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VALIDATION OF AN EXTENDED VIOLENT IDEATIONS SCALE - THE VIS-X

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Abstract:	<p>A previous study developed and validated a multi-item instrument for the assessment of violent ideations, the "Violent Ideations Scale" (VIS). However, the final 12-item scale contained no items relating to sexual violence and was thus lacking an important dimension of violence. The current study explores an expansion of the original VIS to include ideations of sexual violence and investigates the psychometric properties of this new version: The Violent Ideations Scale-Extended (VIS-X). The VIS-X was completed by participants in the latest wave of the z-proso study (n=1177; 595 females, 580 males aged 19 to 22). Exploratory factor analysis was conducted in a calibration sample and confirmatory factor analysis in a validation sample to establish a two sub-scale structure as optimal. Cronbach's Alpha and Composite Reliability suggested good internal consistency. Nomological analysis supported the convergent validity of the scores.</p>	
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Validation of an Extended Violent Ideations Scale to measure both non-sexual and sexual violent ideations

(The VIS-X)

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Abstract

A previous study developed and validated a multi-item instrument for the assessment of violent ideations, the “Violent Ideations Scale” (VIS). However, the final 12-item scale contained no items relating to sexual violence and was thus lacking an important dimension of violence. The current study explores an expansion of the original VIS to include ideations of sexual violence and investigates the psychometric properties of this new version: The Violent Ideations Scale-Extended (VIS-X). The VIS-X was completed by participants in the latest wave of the z-proso study (n=1177; 595 females, 580 males aged 19 to 22). Exploratory factor analysis was conducted in a calibration sample and confirmatory factor analysis in a validation sample to establish a two sub-scale structure as optimal. Cronbach’s Alpha and Composite Reliability suggested good internal consistency. Nomological analysis supported the convergent validity of the scores.

Keywords: Violent Ideations Scale; validation; aggression; validity; reliability

Introduction

Violent ideations (VIs) are thoughts, daydreams, or fantasies of inflicting harm – physical or psychological - on another person (Murray et al., 2018). VIs have been connected to serious mental illnesses (Brucato et al., 2019; Roché et al., 2021) and interpersonal violent behaviors (Murray et al., 2016), and play a central role in a number of theories of violence and violent ideations such as the general aggression model (e.g., DeWall et al., 2011). Further, a recent study on the prevalence of violent ideation and behaviors among people at clinical high-risk for psychosis showed that intrusive violent ideations appeared in one-third of the participants with attenuated psychosis, serving as a good predictor of conversion to threshold psychosis and violent behaviors (Brucato et al., 2019). Such studies support earlier views that there may be benefits to incorporating VI interventions into therapeutic frameworks (e.g., Nagtegaal et al., 2006). In addition, from a forensic perspective, there is a need for evidence-based tools, which can enhance the objectivity and transparency of violence risk assessment processes, improve predictive efficacy in professional contexts, and help in handling the future risk of violent behaviors in an efficient and effective way (Canales et al., 2013; Folino, 2015; Llor-Esteban et al., 2016; Loinaz, 2017).

The robustness of any research investigating the role of VIs, is dependent on a valid and reliable VI measurement. Such a measure would ideally show excellent psychometric properties (such as structural and predictive validity, reliability, and fairness across different groups) and would accurately predict whether an individual is likely to commit a violent act in normative, clinical or forensic populations. To help address this need, Murray et al. (2018) designed and validated a multi-item instrument for the assessment of VIs, the “Violent Ideations Scale” (VIS).

The VIS was validated in a normative sample of $N = 1,276$ older Swiss adolescents, who were part of the Zurich study on the Social Development of Children and Youths (z-proso).

