



Understanding the Dynamics of Unwanted Online Sexual Solicitation Among Youth in Taiwan: Vulnerability and Resilience Factors

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Abstract

The rise in online sexual exposure and solicitation among youth has heightened concerns. Youth, due to their limited socio-cognitive capacity, face greater risks of online sexual victimization compared to adults. Unwanted online sexual solicitation (UOSS) is a concerning aspect of sexual victimization, encompassing requests for unwanted sexual talks, activities, and sharing personal sexual information or images online. This study, based on target congruence theory, examined UOSS risk and protective factors using a national-representative youth sample in Taiwan. In 2020, 19,556 students (Grades 5–12, average age 15, 50% male) participated in the school-based online survey. Hierarchical linear regression was used to determine the significance of UOSS predictors. Findings revealed a 15.4% prevalence of UOSS. Accounting for age and gender, target-vulnerability variables (self-esteem, bullying victimization, psychological distress) and target-gratifiability variables (online self-disclosure, time spent online) significantly linked to UOSS. Youth who were bullied, had greater psychological distress and online self-disclosure, and increased Internet use were prone to UOSS, while self-esteem mitigated risks. Bullying victimization and online self-disclosure were the strongest correlates of UOSS in Taiwan's youth, followed by psychological distress, Internet usage, and self-esteem. In sum, this study enriches the understanding of UOSS among Taiwanese youth and suggests strategies to prevent online sexual victimization. Enhancing self-esteem, promoting social media education including online privacy and self-disclose, tackling bullying, addressing psychological distress, and furnishing relevant services are crucial preventive measures. These findings offer guidance to parents, educators, and health professionals for supervising and steering adolescents' online conduct, presenting an evidence-based framework to avert online sexual victimization.

Keywords Unwanted online sexual solicitation · Online self-disclosure · Bullying victimization · Self-esteem · Psychological distress

Introduction

In the digital era, internet use among children and adolescents has dramatically increased (Rideout, 2019; Wang et al., 2012), leading to an increase in the risks of problematic internet use and online victimization (Hsieh, 2020; Hsieh et al., 2019; Livingstone et al., 2023). Among various types of online victimization, the rates of online sexual harassment have risen (Mori et al., 2022). In Taiwan, the Department of Protective Services at the Ministry of Health and Wealth disclosed that from February to June 2023, there were 1327 people who filed reports of intimate images being disseminated online without individual consent. This figure was five times higher than the same period last year, with 66 percent of the cases involving minors (Focus Taiwan, 2023a, 2023b). Additionally, ECPAT Taiwan, an organization dedicated to

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preventing child sexual exploitation and trafficking while advocating for child rights and online safety, has observed a rise in reports related to child online sexual abuse and solicitation through the Internet Reporting Hotline (Web547), with cases increasing from 1148 to 1820 (ECPAT Taiwan, 2021, 2023). Similarly, the FBI has issued a national public safety alert regarding sextortion cases, where minors are manipulated into sharing explicit images online and then blackmailed for more explicit content or money. Over 7000 such cases were reported in 2022, affecting at least 3000 victims in the USA (United States Attorney's Office, 2023). Compared to sextortion, unwanted online sexual solicitation (UOSS) is a broader term that may or may not involve blackmail, threat, or money. UOSS is a form of online sexual victimization that include requests to engage in unwanted sexual talk or sexual activities, or to provide personal sexual information or images to another individual (including peers and adults) online (Mitchell et al., 2007, 2014). Mitchell et al. were pioneers in the study of UOSS, and they found that 35% youth reported being victims of either Internet harassment or unwanted sexual solicitation in the USA, with 1% solely experiencing UOSS, 21% solely experiencing Internet harassment, and 13% being victims of both Internet harassment and unwanted sexual solicitation (Ybarra et al., 2007). Internationally, the mean prevalence of unwanted online exposure was 20.3%, and unwanted online solicitation was 11.5% in over 30 youth samples across nations (Madigan et al., 2018). According to Taiwan's Ministry of Health and Welfare, cyber sexual abuse victims are primarily between 19 and 25 years old, with, 74% being females and 22% males (Shen, 2022). In Taiwan, only one study has examined UOSS and revealed that within Northern Taiwan, 20% of 10th graders have experienced incidents of UOSS (Chang et al., 2016). One characteristic of the sexuality in adolescence is low-risk perception (Castro, 2016), which increased their vulnerability of sexual victimization. Adolescents explore their independence, develop a sense of self, and often feel confused or insecure about themselves and how they fit into society (Erikson, 1958, 1963). Their desire for acceptance and sensitivity to others' opinions puts them at higher risk of online sexual victimization. To address this issue effectively, it is crucial to identify risk and protective factors for UOSS and formulate policies for prevention and intervention measures.

