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A latent class analysis of technology-facilitated sexual violence: Associations to other victimizations, psychiatric symptoms, and gender

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ABSTRACT

Background: Poly-victimization research has shown the cumulative detrimental effects of violence exposure on mental health. Latent Class Analysis (LCA) of victimization is a growing research field uncovering specific combinations of violence exposures particularly negative to mental health. Despite a growing concern of technology-facilitated violence (TFSV), it is scarcely included in LCA studies.

Objectives: Investigating victimization typologies that includes technology facilitated sexual violence.

Participants and setting: Cross-sectional survey data from a representative sample of Swedish young people in the age range of 16–23 ($N = 3243$, mean age = 18.20, $SD = 0.61$).

Methods: A Latent Class Analysis was conducted using the package PoLCA in R. A model with three classes was deemed to best fit the data.

Results: Class 1 (*sexual polyvictimization*, 10.1 %) had high probabilities of all forms of sexual violence including TFSV and the highest proportion of psychiatric diagnosis (45.2 %). This class consisted of mostly girls. Class 2 (*child abuse polyvictimization*, 14.8 %) was characterized by high probabilities of physical and psychological child abuse and had an even gender distribution. 30.6 % of this class endorsed having a psychiatric diagnosis. Class 3 (75.1 %) was a *low victimization/normative* subgroup with an even gender distribution and a low (12.8 %) frequency of psychiatric diagnosis. Class 1 exhibited the highest levels of psychiatric symptoms.

Conclusions: Prevention efforts targeted against TFSV should consider the whole web of violence that some young people are situated in. Since TFSV seems to be connected to psychiatric symptoms and diagnosis, Child- and Adolescent Psychiatric services should pay more attention to this type of violence among their young patients.

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1. Introduction

Today's current diagnostic framework for trauma and stress-related disorders is not sufficiently developed for patients for whom exposure to violence is not only in the form of circumscribed events but could be viewed more as a condition of life (Hamby, 2013). In psychiatric practice, it is known that people with an extensive history of trauma and violence show more severe psychiatric symptoms (Ford, Gagnon, et al., 2011) but less is known about which profiles of violence could be most detrimental to psychological health. This could in the long term have implications for both public health interventions, resource allocation, and clinical practice. One victimization subtype that consistently has been shown to have particularly negative consequences for psychological health and well-being is sexual violence, defined by WHO as: "(...) any sexual act, attempt to obtain a sexual act, or other act directed against a person's sexuality using coercion, by any person regardless of their relationship to the victim, in any setting. It includes rape, defined as the physically forced or otherwise coerced penetration of the vulva or anus with a penis, other body part or object." (WHO, 2012, p. 2).

Exposure to sexual violence seems to be affecting the very sense of self of the victim in ways that other violence experiences are not (Schnittker, 2022). Exposure to sexual violence has been associated to psychological problems including but not limited to depression, self-harm, and suicidality (Chen et al., 2010; Dworkin, 2020; Rajan et al., 2020) and has been shown to be the specific type of violence exposure that differentiates Post Traumatic Stress Syndrome (PTSD) from Complex Post Traumatic Stress Syndrome (CPTSD) (Maercker et al., 2018). When it comes to associations between sexual violence and psychiatric symptoms, a large body of research concerns child sexual abuse, which is consistently shown to have severe consequences on many aspects of mental health and functioning (Chen et al., 2010; Maniglio, 2009). Child sexual abuse is an abuse type that often co-occurs with other forms of victimization such as child maltreatment, neglect, and physical abuse, with many victims being poly-victimized (N. Aho, Proczkowska-Bjorklund, et al., 2016; Pereda et al., 2016).

Other types of sexual violence linked to psychiatric symptoms or psychiatric diagnosis in not only children but young adults are for example sexual assault and sexual harassment (Blindow et al., 2022; Dahlqvist et al., 2016; Dworkin, 2020). In summary, sexual violence is a subtype of violence strongly associated with mental health difficulties and has been highlighted as an important research topic within psychiatric research (Oram, 2019; Oram et al., 2017).

Since the emergence of the internet, most people's social communications can take place through digital media, and social media platforms are an indispensable part of many people's social life. This is especially true for young people. In Sweden, nearly all children from the age of 11 use a smartphone daily, and around 50 % of 17–18-year-olds use social media more than 3 h a day (Swedish Media Council, 2019).

The migration of human social life to online arenas has brought interpersonal violence into cyberspace and has given rise to new typologies of violence in the sexual realm. Technology facilitated sexual violence (TFSV) is a term covering a broad range of digital media-based offenses, including but not limited to, grooming, sexual harassment, pressurized sexting, and rape using digital technology and webcams, and prompts the study of the extension and mediation of sexual violence that technology facilitates (Henry & Powell, 2018; Mitchell et al., 2022). In the present study we have included three forms of TFSV, namely grooming, pressurized sexting and online sexual abuse.

