factual accuracy were preserved.

## Data Availability Statement

The data presented in this study are available on request from the corresponding author. The data are not publicly available due to legal restrictions of data from underage participants. Researchers interested in in-situ access to the data should contact Dr. Marcos or Prof. Novo directly.

The supplementary materials are available on: <https://osf.io/x45uv/>

## Authors' Contribution

**Maite Azabal-Gallego:** conceptualization, writing—original draft, funding acquisition. **Alexander Trinidad:** conceptualization, methodology, data curation, formal analysis, writing—original draft, supervision, funding acquisition, project administration. **Verónica Marcos:** conceptualization, investigation, methodology, resources, data curation, writing—review & editing, funding acquisition, project administration. **Mercedes Novo:** conceptualization, writing—review & editing, investigation, resources, funding acquisition, supervision. **Laura Vozmediano:** conceptualization, writing—review & editing, funding acquisition, supervision.

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This study was approved by the Bioethics Committee of the University of Santiago de Compostela (Code: USC-06/2021).

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