Involvement in UOSS was linked to offline victimization and perpetration of relational, physical, and sexual aggression, and psychosocial problems like substance use, tendency to react to stimuli with anger, delinquent peer associations, poor caregiver bonds and monitoring (Ybarra et al., 2007). UOSS was also associated with factors such as online gaming, exposure to pornography, risk online behaviors, cyberbullying victimization, and depression in high school students (Chang et al., 2016). Additionally, the target congruence theory highlighted

individual characteristics and attributes that increase vulnerability to victimization, including emotional deprivation, psychological distress, and being female, which have some congruence with the needs, motives, or reactivities of offenders (Finkelhor & Asdigian, 1996). To explore potential risk factors for victimization, the target congruence theory introduces three concepts: target vulnerability, target gratifiability, and target antagonism (Finkelhor & Asdigian, 1996; Sween & Reysn, 2017). Target vulnerability refers to characteristics (e.g., low self-esteem, bullying victimization, psychological distress, female) that decrease the potential victims' ability to resist or prevent the crime. Target gratifiability refers to characteristics or attributes (e.g., high level of online self-disclosure, and much time spent online exchanging messages) that the offender wants to possess or manipulate. In other words, it means that the target fits what the offender seeks. For example, offenders may manipulate adolescents' emotional needs and entice them to involve in sexual activities like taking sexy photographs or videos in exchange. Finally, target antagonism refers to characteristics that elicit negative emotional reactions from the offender.

Based on the concepts of target vulnerability and target gratifiability, the current study identified and examined five risk and protective factors of UOSS using large-scale secondary data in Taiwan. While previous research has mainly focused on offline sexual assault and abuse (Assink et al., 2019; Spencer et al., 2023), this current study aimed to shed light on the emerging field of UOSS risk factors. Previous studies highlighted the significance of factors such as physical intimate partner violence and prior sexual assault victimization in offline sexual assault (Spencer et al., 2023) and various forms of prior victimization in offline sexual abuse (Assink et al., 2019). They also found other risk factors such as parental problems, parenting problems, child problems, and being female (Assink et al., 2019). Research on risks of UOSS was relatively less but growing. A few studies on the risks of UOSS have primarily concentrated on prior victimization and family conditions (Chang et al., 2016; Ybarra et al., 2007). Nonetheless, our understanding of additional dimensions of risk factors linked to UOSS, such as online behavior (specifically self-disclosure), mental health, and youth characteristics (particularly self-esteem), remains limited. The current study aimed to enhance our understanding of how self-esteem, traditional bullying victimization, psychological distress, online self-disclosure, and time spent online contribute to UOSS. This knowledge is crucial for identifying adolescents in need of targeted interventions and illuminating risk factors that prevention programs should address in Asian societies.

Risk Factors for Online Sexual Victimization

Self-Esteem

Self-esteem refers to a person's overall sense of his/her value and attitude toward the self (Rosenberg, 1965). Normal ups and downs may severely affect how people with low self-esteem see themselves, while people with high self-esteem may experience only a temporary fluctuation. Low self-esteem increased vulnerability to victimization, as seen in studies predicting sexual assault victimization among college students (Krahé & Berger, 2017) and its transactional relationship with peer victimization, suggesting that children with low self-esteem are more likely to become victims, and being victims could have long-lasting negative effects on self-esteem (van Geel et al., 2018). In the cyber realm, low self-esteem predicts cyberbullying victimization in adolescents (Özdemir, 2014). Moreover, self-esteem influences sexual behaviors, with adolescent boys with high self-esteem more likely to initiate sex and girls with high self-esteem more likely to delay it (Spencer et al., 2002). Different forms of victimization may affect self-esteem variably among Taiwanese adolescents, with psychological abuse and neglect linked to lower self-esteem, but no such relationship found with physical abuse and sexual abuse (Lee & Feng, 2021). While prior research has explored associations between self-esteem and various forms of victimization (e.g., offline sexual assaults, bullying, psychological abuse and neglect), the connection between self-esteem and online sexual victimization (e.g., UOSS) within Asian societies remains unexplored.

Bullying Victimization

Experiencing peer bullying is a significant risk factor linked to various forms of victimization, including those of a sexual nature (Paat et al., 2020). For example, a survey conducted of 47,114 Peruvian students aged 16–18 revealed a strong connection between traditional face-to-face bullying and sexual harassment (Oriol et al., 2021). Research in California's public schools also showed that bullied students were more likely to face abuse in romantic relationships (Jain et al., 2018). Additionally, offline and online interactions often correlate. A survey of 28,104 Maryland high school students found that 95% of cyberbullying victims had experienced other forms of peer victimization (Waasdorp & Bradshaw, 2015). Another study on Taiwanese sexual minority youth found that offline bullying victims were at a higher risk of encountering cyberbullying (Wang et al., 2019). Recent research using data from the National Survey on Teen Relationships and Intimate Violence indicated significant overlap between in-person and online sexual harassment experiences (Taylor et al., 2021).