Drawing on a conceptual framework for the definition of violence, proposed by Hamby, UNICEF has published a report in an effort to make an international classification of violence against children (Hamby, 2017; UNICEF, 2023). The foundational definition of violence is that, to be deemed as violence, an act should meet four criteria. It should be; 1) deliberate, 2) unwanted; 3) non-essential; and 4) harmful. This is, together with the broad definition by the WHO mentioned earlier, the definitional background regarding specifically sexual violence.

Grooming is a process to engage a child in sexual activity and can be attempted IRL (In Real Life) as well as on digital arenas (Winters et al., 2022). In this study it is defined as any attempt by an older individual to engage someone below the age of 15 in sexual talk online. The prevalence estimates of grooming in our study are relatively conservative due to the established age difference, which make all the acts included in our definition considered child sexual abuse, and illegal in the Swedish context. See (Finkelhor, Cavanaugh, et al., 2024).

Sexting has become a common practice among youth in our time (Madigan et al., 2018). This can be done consensually, as well as happen as a consequence of pressure or coercion. Pressurized sexting is estimated to have a general prevalence rate of about 7 %, and is linked to mental health difficulties as well as several types of risky sexual behavior (Finkelhor et al., 2022; Wright & Wachs, 2024). In line with these other scholars we defined it in this study as having sent nude images due to force or pressure.

Online sexual abuse was, in the present study, defined as having sex online without consent, which means that the victim perceived coercion, pressure or threats and thus complied to the actions. Since some of the participants may have been over the age of 18 and technically an adult when the abuse happened, we do not define these acts as sexual abuse against children. However, the lack of consent, as well as the acts being of a sexual nature are defining elements for considering the event as sexual abuse. See (Mathews & Collin-Vézina, 2019) for a discussion of the conceptualization of child sexual abuse.

Online sexual abuse has been shown to be associated to trauma symptoms, other types of violence as well as a less favorable social background with less parental support and more experience of other victimization experiences such as bullying (Jonsson et al., 2019) It has also been shown to be as detrimental to mental health as IRL abuse (Hamilton-Giachritsis et al., 2020). The three above-mentioned types of TFSV can be seen as having an increased severity.

Among girls, women and sexual or gender minority people, research has shown a higher prevalence of exposure to TFSV (Gassó et al., 2021; Turner et al., 2024). This is in line with the vast body of knowledge of sexual violence in other arenas being more common among girls, women and gender and sexual minorities.

Researchers have proposed that TFSV should be seen as resting on a continuum, where the gendered aspect of this type of violence

as the common denominator (Kelly, 1987; McGlynn et al., 2017). In this way of conceptualizing sexual violence, the focus of analysis should be the fact that the violence is targeted towards specific gender/s, reinforcing a gender hierarchy ideology (Hunnicut, 2009). The purpose of perpetrating sexual violence is therefore not the same as for example hitting or threatening. It should be conceptualized as aimed towards the individual's gender identity. The concept of continuum also suggests that seemingly less severe events can be conceptualized as belonging to the same category as more severe sexual violence.

Among young people with psychiatric diagnosis, the prevalence of interpersonal violence is estimated to be several times higher than in the general population (Ford et al., 2000; Hedtj rn et al., 2009; Hultmann & Broberg, 2016). Exposure to violence is also related to the severity of psychiatric symptoms (Ford, Wasser, et al., 2011).

Many studies of victimization have focused on the effects of one category of victimization, such as physical maltreatment or sexual abuse. By only investigating one subtype of victimization at a time, one is likely to underestimate the full magnitude of violence and the web of violence that individuals are caught in, thus inflating the consequences of one particular victimization experience (Finkelhor et al., 2007; Hamby, 2013). Further, since victimization experiences rarely occur independently, studies including only one victimization subtype are not representative of the average victimized young person (Wolfe, 2018).

Poly-victimization, defined as the presence of several types of victimization experiences in the same person, is associated with higher levels of psychiatric symptoms and psychological problems (Aho, Proczkowska-Bj rklund, et al., 2016; Ford, Wasser, et al., 2011). Poly-victimization research has sometimes conceptualized victimization as a unified construct and treated it as a continuous sliding scale from less to more victimization exposure, not considering the specifics of each type of victimization (Finkelhor et al., 2005; Holt et al., 2007). This approach can risk obscuring that certain victimization profiles could be particularly detrimental to mental health.