1 Items from the initial VIS measure were included in the 7th wave of z-proso when participants
2 were approximately 17 years of age. Murray et al. (2018) investigated the structure, reliability
3 and gender invariance of the VIS. The VIS showed unidimensionality, minor measurement
4 differences across gender and showed a predictive relation to criminal violence. The scale was
5 also translated and validated in English by McKenzie, et al. (2018) in a sample of 116 English-
6 speaking adults.
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13 In the initial validation study, the original item pool contained two items relating to
14 sexual violent ideations. However, these items were found to not relate as strongly to other
15 items in the scale and thus, were not included in the final item selection for the 12-item VIS. It
16 was noted, however, that if further sexual violent ideation items had been included, it may have
17 been possible to form a distinct reliable sexual violent ideations sub-scale that was correlated
18 with the general violent ideations sub-scale. Indeed, research has shown that violent sexual
19 fantasies are a potential risk factor for aggressive non-consensual sexual behavior in normative
20 samples, even when controlling for sadomasochistic preferences (Bondü & Birke, 2020).
21 Likewise, these violent sexual fantasies seem to be prevalent in sexual offender populations
22 (Bartels & Gannon, 2011; Woodworth et al., 2013). These suggest there may be considerable
23 value in expanding the VIS to also include ideations of sexual violence.
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41 In this study we, therefore, sought to develop and validate an expanded version of the
42 VIS to also measure ideations of sexual violence, the 'VIS-X'. We investigate the structural
43 validity, internal consistency reliability, and convergent (nomological network) validity of the
44 VIS-X. We constructed a theoretical nomological network for the VIS-X in which we expected,
45 based on past theory, for the general and sexual ideation scores to correlate with: aggression,
46 bullying perpetration, intimate partner violence, self-control, and violent media consumption.
47 The expectation that the scores would correlate with aggressive behaviors, including bullying
48 and intimate partner violence is based on models such as scripts theory and the general
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aggression model which suggest that violent ideations are an important precursor to aggressive behaviors. We anticipated a correlation with self-control based on perspectives such as the general theory of crime, in which low self-control is thought central to engagement in aggressive and criminal acts (Gottfredson & Hirschi, 1990). Since then, different studies (Belsky et al., 2020; Farrington, 2003; Moffitt et al., 2011; Vazsonyi et al., 2017) have shown that the lack of self-control is a reliable predictor of violent behavior, even when accounting for other variables, such as IQ or socioeconomic status. Low self-control has also been linked to ruminative thoughts in the past, including anger rumination (Li et al., 2019), which may partly account for the association between self-control and aggression. Murray et al (2018) examined the relationship between low self-control and violent ideations, showing a significant relationship (.33) between low of self-control and the VIS. This study seeks to complement these findings by exploring the relationship with sexual violent ideations. Lastly, problematic media consumption was judged an important construct to explore in a young adult sample. For example, in perspectives such as scripts theory, it is assumed to increase the risk of violent ideations which in turn is assumed to lead to an increased risk of violence. Bushman & Huesmann (2006) found moderate significant effect sizes between exposure to violent media and aggressive behaviors, thoughts, and feelings. Recently, Eisner et al. (2021) studied the relationship between problematic media consumption and violent ideations using the VIS. Their results also showed significant but small effects. Exploring whether these effects vary when using the VIS-X would provide valuable information on how problematic media consumption relates to sexual violent ideations.

Given the importance of sexual violence within the broader concept of VIs, the original VIS was expanded to include further items related to ideation of sexual violence. This study seeks to investigate the psychometric properties of the new expanded version of the Violent Ideations Scale (VIS, now VIS-X) and the relationship with relevant constructs.

Methods

We report how our sample was selected, all data exclusions and all analyses including all tested models.

Participants

The VIS-X was validated using the latest main wave of the z-proso study (Ribeaud et al., 2021), collected in 2018. The sample consisted of 1177 participants (597 females and 580 males), aged 19 to 22. In brief, the sample is based in Zurich, Switzerland and was first recruited in 2004 to take part in a combined longitudinal/intervention study. Participants were recruited on entry to primary school (median age=7), with sampling occurring at the school-level with stratification by school size and location. In all, 56 schools were included in the study, with a total target sample size of n=1675 and approximately n=1662 providing some data for at least one wave. Analyses of non-response and attrition suggest that the sample is largely representative of the underlying same-aged population; however, there is a slight under-representation of children whose parents did not speak German as a first language (Eisner et al., 2019). Further information about the study; its sampling, recruitment, assessment, and retention procedures can be found in the publications listed at: <https://www.jacobscenter.uzh.ch/en/research/zproso/aboutus.html>.