These findings align with a consistent theme in the literature regarding various types of peer victimization (Estévez et al., 2020). Various theoretical frameworks, including the lifestyles and routine activities theory (Cohen et al., 1981), have been applied to elucidate the overlap of victim roles, as seen in works like Choi et al. (2019). However, while previous studies have unequivocally identified a continuity in victimization, the breadth of their investigations remains notably narrow. With the rapid digitization of peer interactions in contemporary society, today's youth encounter a slew of unprecedented dangers in the digital realm. Beyond well-documented threats like cyberbullying and cyber-dating violence, emerging risks such as sextortion, sexting, revenge porn, and online scams are increasingly prevalent (Paat & Markham, 2021). Disturbingly, these online threats disproportionately impact girls, women, and gender minorities (Backe et al., 2018). Despite these growing concerns, there's a notable research gap in understanding the connection between bullying victimization and adolescents' online sexual victimization. Therefore, this study aims to address this gap by exploring how bullying victimization related to undesired online sexual solicitations.

Psychological Distress

The vulnerability hypothesis suggests that vulnerability variables (e.g., powerless, stigmatization, mental health problems) increase the risk of victimization (Koss & Dinero, 1989). Cuevas et al. (2009) found that psychiatric diagnosis could serve as risk factors for subsequent victimization, and Chu (1992) suggested that posttraumatic symptoms might reduce victims' capabilities to detect danger cues or make appropriate judgment, thereby increasing their vulnerability to victimization. In a longitudinal study, psychological distress at Wave 1 predicted subsequent overall re-victimization and various forms of offline victimization including maltreatment, sexual victimization, peer victimization, and witnessed victimization at Wave 2 (Cuevas et al., 2010). A recent study in the USA indicated a reciprocal relationship between psychological distress and offline sexual harassment victimization (Murchison et al., 2023). Nevertheless, when narrowing the focus from various types of offline victimization to online sexual victimization as an outcome, there remains a lack of dedicated research that investigates psychological distress as a predictor. One longitudinal study in Spain revealed that adolescents with depression in Year 1 were more vulnerable to sexting pressure and online sexual victimization in Year 2 (Gámez-Guadix & De Santisteban, 2018). Furthermore, although past research has established a link between sexual assault and mental health problems like anxiety, depression, and substance use disorders (Dworkin, 2020), there has been limited exploration of how mental health conditions among youth affect the

likelihood of online sexual victimization. The current study aimed to examine the distinct role of psychological distress in heightening vulnerability to UOSS within an Asian sample.

Online Self-Disclosure

Self-disclosure refers to revealing intimate aspects of one's true self, including personal states, dispositions, events in the past, plans for the future, love, sex, and private thoughts and information (Derlega & Grzelak, 1979; Schlenker, 1986). It encompasses the frequency and amount of information revealed, the degree of intimacy, honesty, and accuracy of information shared (Jourard, 1971). Online self-disclosure has become a common cyber behavior among adolescents, especially when they are under peer pressure and having the desire for conformity, social acceptance, and popularity (Casas et al., 2013; Gangopadhyay & Dhar, 2014; Peluchette et al., 2015). Individuals on social networking platforms encourage users to share photographs, videos, and information about themselves, including their interests, sexual preferences, social attitudes, religious beliefs, and other private information (Ledbetter et al., 2011). However, as adolescents express themselves online, they often lose control over their privacy in cyber environments (Gangopadhyay & Dhar, 2014; Marwick & Boyd, 2014). Privacy concerns have been shown to reduce self-disclosure on platforms like Facebook among adult users (Oghazi et al., 2020). Adolescents, on the other hand, frequently adopt an "nothing to hide" perspective and underestimate privacy risks (Adorjan & Ricciardelli, 2019). They often believe that nothing negative will result from sharing private information online (Tow et al., 2010), while perceived enjoyment and social capital (reciprocity and trust) further encourage their online self-disclosure (Krasnova et al., 2009; Posey et al., 2010). Given that self-disclosure is a common behavior among adolescents that challenge their privacy control, it is essential to understand its relationship with online victimization. Research has shown that online self-disclosure, such as sharing private content on social networking profiles, is a significant predictor of cyberbullying victimization (Peluchette et al., 2015). By sharing personal information and images online, adolescents unintentionally create opportunities for manipulation by wrongdoers, increasing the risk of online victimization (Chen et al., 2017; Walrave & Heirman, 2011; Ybarra et al., 2006). However, the connection between self-disclosure and a specific type of online victimization, namely online sexual victimization, remains limited. Previous research on self-disclosure and sexual victimization has primarily focused on the self-disclosure behaviors of survivors, rather than examining how self-disclosure contributes to online sexual victimization. Only one study has indicated that willingness to sexting and engaging in sexy self-presentation were

associated with more online sexual victimization experiences among adolescents and young adults (Festl et al., 2019).