Expanding poly-victimization theory and the knowledge about cumulative harm, studies are exploring different clusters or classes of victimization and their relationship to for example psychiatric symptoms among young people and adults (Ayer et al., 2019; Davis et al., 2019; Dhingra et al., 2016; Turner et al., 2016). This type of analysis can be done to construct typologies of victims of violence and assess mental health outcomes for different victimization profiles and can give knowledge that can be utilized to better tailor psychiatric treatment and contribute to more cost-effective resource allocation. To our knowledge, only one study has also incorporated technology-facilitated sexual violence in their analysis. In this study, they found a substantial overlap between online and IRL sexual harassment victimization (Taylor et al., 2019).

In summary, there is scarce knowledge about how TFSV co-occurs with other forms of victimization experiences, and which victimization profiles are associated with greater severity of psychiatric symptoms as well as a heightened occurrence of psychiatric diagnosis.

There is also a lack of knowledge about how gender is associated with different victimization profiles.

1.1. Aim

The overarching aim of this study is to add knowledge about the prevalence of victimization as well as possible subgroups of victimization, both online and offline, among young people in a Swedish context. Specifically, we aim to explore and identify the number and characteristics of naturally occurring latent classes of victimization experiences based on responses to items endorsing 10 different victimization types. The obtained classes will be compared regarding psychiatric symptoms, diagnosis, and gender.

In a sample of randomly selected young people, 18 years of age, we will investigate the following research questions:

What is the prevalence of victimization among young people with and without a psychiatric diagnosis and in different gender groups?

Can meaningful Latent Class Analysis (LCA) classes based on patterns of exposure to; technology-facilitated sexual violence; offline victimization types such as offline sexual abuse, bullying, and child physical and psychological abuse, as well as using sex as a mode of self-injury and having sex for reimbursement, be identified?

Are there differences between the classes regarding psychiatric symptoms gender and the prevalence of psychiatric diagnosis?

2. Materials and methods

2.1. Sample and procedure

This study utilizes the computerized survey data from 2020 to 2021, from a Swedish nationally representative survey with focus on sexual behaviors, sexual abuse, and sexual exploitation. The survey was directed towards young people in their 3rd year of high school.

The survey aimed to collect a representative sample of Swedish high school seniors, with a mean age of 18 years. The schools were selected in the national school register and stratified to represent a general population of third-year Swedish high school students regarding study program (three strata) and school size (three strata), resulting in nine different types of schools with a representative geographical spread across Sweden (Svedin et al., 2021).

Out of a total of 1174 schools, 210 schools with 7752 students were randomly selected proportionally according to the stratification. Of these, 110 schools with 3286 students agreed to participate. Four questionnaires, assessed as not being sincere on the part of the participant (inconsistent, strange or provocative answers), were excluded, resulting in responses from a total of 3282 students.

Due to the COVID-19 pandemic, data collection was interrupted and extended, with the collection method changed to an online version that was possible to access from other locations than the classroom. This resulted in three periods of data collection in 2020 and

2021: two in classrooms – in the spring of 2020 ($n = 1195$) and the autumn of 2020 ($n = 737$) – and one from home, in the spring of 2021 ($n = 1350$). The response rates differed between the three periods. During the data collection in classrooms, the response rates were 57.1 % and 58.4 %, respectively, while the response rate during the period of home studies was 30.7 %. 3286 students completed the questionnaire. Thus, the overall response rate was 42.3 %.

The Swedish Ethical Review Authority (Dnr: 2019-05013-31, 2020-03611, 2020-06556) approved the study. All students were given written information about the location and availability of counseling services in case they felt a need to speak with someone after having completed the survey. Students obtained written research information and consent was given by proceeding to answer the questionnaire. According to the Ethical Review Act (2003) of Sweden, parental consent is not required if the respondent is older than 15 years of age.

2.2. Measures

The questionnaire used in the present study was a modified version of a questionnaire used in three previous studies carried out in 2004 (Svedin & Priebe, 2004); 2009 (Svedin & Priebe, 2009); and 2014 (Svedin & Jonsson, 2017). It consisted of 116 main questions. The questions concerned socio-demographic background, experiences of abuse, and risk behaviors.

The measures of victimization experiences were dichotomized, grouping all individuals endorsing experience of the victimization in question.

2.2.1. Grooming

This was measured using one question with four answer alternatives: Have you while being on the internet, before the age of 15, experienced that a person you think/know was at least five years older than you has; a) Tried to get you to talk about sex, b) asked you to show nude pictures of yourself, or something similar, c) Asked to meet you, to do something sexual d) Shown or sent you nude pictures. If one of the questions were endorsed, the participant was deemed to be a victim of grooming.