Measures

Extended Violent Ideations Scale (VIS-X). The VIS-X contains the 12 retained items from the original VIS questionnaire, the two excluded items related to violent sexual ideations (Murray et al., 2018) and two additional items related to ideations of acts of sexual violence. The additional four items were developed by three members of the z-proso team (DR, ALM, MPE),

who are experts on interpersonal violence. First, the team developed a conceptualization of the construct of sexual violent ideations and determined its scope. For example, fantasies of consensual violent sex were judged to be out of scope while fantasies of inflicting physical or psychological harm were deemed within scope. Next, items were generated with the goal of reflecting this conceptualization in a manner that could be relevant for different age groups and gender and to sample as wide as possible a range of behaviors within the limited number of items it was possible to add. The generation of the items drew on the team's expertise as well as consulting the literature on sexual violence and violent ideations. Items were written conforming to recommended principles of item construction, such as avoiding complex or ambiguous language, double-barreled statements, using personalized phrasing to improve engagement (e.g. Irwing & Hughes, 2018). Other elements of the scale such as the response format, reference period, and instructions to participants had already been determined during the development and validation of the VIS. These elements were thus also adopted for the VIS-X.

Participants responded on a five-point Likert-type scale how often they had experienced these violent ideations in the past month. The item description in English can be found in Table 1.

--- Table 1 ---

Bullying Perpetration Scale. This instrument measures four types of bullying behaviors: teasing, stealing/damaging belongings, threatening, and exclusion (Murray et al., 2019). The 4 items are scored from the offender's perspective on a 6-point Likert scale ($\alpha = .66$).

Intimate Partner Violence Victimization Scale. This scale includes 17 items adapted from Taylor et al. (McKenzie et al., 2021), Zweig et al. (2013) and Foshee (1996) by the z-proso team. The items capture physical aggression, sexual aggression and monitoring behaviors. They are answered in a 4-point Likert scale ($\alpha = .76$).

Low Self-Control Scale (abbreviated). This instrument assesses low self-control through 15 items adapted from Grasmick, Tittle, Bursik, and Arneklev's (1993) Self-Control Scale. This 4-point Likert scale explores low self-control, impulsivity, self-centeredness, risk-seeking, preference for physical activities, low frustration tolerance and social desirability. High scores represent a lack of self-control ($\alpha = .74$).

Problematic Media Usage Scale. This instrument was developed by the z-proso team and it contains 8 items that focus on the consumption of problematic contents of media like violent and pornographic content ($\alpha = .78$).

Procedure

The sample collection took place from April to early September 2018. The participants were invited to attend the Decision Science Laboratory (DeSciL) of the Swiss Federal Institute of Technology (ETH) in the centre of Zurich or the Data Collection Center at the Jacobs Center in Zurich Oerlikon in order to complete the questionnaires in computer terminals. They received 75 Swiss Francs (1 CHF=1 USD) as an incentive. Those participants who could not visit the laboratories, were offered the option of completing the questionnaire online during a given time slot, where they counted on the guidance and support of a z-proso collaborator by phone or Skype. The study protocol was approved by the "Ethics Committee of the Faculty of Arts and Social Sciences of the University of Zurich".

Analysis Strategy

The sample was randomly divided into a calibration (n = 588) and validation sample (n = 589). In all cases the items were treated as ordered-categorical because although they had a 5-point scale, responses were skewed towards the low end of the scale (Rhemtulla et al., 2012).