The Current Study

Beyond offline sexual victimization, the rates of online sexual harassment among youth is on the rise are rising (Mori et al., 2022). The current study goes beyond previous research on Internet usage, cyberbullying, and offline sexual victimization by placing explicit emphasis on online sexual victimization and addressing risk factors that increase the vulnerability of adolescents to engage in UOSS. While some studies have explored the risks of UOSS, primarily focusing on prior victimization and family conditions (Chang et al., 2016; Ybarra et al., 2007), our understanding of other dimensions of UOSS risk factors remains limited. Drawing from the target congruence theory (Finkelhor & Asdigian, 1996), we applied the concepts of target vulnerability and target gratifiability to identify five risk and protective factors of UOSS, measured using secondary data from Taiwan. Our goal was to examine these factors in a nationally representative sample of Taiwanese youth. Our hypotheses were as follows: (1) high self-esteem would have a negative association with UOSS, while bullying victimization and psychological distress might hinder adolescents' ability to resist or deter online sexual victimization, thereby increasing the risks of UOSS. (2) High self-disclosure on social networking sites and spending extensive time online exchanging messages would be positively associated with the risks of UOSS.

Method

Participants and Procedure

This current study utilized data from the Bullying Prevention project, funded by the Ministry of Education in Taiwan. A two-stage stratified cluster sampling design was used to obtain a nationally representative sample of 19,556 students from 5 to 12th grades (mean age = 15, 50% male) in Taiwan. In the first stage, schools were categorized into four regions: Northern Taiwan, Southern Taiwan, Central Taiwan, and Eastern Taiwan with offshore islands. Within each region, schools were further divided into eight strata based on whether they were public or private and their school systems (elementary, middle, high, and vocational schools). Three schools were randomly selected from each stratum using the school list published by the Ministry of Education for the 2019 academic year. In total, 220 schools were sampled, including 55 elementary schools, 74 junior high schools, 55 senior high schools, and 36 vocational schools. Following the selection of sample schools, the cluster sampling method

was employed. With the assistance of school administrators, two classes per grade were selected from each sample school, and all the students in the selected classes were invited to participate in the online survey, which took approximately 30 min to complete. Participating schools received an official letter from the Ministry of Education outlining the project and online survey instructions. Participating teachers scheduled time for their consented students to complete the self-administered online survey in school computer laboratories between June and July 2020. The survey consisted of one main set of questions and three supplemental sets. The final sample included a total of 19,556 students.

Measures

Dependent Variable

Unwanted Online Sexual Solicitation (UOSS) UOSS was assessed using four items adapted from the Youth Internet Safety Survey (Mitchell & Jones, 2011). These items covered unwanted propositions or requests for engaging in sexual activities, sexual talk, solicitation of personal sexual information, and attempts to arrange offline meetings. Sample questions included: “Did anyone on the Internet ever try to get you to talk about sex when you did not want to?” “Did anyone on the Internet ever ask you to do something sexual that you did not want to do?” “Did anyone on the Internet ask you for sexual information about yourself when you did not want to answer such questions, like what your body looks like or sexual things you have done?” Participants were asked to rate the frequency of their experiences with UOSS on a 5-point scale (1 = never, 2 = one time, 3 = two times, 4 = 3–5 times, and 5 = more than six times). The mean score was computed based on their responses to these items. The scale used in this study demonstrated strong internal consistency, with a Cronbach’s alpha (α) coefficient of 0.85.

Independent Variables

Self-Esteem We used the 10-item Rosenberg’s (1965) self-esteem scale to define and measure global self-worth and feelings about oneself. The scale has been validated in 53 nations, including Taiwan (Schmitt & Allik, 2005). Sample questions include: “I feel that I’m a person of worth,” “I feel that I have a number of good qualities,” “All in all, I am inclined to think that I am a failure (reverse-coded),” and “I am able to do things as well as most other people.” Respondents rated these items on a 4-point scale (1 = strongly disagree to 4 = strongly agree), with five items being reverse-scored. Higher scores on the scale indicated higher levels of self-esteem. We calculated the mean score based on participants’ responses to these items. In our study, this scale exhibited strong internal consistency (Cronbach’s $\alpha = 0.85$).

Bullying Victimization To assess bullying victimization, we utilized eight items drawn from the Olweus Bully/Victim Questionnaire (OBVQ) (Olweus, 1996). To streamline the questionnaire, our research team chose items from sub-categories of the original OBVQ scale, including physical, verbal, and social/relational aggression. Sample questions included: “I was hit, kicked, pushed, and shoved around,” “I was called mean names,” “I was threatened or forced to do things I didn’t want to do,” “Other pupils left me out of things on purpose or completely ignored me,” “Other pupils took something of mine without permission.” Participants indicated the frequency of their experience with bullying on a 5-point scale (1 = never, 2 = one or two times, 3 = 2–3 times a month, 4 = once a week, and 5 = many times a week). We calculated the mean score based on their responses to these items. The school bullying/victimization scale, based on OBVQ, has been previously validated with samples from Taiwan (Cheng et al., 2011). In our study, this scale exhibited strong internal consistency (Cronbach’s $\alpha = 0.83$).