2.2.2. Pressurized sexting

This was measured with one question: Have you ever sent naked images/films where breasts, genitals, or buttock were visible? If the participant endorsed this question, a follow-up question of why the person sent the images/films were presented.

Those who declared that they had felt threatened or forced were deemed victimized by pressurized sexting.

2.2.3. Online sexual abuse

Online abuse was defined as endorsing the following two questions: 1. Have you gotten to know someone on the Internet that you had sex with online? The respondent could then choose one or several alternatives of the six following activities: a) Chatted about sex, b) Sent nude images, c) Showed yourself naked on webcam, d) Masturbating/having sex with yourself on webcam e) Had sex with another person on webcam and f) Other.

2. Did you feel coerced, pressured or forced at some point?

2.2.4. Sexual abuse and penetrative sexual abuse

Sexual abuse was in this study defined with one main question: Sometimes people get persuaded, pressured, or coerced/forced to sexual acts that they do not wish to do. Have you been exposed to something of the following against your will (not online)?

This question was followed by six specified acts: 1. Someone has exposed themselves for you; 2. Someone has touched your genitals or breasts or tried to undress you to have sex with you; 3. You have masturbated someone; 4. You have had vaginal sex; 5. You have had oral sex; 6. You have had anal sex.

If one endorsed one or more of questions one, two and three, the person was categorized as a victim of sexual abuse, and if one endorsed one of question four, five or six, this was categorized as penetrative sexual abuse.

2.2.5. Sex for reimbursement

Sex for reimbursement was defined as endorsing one or several of the items following the questions: Have you done anything of the following for reimbursement? 1. Shown your genitals to someone 2. Let yourself be photographed or filmed naked 3. Masturbated for someone 4. Had oral sex 5. Had vaginal intercourse 6. Had anal intercourse 7. Been photographed or filmed in sexual situations.

2.2.6. Sex as self-injury

This was defined as endorsing the question: Have you ever used sex to intentionally hurt yourself?

2.2.7. Psychological child abuse

The items for the Psychological child abuse variable was developed from the Conflict Tactics Scale (Straus, 1979) by Lucas et al. (2016).

Before the age of 18, has an adult done something of the following to you: 1. Kept you isolated from friends/partner; 2. Insulted you (i.e. called you worthless, stupid, ugly); 3. Locked you in a basement, wardrobe, or something similar; 4. Locked you out of your home; 5. Threatened to hit you or hurt you; 6. Treated you as if you didn't exist.

The answers were on a three-point Likert scale: 1 (never), 2 (a few times) and 3 (many times). To fulfill criteria for physical child abuse, the questions were weighted slightly differently depending on the type of abuse, to make sure that the threshold for inclusion

was not too low (Jernbro & Jansson, 2016). Q 1 was excluded from the definition, Q2 had to have at least a point 3, Q3–5 had to have at least a point 2, and Q 6 had to have at least a point three for the individual to be classified as a victim of physical child abuse. If the individual endorsed one of these questions with a high enough frequency, they were classified as a victim of psychological child abuse.

2.2.8. Physical child abuse

The items constituting the Physical child abuse variable was developed from the Conflict Tactics Scale (Straus, 1979) by Lucas et al. (2016).

Before the age of 18, has an adult done something of the following to you: 1. Pushed, shoved, or shake you; 2. Pulled your hair, or your ear; 3. Smacked you with their hand; 4. Punched you forcefully with hand or fist; 5. Kicked you; 6. Burned or scalded you (with hot liquid); 7. Squeezed your over the throat/neck; 8. Hit you with a stick, belt, ruler, or something else; 9. Threatened you with a knife or gun; 10. Hurt you with a knife or gun; 11. Attacked you physically in some other way. The answers were on a three-point Likert scale: 1 (never), 2 (a few times) and 3 (many times).

To fulfill the criteria for physical child abuse, the questions were weighted slightly differently depending on the type of abuse, to make sure that the threshold for inclusion was not too low (Jernbro & Jansson, 2016). Q 1 and 11 were excluded from the definition and Q2–Q10 had to have at least a point 2. If the individual endorsed one of these questions with a high enough frequency, they were classified as a victim of physical child abuse.

2.2.9. Bullying

Bullying was measured with one question: Have you, before the age of 18, been bullied by other children in school or elsewhere? The participants were asked to provide this information for five stages of school, preschool, two points at middle school, high school and gymnasium. The answers were on a four-point Likert scale, ranging from never (1) to many times (4). If an individual had endorsed at least 2 on the Likert scale on every school stage, they were placed in the bullied category.