Factor structure and internal consistency. Scale dimensionality was tested using exploratory factor analysis (EFA) in the calibration sample. Factor retention was guided by parallel analysis with principal components (PA-PCA), the minimum average partial (MAP) test, the very simple structure (VSS) test, and visual inspection of a scree plot (Revelle & Rocklin, 1979; Zwick & Velicer, 1986). Where the measures disagreed, we took PA-PCA to be indicative of a maximum number of factors, and MAP to be indicative of the minimum. When the solutions were empirically indistinguishable, we retained the solution with the most coherent theoretical interpretation. We considered factor loadings of $\pm .3$ as the minimal salience threshold (Hair et al., 2014).

Confirmatory factor analysis (CFA) in the validation sample was used to assess the generalizability of the solution resulting from the EFA. Scaling and identification were achieved by fixing the loading of the first item for each latent factor to 1. Diagonally weighted least squares estimation was used to account for the ordered-categorical nature of the items. We considered the model to fit well if Tucker Lewis index (TLI) and Comparative Fit Index (CFI) were $>.95$, Root Mean Square Error of Approximation (RMSEA) was $<.08$ and Standardized Root Mean Square Residual (SRMR) was $<.08$ (Beauducel & Wittmann, 2005; Hu & Bentler, 1999).

Internal Consistency Reliability. Cronbach's alpha was used to compute internal consistency reliability using polychoric correlations due the data's ordinality (Gadermann et al., 2012). Good internal reliability was reached when $\alpha > .8$ (Lance et al., 2006; Nájera Catalán, 2019). We also used the factor loadings in the retained CFA solution to calculate composite

reliability (CR) with the nonlinear SEM reliability coefficient by Green and Yang to account for the ordinal nature of our data (Viladrich et al., 2017). We considered a CR of $> .7$ to indicate good internal consistency reliability (Hair et al., 2014). We also calculated the Average Variance Extracted (AVE), considering values of $.5$ as acceptable, and values above $.7$ as very good (Fornell & Larcker, 1981).

Nomological Analysis. Nomological networks represent the theoretical relations between a construct and associated constructs (Cronbach & Meehl, 1955). We calculated the association between the VIS-X sum score of the factors retained during the CFA and four other constructs that should be related to VIs, based on theory and past evidence. We examined the following constructs: low self-control, intimate partner-violence perpetration, bullying perpetration and consumption of problematic media content.

All analyses were conducted in R statistical software (version 4.0.3; R Core Team, 2020).

Results

Item Descriptive

Table S1 in Supplementary Materials shows the response distribution for the calibration and validation samples. The results show that the proportion of participants in both samples reporting at least one violent ideation in the past month ranged from 1% (threatening for sex) to 22% (violent payback). The response pattern in both samples was consistent.

Factor structure and internal consistency

PA-PCA indicated four factors with two components were optimal for the data; MAP suggested two; VSS suggested between one and two factors; and the scree plot (see Figure S1 in Supplementary Materials) showed the clearest inflection at the second eigenvalue, indicating

the retention of only one factor. Given these results, we inspected factor solutions for between one and four factors. These are provided in Table S3 in Supplementary Materials.

The one-factor solution (37% variance explained) showed that all items loaded saliently ($>|.3|$) on a general violent ideations factor, with the highest loadings for two items relating to homicidal ideation and another relating to inflicting pain on somebody. In the two-factor solution (30% and 18% variance explained), the first factor could be interpreted as a general violent ideations factor, with the highest loading for the item relating to beating up someone the respondent finds obnoxious. The second factor could be interpreted as a sexual violent ideations dimension, with the highest loading item relating to having sex with someone as they try to fight the respondent off and three other sexual violent ideation items also having salient loadings for this factor. The three-factor solution was similar to the two-factor solution in its first two factors in that the first could be interpreted as a general dimension and the second as a sexual violent ideation dimension; however, an item related to humiliating someone weaker also loaded on the second factor and the third factor was not well-determined. It essentially reflected a splitting off of the item relating beating up someone out of anger and beating someone up for no reason into a separate dimension. In the four-factor solution, a similar phenomenon was observed with not well-determined factors.