Psychological Distress We employed the 5-item Brief Symptom Rating Scale (Lee et al., 2003) to measure adolescents’ psychological symptoms, including anxiety, depression, and sleep disturbances experienced in the past week. This scale is widely used in Taiwan for screening psychological disorders and has been validated with samples from Taiwan (Wu et al., 2016). Sample questions included: “feeling tense or uneasy,” “feeling easily annoyed or irritated,” and “feeling blue.” Each item was rated on a 4-point rating scale (1 = strongly disagree to 4 = strongly agree), with higher scores indicating greater psychological distress. We calculated the mean score based on participants’ responses to these items. In this study, the scale demonstrated strong internal consistency (Cronbach’s $\alpha = 0.88$).

Online Self-Disclosure We measured online self-disclosure behaviors using 18 items, which were adapted from the Revised Self-Disclosure Scales (Wheeless, 1976) and the instant information sharing subscale (Lai & Yang, 2015). These items assessed various aspects of online self-disclosure, including frequency, duration, accuracy, intimacy, the positive and negative nature of the messages revealed online, and instant information sharing. To create this scale, our research team selected 13 items from each of the five dimensions (i.e., amount, depth, intent, honesty, and valence (positive/negative)) from the original 40-item self-disclosure scale. Additionally, five items were chosen from the original instant information sharing subscale. Sample questions included: “I often talk about myself on social networking sites (SNS),” “I would openly and fully disclose who I really am in my post on SNS,” “When I self-disclose on SNS, I am consciously aware of what I am revealing,” “I am always honest in my self-disclosure on SNS,” “My disclosure about

myself on SNS are more positive than negative,” and “When I found something interesting, I would like to post it online instantly.” Participants rated these items on a 5-point scale, ranging from 1 (not at all like me) to 5 (very much like me), with higher scores indicating greater levels of online self-disclosure. The mean score was calculated based on participants’ responses to these items. The reliability and validity of the scale have been previously established in Taiwanese samples (Huang, 2016; Lai & Yang, 2015). In our study, the scale demonstrated strong internal consistency (Cronbach’s $\alpha=0.95$).

Time Spent Online Exchanging Messages Youth were asked to report how much time they spent online exchanging messages with others in a typical working day. Responses were provided on a 6-point scale, anchored by 1 (less than half hour), 2 (half-1 h), 3 (1–2 h), 4 (2–3 h), and 6 (4 h and more).

Statistical Analyses

We conducted statistical analyses using SPSS version 28. Our analysis comprised several steps. First, we conducted descriptive statistics to understand the distribution of study variables and employed Pearson’s coefficient for correlational analysis, illustrating how these variables related to one another. Second, we conducted a t-test to examine gender differences in study variables. Finally, we performed a hierarchical regression analysis to examine the contributions of target-vulnerability variables (self-esteem, bullying victimization, and psychological distress) and target-gratifiability variables (online self-disclosure and time spent online exchanging messages) to UOSS, after considering for child sex and age as covariates. The hierarchical regression approach is a widely accepted method for assessing the influence of

predictor variables while accounting for the impact of other variables in the model. We systematically entered the variables in steps, beginning with demographic variables (the two covariates), followed by the inclusion of the three target-vulnerability variables, and concluding with the addition of the two target-gratifiability variables. This method allows us to assess how each variable or group of variables contributed to the prediction of UOSS while controlling for other factors. We measured the incremental change in the adjusted R^2 at each step to understand the variance explained by each variable or set of variables introduced into the regression model (Pedhazur, 1997).

Results

Descriptive Statistics and Correlations

A total of 19,556 students from 5th grade to 12th grade (mean age = 15) in Taiwan, 50% boys and 50% girls, completed the main questionnaire. Because the requirement of force response was added in this online survey, there is no missing data. Table 1 presents the correlation coefficients for all the study variables and the variables’ means, standard deviations, and score ranges. UOSS was positively correlated with age ($r=0.09$), bully victimization ($r=0.24$), psychological distress ($r=0.25$), online self-disclosure ($r=0.22$), and time spent online exchanging messages ($r=0.16$), and negatively correlated with self-esteem ($r=-0.13$). The prevalence rate of all types of UOSS was 15.4%. Table 2 presents the t-test results indicating gender differences in self-esteem, bullying victimization, psychological distress, online self-disclosure, and UOSS. Specifically, boys had higher scores on self-esteem and bullying victimization than girls, while