2.2.10. Psychiatric diagnosis

To be considered having a psychiatric diagnosis, one had to endorse having been diagnosed with at least one of the following psychiatric labels: 1) ADHD or ADD, 2) Aspergers, Autism or Tourette's, 3) Alcohol/Substance/Medication addiction, 4) Eating disorder (Anorexia/Bulimia), and 5) Depression/Anxiety. The participant also had to endorse that the diagnosis was made by a doctor or licensed psychologist.

2.2.11. Psychiatric symptoms

Psychiatric symptoms were measured using the Trauma Symptom Checklist for Children (TSCC). This questionnaire consists of 54 questions which can be divided into six subscales: anxiety, depression, post-traumatic stress, sexual concerns, dissociation, and anger. Response options are “never”, “sometimes”, “often” and “almost all of the time”. The subscales could significantly identify a clinical group of young people, except for the sexual concern scale. Further, TSSC is shown to have good internal consistency (Cronbach's alpha) for the total scale 0.94 (the subscales ranging between 0.78–0.83) and test-retest for the total scale $r = 0.81$ (the subscales ranging between 0.67–0.81), when investigated in both clinical and non-clinical samples (Nilsson et al., 2008).

2.3. Statistical analysis

To be able to utilize Latent Class Analysis (LCA), the dataset had to be complete regarding all the indicator variables. Thus, missing variables led to a listwise deletion, rendering a complete dataset of 3242 observations.

LCA is person-centered statistical modeling approach which rests on the basic assumption that in a given population, homogenous sub-populations can be uncovered from the data. The model also assumes that these sub-populations cover the whole of the sample, so that each individual belongs to only one of the latent classes. This means that classes are mutually exclusive. Another assumption is that the patterns in the observed variables reflect an unobserved latent variable with n categories, where each category represents a latent class.

LCA is based on the statistical concept of maximum likelihood, estimating conditional item probabilities, and the probabilities of class membership (McCutcheon, 1987). The analysis determines the probability of endorsement of indicators for each case within each class and assigns each participant the class for which they received the highest probability value. The analytic approach of LCA provides several benefits. In contrast to for example cluster analysis, which is conceptually similar, LCA models are probabilistic. This means that the models obtained can be used to confirm the classes in an independent sample, increasing the replicability of the study. Further, LCA models give indications of the statistical fit, which can be used to assess model fit and give guidance on the number of classes (Nylund et al., 2007).

In the first step of a three-step approach, a latent class model was built for the set of indicator variables included in this study. In the second step, the probability of class affiliation was determined for all cases. In the final step outcome variables were compared for the classes, correcting for the classification error to prevent bias.

3. Results

3.1. Sample description

Grooming was the most endorsed victimization type with a prevalence of 26 % in the total sample. All victimization types had a higher rate of endorsement among those with psychiatric diagnoses. All sexual victimization experiences, on- and offline, were more common among girls compared to boys. See [Table 1](#), for a summary of all victimization prevalence numbers.

3.2. Substantive interpretation of the three-class solution

Latent class models were tested from two to seven classes. See [Table 2](#), for the fit indices. Four classes were the best fit of the data according strictly to the fit indices, but when weighing in class size and parsimony of the model, three classes were deemed optimal. We followed best practice in choosing the final model ([Sinha et al., 2021](#); [Weller et al., 2020](#)).

The final model consisted of two victimization classes, number 1 and 2, as well as one low-victimization (normative) class, number 3.

Class 1 consisted of 10.1 % ($n = 327$) of the total sample. This class was characterized by the highest prevalence of all sexual victimization exposures including TFSV, and physical and psychological child abuse was also prevalent, Class 1 had the highest

Table 1

Prevalence of victimization in the total sample ($n = 3242$), for those with psychiatric diagnosis, and in different gender groups.

	Total Sample ($n = 3242$) % (n)	Psychiatric Diagnosis		Gender		
		Yes ($n = 595$) % (n)	No ($n = 2673$) % (n)	Not specified ($n = 26$)	Girl ($n = 1804$)	Boy ($n = 1452$)
Indicator variables						
Grooming	25.90 (840)	43.9	22.0	44.0	37.9	10.8
Pressurized sexting	07.37 (239)	16.1	5.46	8	11.6	2.09
Online sexual abuse	1.97 (64)	4.62	1.39	0	2.87	0.905
Sexual abuse	10.9 (353)	17.4	9.41	16	15.6	4.87
Penetrative sexual abuse	10.0 (324)	21.5	7.49	12	14.6	4.87
Sex as self-injury	5.80 (188)	15.6	3.65	0	8.65	2.16
Sex for reimbursement	1.05 (34)	2.39	0.753	4	1.35	0.63
Physical child abuse	18.1 (587)	32.3	14.9	24	17.3	18.7
Psychological child abuse	18.4 (597)	37.1	14.3	28	19.8	16.6
Bullying	5.15 (167)	10.9	3.88	12	5.67	4.38

Note: The table shows the prevalence of endorsement of each indicator variable in the specified subgroup. Indicator variables with a significant difference (Chi2) between groups (psychiatric yes/no; gender girl/boy) is highlighted in bold. Due to the small sample of individuals not endorsing binary gender alternatives, only boys and girls are compared.