The 1-factor solution showed a reasonable fit ($CFI=.980$, $TLI = .977$, $RMSEA = .045$, $SRMR = .12$), but when comparing the 1- and the 2-factor solution, the latter was preferred on balance because it captured an important distinction (sexual versus non-sexual violent ideation) that was not captured in the 1-factor solution.

Based on these results, we took the 2-factor solution forward to the CFA stage for validation. The two-factor showed an acceptable fit by conventional criteria ($CFI=.982$, $TLI=.979$, $RMSEA=.044$, $SRMR =.099$). All factor loadings were statistically significant and

>.70 on the standardized scale. The correlation between the general and sexual violent ideations factors was $r=.83$. Standardized parameter estimates for this model are provided in Table 2.

--- Table 2 ---

Internal Reliability and Average Variance Extracted

The VIS-X showed good internal reliability values with a Cronbach's Alpha .96 for the general violent ideation sub-scale and .96 for the violent sexual ideations sub-scale. Composite reliability for the general factor was .90 and for the sexual violent ideations factor was .80. Average Variance Extracted was .71 for the first factor and .88 for the second factor, which can be interpreted as very good values.

Nomological Analysis

The correlations between the two VIS-X scores and four other constructs can be found in Table 3. The representation is shown in Figure 1, where the strength of the associations is plotted through the thickness of the vertices of the nomological net. The VIS-X general violent ideation items were associated ($p < .01$) with all included constructs. The strongest relationship was with problematic media consumption (.40), followed by low self-control (.33) and bullying perpetration (.32). The association with intimate partner violence perpetration was weak. The VIS-X sexual violent ideation items presented only a low statistically significant association with bullying perpetration and problematic media consumption.

--- Table 3 ---

--- Figure 1---

Discussion

This study provides an initial analysis of some core psychometric properties of the scores of VIS-X, an extended version of the Violent Ideations Scale (VIS) to include the measurement of sexual violent ideations. Results supported the retention of two factors for the

VIS-X, and both factors displayed good reliability in their scores. The fact that the VIS-X resulted in a two factors solution as opposed to the one factor solution obtained in the previous VIS validation supported our hypothesis that the addition of further items assessing violent sexual ideations would result in the retention of an additional factor.

Our study shows that sexual violent ideations are prevalent in a normative sample, with 1 to 3% of our sample endorsing at least one sexually violent ideation in the last month. This is consistent with prior research conducted in 10 European countries that has shown that non-forensic samples of young adults (16.3% males and 5% females) report having engaged in at least one form of sexual violence and coercion (Krahé et al., 2015).

This is also in line with a recent study (Bondü & Birke, 2020) which explored sexual fantasies in the general public. The results showed six distinct factors, one being related to fantasies of sexual coercion and another one with fantasies about inflicting injuries during sexual encounters. These two types of sexual fantasies also seemed to predict self-reported non-consensual sexual behaviors beyond other risk factors. The studied sexual coercion fantasy factor is similar in nature to the VIS-X sexual items.

The nomological network analysis showed significant positive relationships between general violent ideations and four constructs of interest: bullying perpetration, low self-control, intimate partner violence and use of problematic media content; however, violent sexual ideations were not as strongly related to these constructs, providing further evidence to support a distinction between general violent ideations and violent ideations of a sexual nature. Future research would be valuable to establish whether, given this apparent bi-dimensionality, sexual and non-sexual violent ideations show unique mappings to corresponding real-world violent behaviors.