Table 1 Bivariate correlations, means, and standard deviations for the study variables

Variables	1	2	3	4	5	6	7	8
1. UOSS	–	– 0.07**	0.09**	– 0.13**	0.24**	0.25**	0.22**	0.16**
2. Gender	– 0.07**	–	– 0.03**	0.10**	0.13**	– 0.10**	– 0.21**	– 0.07**
3. Age	0.09**	– 0.03**	–	– 0.06**	– 0.11**	0.13**	0.25**	0.23**
4. Self-esteem	– 0.13**	0.10**	– 0.06**	–	– 0.13**	– 0.49**	0.01	– 0.06**
5. Bully victimization	0.24**	0.13**	– 0.11**	– 0.13**	–	0.30**	0.01	0.04**
6. Psychological distress	0.25**	– 0.10**	0.13**	– 0.49**	0.30**	–	0.16**	0.12**
7. Self-disclosure	0.22**	– 0.21**	0.25**	0.01	0.01	0.16**	–	0.21**
8. Time spent online	0.16**	– 0.07**	0.23**	– 0.06**	0.04**	0.12**	0.21**	–
Mean	1.14	–	15.16	2.77	1.32	1.68	2.03	2.84
SD	0.48	–	2.17	0.43	0.52	0.77	0.87	1.88
Range	1–5	–	8–26	1–4	1–5	1–4	1–5	1–6

Codes for sex are 1 = male, 0 = female. Codes for time spent online are 1 = 0–0.5 h, 2 = 0.5–1 h, 3 = 1–2 h, 4 = 2–3 h, 5 = 3–4 h, 6 = more than 4 h
SD standard deviation, UOSS unwanted online sexual solicitation

** $p < .01$

Table 2 Differences between boys and girls on study variables

Variable	Boys		Girls		df	t	p	Cohen's d
	M	SD	M	SD				
Self-esteem	2.81	0.42	2.72	0.43	19,543	14.08	<.001	0.43
Bullying victimization	1.39	0.60	1.26	0.42	17,502	18.38	<.001	0.52
Psychological distress	1.60	0.75	1.75	0.78	19,538	13.86	<.001	0.77
Online self-disclosure	1.85	0.88	2.21	0.82	13,014	- 24.2	<.001	0.85
UOSS	1.11	0.43	1.18	0.52	12,683	- 8.12	<.001	0.48

M is mean. SD is standard deviation. UOSS is unwanted online sexual solicitation

girls had higher scores of psychological distress, online self-disclosure, and UOSS than boys. The effect size for self-esteem and UOSS, as measured by Cohen's d, was 0.43 and 0.48, respectively, indicating a small-to-medium effect. The effect size for bullying victimization and psychological distress was medium to large, with a Cohen's d of 0.52 and 0.77, respectively. The effect size for online self-disclosure was large, with a Cohen's d of 0.85.

Effects of Risk Factors on Unwanted Online Sexual Solicitation

Table 3 summarizes the results of the hierarchical regression analysis of UOSS predictors. Two demographic variables were entered into the UOSS regression model in the first step (Model 1). Target-vulnerability variables (self-esteem, bullying victimization, and psychological distress) were entered into the regression model in the second step (Model 2). Finally, target-gratifiability variables (online self-disclosure and time spent online exchanging messages) were entered into the regression model in the third step (Model 3). The

results showed that the demographic variables significantly contributed to the regression model, $F(2, 13,094) = 88.52, p < 0.001$, and accounted for 1.3% of the variance in UOSS. Adding the three target-vulnerability variables significantly explained an additional 9.1% of the variance in UOSS, $F(3, 13,091) = 444.83, p < 0.001$. Finally, adding two target-gratifiability variables to the regression model explained an additional 3.3% of the variance in UOSS, $F(2, 13,089) = 251.78, p < 0.001$. The variables in the final model significantly explained 13.7% of the variance in UOSS. The regression coefficients in the final model indicated a negative association of self-esteem ($\beta = -0.02, p < 0.05$) with UOSS. The results supported the hypotheses of the study. While higher self-esteem was negatively associated with UOSS, bullying victimization ($\beta = 0.20, p < 0.001$) and psychological distress ($\beta = 0.13, p < 0.001$) were positively associated with UOSS. Moreover, online self-disclosure ($\beta = 0.16, p < 0.001$) and time spent online exchanging messages ($\beta = 0.09, p < 0.001$) were positively associated with UOSS. Adolescents who were bullied and scored higher on psychological distress and online self-disclosure (e.g., frequency, duration, accuracy,

Table 3 Hierarchical regression analysis for variables predicting unwanted online sexual solicitation