Table 2

Fit indices for latent class models two to seven.

Model	BIC	AIC	Entropy
2C	17,965.89	17,838.13	0.7574388
3C	17,720.04	17,525.35	0.7922202
4C	17,572.04	17,310.43	0.8481022
5C	17,508.78	17,180.25	0.8212683
6C	17,552.04	17,156.59	0.7961615
7C	17,563.83	17,101.45	0.8170894

Note: C=Class; BIC = Bayesian Information Criteria; AIC = Akaike Information Criteria.

Table 3

Class proportions and distribution of gender and psychiatric diagnosis.

	Class 1	Class 2	Class 3
Class proportions % (n)	10.1 (327)	14.8 (480)	75.1(2435)
Gender (girl %)	84.8	56.2	51.3
Psychiatric Diagnosis (yes %)	45.2	30.6	12.8
ADHD/ADD	14.8	11.4	3.8
Autism/Tourette's/Aspergers syndrome	5.2	5.5	2.1
Alcohol/Substance/Medication addiction	3.8	1.2	0.4
Eating disorder (Anorexia/Bulimia)	10.7	2.6	2.4
Depression/Anxiety	36.2	22.5	8.0

Note: Due to possible co-morbidity, the sum of the specific diagnoses is not equal to the proportion of psychiatric diagnosis.

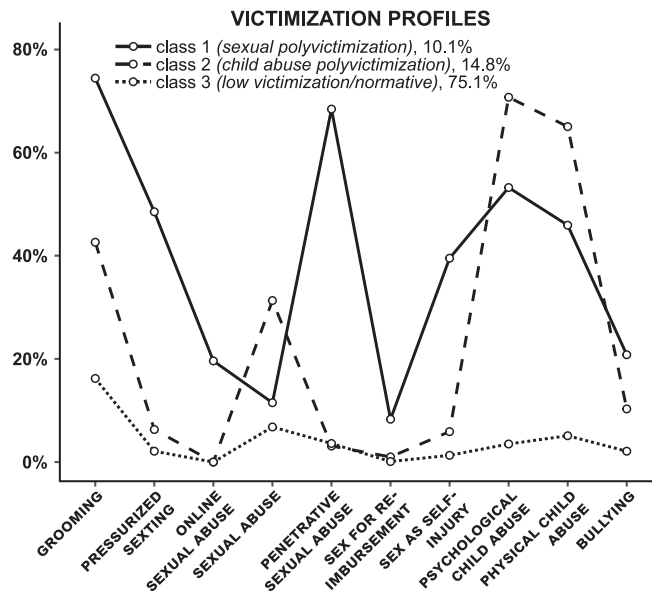


Fig. 1. Item Response Probabilities for the Three Classes Below the figure there is also a note: Note: The dots show the percentage of endorsement of the item for the respective class.

prevalence of psychiatric diagnosis, all five groups, and consisted of 84 % girls.

Class 2 consisted of 14.8 % ($n = 480$) of the total sample. This class was characterized mainly by physical and psychological child abuse, and non-penetrative sexual abuse. This class had an approximately even gender distribution.

Class 3 consisted of 75.1 % ($n = 2435$) of the total sample. This class was characterized by low prevalence of all victimization exposures and had the lowest prevalence of psychiatric diagnosis and an even gender distribution.

Distribution of gender and psychiatric diagnosis for the three classes can be found in Table 3.

The figure below, Fig. 1, illustrates how the victimization items were distributed in the respective class. This shows how certain items were more prevalent in some classes than others.

3.3. Associations to psychiatric symptoms

Beta binomial regression analysis was employed to investigate differences between the two victimization classes, compared to the class with low victimization probabilities. Five subscales of the TSCC were used to measure psychiatric symptoms. Both victimization classes scored significantly higher levels than the normative class (nr 3) regarding all five subscales. Class 1 scored significantly higher levels than class 2 on all subscales except Anger (Tables 4 and 5).

Table 4
Mean scores and standard deviations on trauma symptom checklist for children.