Limitations and Future Directions

1 It is important to note the limitations of the current study. First, it was not possible to
2 conduct a gender invariance analysis because the number of participants reporting certain
3 violent ideations was too low in the female group to allow the relevant models to be estimated.
4 Examination of response patterns by gender make it clear that females reported fewer violent
5 ideations than males, though unfortunately the possible contribution of measurement non-
6 invariance to this difference is not possible to gauge. We found that for item 15, the whole
7 sample of both females and males answered that they never experienced ideations of
8 “threatening someone with violence in order to have sex with them”. For the rest of the sexual
9 ideation items, females endorsed the sexual ideations less than males (<1% for females and
10 <6% for males). Further exploring gender differences in violent ideations, and specifically,
11 sexual violent ideations, is paramount to better understand the possible different predictive
12 capacities of actual aggression.
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29 Second, along with the VIS-X, we also included different measures available in the 8th
30 wave of the z-proso study in our nomological net analysis. However, some of these measures
31 had lower than ideal reliability indexes which will have attenuated their associations with the
32 VIS-X scores.
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39 Third, it should not be assumed that this scale will measure the same construct in the
40 same way across different populations, therefore, further validation will be required before the
41 use of the VIS-X could be recommended in clinical and forensic contexts and in different age
42 groups. An examination of the extent to which the VIS-X improves the prediction of (sexually)
43 aggressive behavior over and above the VIS would be particularly valuable for establishing
44 whether the addition items of the VIS-X are likely to be valuable for use in forensic setting.
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58 Conclusion

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The VIS-X showed bi-dimensionality and high reliability providing initial support for its use in measuring sexual violent ideations alongside other forms of violent ideations.

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Open Science

We report how we determined our sample size, all data exclusions (if any), all data inclusion/exclusion criteria, whether inclusion/exclusion criteria were established prior to data analysis, all measures in the study, and all analyses including all tested models. If we use inferential tests, we report exact p values, effect sizes, and 95% confidence or credible intervals.

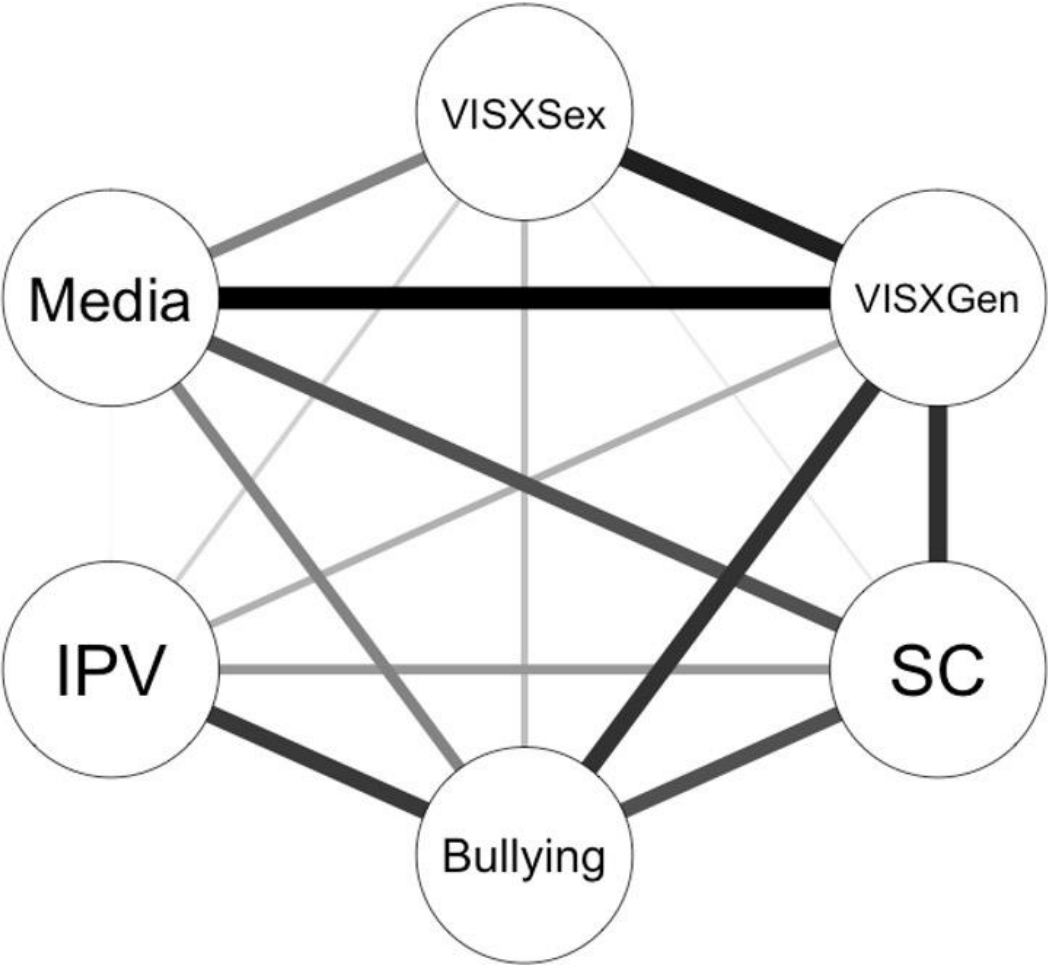
Open Data: We confirm that there is sufficient information for an independent researcher to reproduce all of the reported results (Urruela, Booth, Eisner, Ribeaud & Murray, 2021).