Predictor variables	Model 1			Model 2			Model 3		
	B	SEB	β	B	SEB	β	B	SEB	β
<i>Demographic factors</i>									
Sex	- 0.07	0.01	- 0.07***	- 0.07	0.01	- 0.08***	- 0.04	0.01	- 0.04***
Age	0.02	0.00	0.09***	0.02	0.00	0.09***	0.01	0.00	0.04***
<i>Target vulnerability</i>									
Self-esteem				- 0.01	0.01	- 0.01	- 0.03	0.01	- 0.02*
Bullying victimization				0.19	0.01	0.21***	0.18	0.01	0.20***
Psychological distress				0.10	0.01	0.16***	0.08	0.01	0.13***
<i>Target gratifiability</i>									
Online Self-disclosure							0.09	0.01	0.16***
Time spent online							0.02	0.00	0.09***
<i>Model fit</i>									
R ² Change			0.013			0.091			0.033
Adjusted R ²			0.013			0.104			0.137

Codes for sex are 1 = male, 0 = female

* $p < .05$

*** $p < .001$

intimate degree of messages revealed on social networking sites) and spend much time online exchanging messages with others were more likely to experience UOSS. Child sex ($\beta = -0.05, p < 0.001$) was negatively associated with UOSS, indicating that boys reported less UOSS than girls. Moreover, child age ($\beta = 0.04, p < 0.001$) was positively associated with UOSS, suggesting that older adolescents were more likely to experience UOSS. Among the study variables, bullying victimization and online self-disclosure were the strongest correlates of UOSS among youth in Taiwan, followed by psychological distress, time spent online, and self-esteem.

Discussion

Since Internet use among adolescents is a universal phenomenon in the digital era, adolescents are at considerable risk of UOSS. This study was the first to investigate the prevalence of UOSS in a nationally representative sample of youth in Taiwan and examine the risk and protective factors of UOSS based on the target congruence theory. Our findings revealed that the prevalence rate of overall UOSS was 15.4% among all adolescents, and it was higher among adolescent girls (18.9%) than boys (11.8%). These rates are higher than the mean prevalence rate of UOSS reported in a meta-analysis (11.5%) (Madigan et al., 2018) and the prevalence rate of offline sexual victimization (12.7%) (Stoltenborgh et al., 2011). As adolescents grew older and had more unmonitored access to the Internet, UOSS increased.

In line with the hypotheses, our findings demonstrated the significance of both target-vulnerability variables (self-esteem, bullying victimization, and psychological distress) and target-gratifiability variables (online self-disclosure and time spent online) in relation to UOSS. As anticipated, after accounting for age and sex of the youth, the study revealed that experiences of bullying victimization and elevated psychological distress heightened adolescents' vulnerability and diminished their capacity to protect themselves from UOSS perpetrated by online offenders. These results align with the target-vulnerability concept. Conversely, strong self-esteem emerged as a protective factor, enhancing adolescents' capacity to resist or prevent UOSS. While prior research has explored self-esteem in relation to peer victimization, cyberbullying, and offline sexual behavior (Patchin & Hinduja, 2010; Spencer et al., 2002; Van Geel et al., 2018), little was known about its role in online sexual victimization, including UOSS. Our findings confirmed the hypothesized link between self-esteem and UOSS. One possible explanation is that adolescents with robust self-esteem viewed themselves as valuable and worthy, harboring feelings of self-respect and self-acceptance (Ackerman et al., 2011). Consequently, they appear less vulnerable to targeting and victimization by UOSS. Adolescents with high self-esteem are more likely

to interpret online feedback as consistent with their positive self-conceptions compared to those with lower self-esteem (Blaine & Crocker, 1993; Spencer et al., 1993). Self-esteem can be viewed as a protective buffer against stressors and adverse experiences (Pearlin & Schooler, 1978; Thoits, 1994) and as a cognitive resource that enables them to navigate unfavorable situations more effectively (Spencer et al., 1993), potentially reducing the UOSS risk. Moreover, in line with a previous study conducted in a Swedish sample (Dahlqvist & Gådin, 2018), our results highlighted the connection between offline bullying victimization and UOSS. Adolescent bullying victims faced an increased likelihood of developing psychological disorders, including emotional problems, non-suicidal self-injury, suicidal ideation, and suicide attempts (Jantzer et al., 2022). Subsequently, psychological distress heightened adolescents' vulnerability to UOSS.

Furthermore, our second hypothesis found confirmation in our findings. We discovered that adolescents who engaged in high level of online self-disclosure on social networking sites and spent substantial time exchanging messages online with others faced an elevated risk of becoming targets and falling victim to manipulation, particularly in relation to their socio-emotional needs, which culminated in UOSS. The outcomes align with the target-gratifiability concept. The unrestrained nature of online self-disclosure can indeed expose children and adolescents to online victimization and harassment (Valkenburg & Peter, 2009). The allure of immediate rewards often motivates adolescents to freely share personal information online in pursuit of a positive self-presentation, a sense of belonging, and popularity (Jordán-Conde et al., 2014), often without fully considering the potential risks associated with such self-disclosure (Albert & Steinberg, 2011). Online offenders may adeptly identify and exploit the socioemotional needs of adolescents who extensively disclose personal information online and spend significant time messaging with others, thus making them susceptible to manipulation and involvement in UOSS.