Classes	Post Traumatic Stress	Anxiety	Depression	Dissociation	Anger
1	14.0 (6.35)	10.8 (5.58)	12.4 (6.06)	11.4 (6.31)	7.61 (5.48)
2	10.3 (5.96)	7.52 (4.89)	9.50 (5.89)	8.96 (5.88)	6.74 (5.06)
3	5.91 (4.71)	4.85(4.01)	5.58 (4.63)	5.11 (4.46)	3.28 (3.40)

Note: Mean scores (SD) for each class on each of the five subscales of the TSCC.

Table 5
Differences in Psychiatric symptoms between classes.

Classes	Post Traumatic Stress	Anxiety	Depression	Dissociation	Anger
1 ^a	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
2 ^a	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
3	Normative	Normative	Normative	Normative	Normative
Victimization classes 1 vs 2 ^b	<0.0001	0.0003	0.0010	0.0026	0.0271

^a Proportion of maximum scale score compared to class 3 (normative class). P -value < 0.05 indicates significantly higher symptom levels than the normative group.

^b The last row compares the two victimization classes, with class nr 1 having higher symptom levels.

4. Discussion

Aiming to enhance the knowledge about the co-occurrence of different victimization exposures and TFSV, the present study investigated the prevalence of victimization and victimization typologies in a representative sample of Swedish young people.

4.1. Prevalence of victimization in the sample

The prevalence of different forms of victimization is shown in Table 1. In the subgroup of young people carrying a psychiatric diagnosis, the prevalence of all violence exposures was significantly higher than in the group without a psychiatric diagnosis. This is an expected finding, given earlier research on the child and adolescent psychiatric population and their exposure to violence, and poly-victimization theory which expects violence to co-occur (Aho, Proczkowska-Björklund, et al., 2016; Hultmann & Broberg, 2016). The findings in this study thus corroborates the link between psychiatric symptoms and diagnosis and exposure to violence of different forms, especially clusters of sexual violence together with child abuse (Hauw et al., 2020; Lasgaard et al., 2018; Oram, 2019).

Grooming was the victimization experience with the highest prevalence in this sample and was the most common victimization experience for girls and for those with psychiatric diagnosis. The reported prevalence of grooming in community samples varies depending on the definition of grooming and threshold for caseness, and rates between 5 and 23 % has been shown (Finkelhor et al., 2022; Ortega-Barón et al., 2022). The risk factors for being exposed to grooming, for example having low-self-esteem, lack of parental support and guidance and having trouble in school, are overlapping with the characteristics of many young people with psychiatric problems which suggests pathways into understanding the higher prevalence of grooming among those with psychiatric diagnosis (Whittle et al., 2013).

The victimization experiences that were most equally distributed among boys and girls was psychological and physical child abuse. Gender differences in child abuse in other contexts is often shown to be higher, with physical abuse being most prevalent among boys and emotional abuse being most prevalent among girls (Moody et al., 2018).

Among those with psychiatric diagnosis in our study, around one third endorsed physical and psychological child abuse. Child abuse is known to be strongly related to psychiatric morbidity, suicide attempts and social problems (Pfaltz et al., 2022; Scott et al., 2010; Zatti et al., 2017). Further, childhood victimization, such as child abuse and maltreatment, has been shown to heighten the risk of subsequent victimization both in child- and adulthood, especially physical and sexual assault and abuse, kidnapping and stalking or having a relative or friend murdered or committing suicide (Widom et al., 2008). When it comes to TFSV it seems to be doubling the risk of future victimization (Hamby et al., 2018). Theories which try to explain this association suggests that child abuse is associated with specific cognitive patterns for example anxious attachment styles, which are in turn associated with emotional dysregulation, and lastly associated with behavioral factors such as excessive risk taking when it comes to relationship and sex, resulting in heightened risk for revictimization (Fereidooni et al., 2023).

4.2. Victimization typologies, gender, and the prevalence of psychiatric diagnosis

Our findings show that victimization typologies could be extracted from the data using Latent Class Analysis, rendering distinct classes with different features. Two victimization classes emerged. One with high probabilities of a variety of sexual violence exposures, on- as well as offline, together with child abuse, and the other with high probabilities of child abuse and non-penetrative sexual abuse. The finding of at least one class that burdened by multiple forms of violence is a common finding of latent class analysis of violence victimization in different populations (Lasgaard et al., 2018; Modrowski et al., 2021; Siller et al., 2022).

The class with the highest probabilities of a variety of on- and offline sexual violence consisted of a majority of girls, and had, together with the highest prevalence of all five groups of psychiatric diagnosis, also the highest levels of psychiatric symptoms on all subscales. Earlier research has shown associations both between being a girl and having higher levels of psychiatric symptoms, especially internalized such as depressive and anxiety-related symptoms, as well as higher prevalence of diagnosed mental health disorders (Boyd et al., 2015). There is also a link between being a girl and being exposed to violence victimization, especially sexual violence, implying that the relationship between gender and mental health complaints might in part be mediated by a higher prevalence of sexual violence exposure among girls. Further, the findings in the present study is in line with a recent study showing a substantial overlap between exposure to TFSV and IRL sexual abuse among young people (Finkelhor, Turner, et al., 2024).