Open Materials: We confirm that there is sufficient information for an independent researcher to reproduce all of the reported methodology (Urruela, Booth, Eisner, Ribeaud & Murray, 2021).

Preregistration of Studies and Analysis Plans: This study was preregistered with an analysis plan on April 8th, 2021 (doi: 10.17605/OSF.IO/E8P7Z).

All supplementary materials, anonymized data sets and scripts can be accessed in DOI 10.17605/OSF.IO/APW8Z or through the following link: <https://osf.io/apw8z/>

Figure 1. Nomological net of VIS-X



Note. VISXSex= VIS-X Sexual Violent Ideations Sub-Scale; VISXGen = VIS-X General Violent Ideations Sub-Scale, SC = Low Self-Control;

Bullying = Perpetration of Bullying; IPV = Perpetration of Intimate Partner Violence; Media = Consumption of problematic media content.

Table 1. VIS-X items in English

I thought about ...

- 1 ... killing someone I know.
 - 2 ... using violence to get back at someone who harmed me.
 - 3 ... getting someone drunk or giving them drugs to have sex with them against their will.
 - 4 ... severely injuring someone I dislike.
 - 5 ... beating up a stranger for no particular reason.
 - 6 ... killing someone who insulted my family or friends.
 - 7 ... humiliating someone I despise.
 - 8 ... stripping someone naked against their will.
 - 9 ... killing a person close to me who humiliated or offended me.
 - 10 ... humiliating someone weaker than me.
 - 11 ... having sex with someone as they try to fight me off.
 - 12 ... using violence to get back at someone who harmed a person close to me.
 - 13 ... beating up someone I find totally repulsive.
 - 14 ... causing someone intense pain.
 - 15 ... threatening someone with violence in order to have sex with them.
 - 16 ... beating someone to a pulp because they made me really angry.
-

Note: Items 3, 8, 11 and 15 were added to the original VIS.

Table 2. Factor loadings for the two-factor solution with the validation sample ($n= 589$)

Item	Factor 1	Factor 2
1	.84	
2	.86	
3		.92
4	.89	
5	.81	
6	.76	
7	.78	
8		.92
9	.91	
10	.71	
11		.87
12	.85	
13	.85	.34
14	.90	
15		1.03
16	.90	

Table 3. Correlation of VIS-X General and Sexual Scales with other Relevant Constructs

	1	2	3	4	5	6
1. VISXSex	1	< .01	.35	< .01	.04	< .01
2. VISXGen	0.35	1	< .01	< .01	< .01	< .01
3. SC	0.03	0.33	1	< .01	< .01	< .01
4. Bullying	0.10	0.32	0.27	1	< .01	< .01
5. IPV	0.07	0.12	0.16	0.31	1	.77
6. Media	0.19	0.40	0.27	0.19	0.01	1

Note. VISXSex= VIS-X Sexual Violent Ideations Sub-Scale; VISXGen = VIS-X General Violent Ideations Sub-Scale, SC = Low Self-Control;

Bullying = Perpetration of Bullying; IPV = Perpetration of Intimate Partner Violence; Media = Consumption of problematic media content.

Pearson correlations below the diagonal, *p* values above the diagonal.