Strengths

This study employed a large-scale, nationally representative sample in Taiwan, enhancing the credibility of its findings for policymaking compared to traditional educational or psychological research, which often relies on convenience samples. This robust sample size substantially enhanced the generalizability and external validity of the study's conclusions. Furthermore, the large sample size bolstered the statistical power to the analyses, enabling the detection of effects that might otherwise have been overlooked in typical educational studies and facilitating more precise estimations of the relationships between variables. Additionally, this study advanced beyond previous research on Internet usage, cyberbullying, and offline sexual victimization by

placing explicit emphasis on online sexual victimization in the digital era. Also, it contributed to enriching our understanding of additional dimensions of risk factors that escalate the vulnerability of adolescents engaged in UOSS. In conclusion, the current study made a meaningful contribution to the body of knowledge, providing valuable insights to inform evidence-based decision making, and support the development of effective policies and interventions.

Limitations

This study had several limitations. Firstly, despite drawing data from a nationally representative sample, the study's use of a cross-sectional design precludes the establishment of causal relationships among the study variables. Secondly, while the findings and existing literature underscore the significance of self-esteem, bullying victimization, psychological distress, and online self-disclosure as predictors of UOSS, it is worth noting that unexamined factors, such as personality, may also hold relevance in predicting the risks associated with UOSS. Thirdly, self-report surveys are susceptible to a range of biases and limitations, including the influence of social desirability bias and variations in how respondents interpret survey questions, potentially introducing variability into the results. Lastly, it is important to recognize that the findings may not be readily generalized to adolescents from diverse cultural and societal backgrounds.

Implications for Research and Practice

The use of a sample from Taiwan adds valuable insights to the existing literature on adolescent UOSS, which has primarily centered on Western contexts. Similar to other East Asian societies such as Hong Kong, Japan, and Korea, Taiwan adheres to more conservative cultural norms surrounding adolescent sexuality (Cheng et al., 2014). Furthermore, in East Asia, educational priorities often lean heavily toward academic success, with limited attention given to non-academic aspects like adolescent sexuality. Like in Hong Kong (Lam & Chan, 2007), Taiwan is characterized by the absence of comprehensive sex education in schools and limited parent–child discussions about sexual matters. This might contribute to the emergence of UOSS and other related online risks among the youth. As previously mentioned, this study shows that the prevalence of UOSS in Taiwan surpasses that in many developed countries such as the USA, the Netherlands, and Spain (Madigan et al., 2018). This disparity raises a critical concern about the necessity for experts, educators, and parents in East Asia to formulate effective strategies for mitigating this form of online victimization.

In general, this study contributes to our understanding of adolescents' UOSS experiences and the multifaced

risk and protective factors involved, ultimately serving as a guide for developing more effective prevention and intervention programs for adolescents. The insights derived from this study offer tools for parents, educators, and health professionals to supervise and guide adolescents' online interactions and behaviors and provide a framework of evidence-based practice to prevent and intervene in online sexual victimization. Among the study variables, we identified bullying victimization and online self-disclosure as the strongest correlates of UOSS among Taiwanese youth, followed by psychological distress, time spent online, and self-esteem. These findings provide valuable insights for educators and health professionals in offering more focused guidance and effectively prioritizing their interventions and prevention strategies concerning UOSS. While self-disclosure can indeed foster closeness in developing personal relationships (Derlega et al., 1987), excessive self-disclosure can have adverse effects (Greene et al., 2006), particularly in the digital realm. People often reciprocally introduce themselves to others who share information about themselves to develop relationships and intimacy (Taylor & Altman, 1987). However, personal information people reveal and share might not be equivalent (Joinson, 2001). Online self-disclosure may be less honest because of the nature of cyber communication, which increases the chance of identity manipulation and deceptive self-presentation (Lea & Spears, 1995). Therefore, online offenders may easily manipulate vulnerable adolescents eager to be seen and loved and to form relationships for the purpose of UOSS. Schools should collaborate with families to raise awareness of online sexual victimization and provide real-world models and practical tools to enhance adolescents' ability to resist or prevent UOSS. In addition to digital citizenship currently taught in schools, our study suggested that it is important to teach proper online self-disclosure, online privacy and safety, as it is an essential part of young people's lives and should be integrated into the professional and educational curriculum. Moreover, it is important to emphasize enhancing adolescents' self-esteem, preventing or reducing bullying, and providing services and resources for psychological distress to prevent UOSS.

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Availability of Data and Material Not applicable.

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Declarations

Conflict of interest The authors declare they have no conflict of interest to disclose.

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