The second victimization class, Class 2, was mainly characterized by the highest endorsement probabilities of child abuse, which is known to have adverse psychological consequences (Leeb et al., 2011). This class, however, had lower psychiatric symptoms on four of the subscales, and a lower frequency of psychiatric diagnosis. This could suggest that this class was less adversely affected by their victimization history than class number 1, but it could also suggest a measurement problem in our study that do not target the problems that is connected to this victimization typology specifically. The TSCC mostly measures internalized symptoms, which is more common among girls and among sexual violence victims. Anger was the only subscale that did not differ between these two victimization classes, indicating that externalizing problems might be a focus for future research of this specific typology.

The victimization with the highest endorsement probability in Class 1 was grooming. This indicates that grooming could be targeted as a low-threshold screening variable with high sensitivity to find individuals with other types of sexual victimization exposures. In psychiatric clinical practice, disclosure of grooming experiences could trigger further assessment of other types of victimization experiences as well.

The present study shows that TFSV should be considered in the context of IRL victimization experiences, especially other forms of sexual victimization and child abuse. This is in line with other research showing the co-occurrence and common dynamics of

technology-facilitated violence and IRL violence e.g. (Finkelhor et al., 2021; Tamarit et al., 2022). TFSV should be conceptualized as a type of violence that is not spread evenly throughout the population but mainly clustering around individuals already burdened by other forms of violence, with child abuse being a primary target of intervention since it so strongly predicts subsequent victimization as well as psychiatric morbidity.

Our findings further clarify that exposure to different sexual victimization experiences, on- and offline, cluster together, suggesting either that these forms of victimization experiences are highly likely to co-occur, or that the measures of these experiences do not capture their intertwined nature, making circumscribed events of life circumstances. Further, the findings clearly show that TFSV is a gendered problem.

Given the shown co-occurrence of TFSV and other forms of sexual violence and child abuse, the study of one form of TFSV such as for example grooming, risk overinflating the consequences of the grooming itself, not considering the whole web of violence that the person is caught in and how that whole situation affects them (Hamby, 2013; Wolfe, 2018).

4.3. Strengths and limitations

One strength of the study is the large sample included, and that the sample was carefully stratified and randomized to be able to generalize to the larger population in as large extent as possible. However, though the sample was a representative stratified school sample, a selection bias could be present since the young people not attending school could share common features, such as a higher burden of victimization or psychiatric symptoms. This could lead to underestimation of certain victimization experiences, or the level of psychiatric distress.

Another limitation is the cross-sectional design of the study limits any causal interpretation of the associations between variables. Further, recollection bias is often highlighted as a limitation of retrospective disclosure of violence, as it is theorized that individuals with mental health difficulties would recall more violence because of their state of mood. However, relatively new research cast doubt on that theory (Pinto Pereira et al., 2021).

4.4. Clinical and policy implications

In summary, policy makers and activists aiming to prevent exposure to TFSV would be well advised to specifically target the largely overlapping subpopulations of young people, specifically girls exposed to other forms of victimization such as child abuse, and those with mental health symptoms and diagnosis. Information-based prevention efforts might be better suited to target higher functioning young people with parents who are emotionally available, which is often not the case for those young people most severely affected by violence. Other types of interventions, directed at high-risk young people, is needed to prevent TFSV in these populations. From a public health perspective, evidence-based interventions targeting child abuse should be at the core of prevention efforts against all violence against children and young people, given the trajectories of violence that this group often experience.

From a clinical perspective, meeting patients in psychiatric care, especially adolescent girls where some type of violence has been disclosed, should prompt further assessment of violence exposure, including things happening in the online realm or through technology.

CRediT authorship contribution statement

Frida Carlberg Rindestig: Writing – review & editing, Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. **Katja Gillander Gådin:** Writing – review & editing, Supervision. **Linda Jonsson:** Writing – review & editing, Supervision, Investigation, Funding acquisition. **Carl-Göran Svedin:** Writing – review & editing, Supervision, Investigation, Funding acquisition, Data curation. **Åsa Landberg:** Writing – review & editing, Supervision, Investigation, Funding acquisition. **Inga Dennhag:** Writing – review & editing, Supervision, Funding acquisition.

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Declaration of competing interest

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Data availability

The authors do not have permission to share data.

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