

UC Irvine

UC Irvine Previously Published Works

Title

Scoring Interpersonal Violence Measures: Methodological Considerations.

Permalink

<https://escholarship.org/uc/item/8rx0b2zd>

Journal

Nursing Research, 69(6)

ISSN

0029-6562

Authors

Williams, Jessica Roberts
Burton, Candace W
Anderson, Jocelyn C
[et al.](#)

Publication Date

2020-11-01

DOI

10.1097/nnr.0000000000000461

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

Peer reviewed



Published in final edited form as:

Nurs Res. 2020 ; 69(6): 466–475. doi:10.1097/NNR.0000000000000461.

Scoring Interpersonal Violence Measures: Methodological Considerations

Jessica Roberts Williams¹, Candace W. Burton², Jocelyn C. Anderson³, Rosa M. Gonzalez-Guarda⁴

¹School of Nursing, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina

²University of California, Irvine, Sue & Bill Gross School of Nursing, Irvine, California

³Pennsylvania State University College of Nursing, University Park, Pennsylvania

⁴Duke University School of Nursing, Durham, North Carolina

Abstract

Background: Interpersonal violence, such as intimate partner violence, sexual assault, and adverse childhood experiences, is a significant global health concern. A major challenge to nurses and others working in the field of interpersonal violence deals with the complexity involved in measuring interpersonal violence. Numerous validated instruments exist; however, there is no standard approach for scoring these instruments. There is also a tendency to examine different forms of violence separately, not accounting for the known co-occurrence of violence. This has led to confusion as the interpretation of results often differs depending on the specific method used.

Objectives: The purpose of this paper is to summarize the major methods for scoring interpersonal violence measures and implications of each approach with a specific focus on co-occurrence.

Methods: The paper begins with a summary of the primary goals of measuring interpersonal violence, major methods for scoring interpersonal violence measures, along with scoring challenges. We then provide a case exemplar examining the relationship between interpersonal violence and posttraumatic stress disorder symptoms to illustrate how scoring methods can affect study results and interpretation of findings.

Results: Our paper shows that each scoring method provides a different picture of the distribution of interpersonal violence experiences and varies regarding the ease of interpretation. Scoring methods also affect interpretation of associations between interpersonal violence and other factors, such as having statistical power to detect significant associations. Accounting for the co-occurrence is critical for making accurate inferences by identifying potential confounding interactions between different types of violence.

Corresponding author: Jessica R. Williams, PhD, MPH, PHNA-BC, University of North Carolina at Chapel Hill, School of Nursing, 5004 Carrington Hall, Campus Box 7460, Chapel Hill, NC, 27599-7460. jrober65@email.unc.edu.

The study protocol for the case exemplar was approved by the University of North Carolina at Chapel Hill Institutional Review Board before engaging in study activities (18-1507). Informed consent was obtained from all participants prior to data collection activities.

The authors have no conflicts of interest to report.

Discussion: The application of different scoring methods leading to varying interpretations highlights the need for researchers to be purposeful when selecting a method and even applying multiple methods when possible. Recommendations are provided to assist researchers and providers when making decisions about the use of scoring methods in different contexts.

Keywords

instrument scaling; psychometrics; research measurement; violence

Interpersonal violence, such as intimate partner violence (IPV), sexual assault (SA), and adverse childhood experiences (ACEs), is a significant global health concern. According to the World Health Organization, about 1 in 3 (35%) women worldwide have experienced IPV or SA and one quarter (25%) of adults have experienced physical abuse as a child (Butchart & Mikton, 2014). The recognition of interpersonal violence as a health issue is relatively recent and emerged largely from research led by the nursing discipline (U.S. National Library of Medicine, 2015). The priority nurses place on holistic, person-centered care makes them uniquely positioned to address both the short- and long-term health consequences of violence through research and practice.

An important challenge to nurses and others working in the field of interpersonal violence deals with the complexity involved in measuring interpersonal violence accurately (Follingstad & Bush, 2014; Grych & Hamby, 2014; Hamby, 2014; Winstok, 2017). Numerous validated instruments exist for measuring interpersonal violence (see Saini et al., 2019, and Thompson et al., 2006, for a compilation of instruments); however, there is generally no standard approach for scoring them. While most instruments have recommended scoring methods, instrument developers often provide several scoring options to measure different nuances. For example, the Revised Conflict Tactics Scale (a widely used measure of IPV), provides three scoring options to assess prevalence, chronicity, and severity (Straus & Douglas, 2004; Straus et al., 1996). The Sexual Experiences Survey (SES), which measures experiences of SA, also provides different scoring options for assessing frequency and severity (Koss et al., 2007), and Davis et al. (2014) proposed nine additional scoring methods for the SES. A variety of scoring options is important for capturing nuances of violence experiences, but at the same time, it adds additional complexity to conducting research in this area.

In addition, instruments are usually developed to measure a single type of violence (e.g., IPV, SA), despite the fact that individuals who experience one type of violence are more likely to experience other forms of violence (Turner et al., 2010). Violence co-occurrence is important to measure as it has synergistic effects on health outcomes such as posttraumatic stress disorder (PTSD) and depression (Suliman et al., 2009). However, this increases the complexity for researchers who want to account for co-occurrence of violence in studies and has contributed to the tendency in the field to examine different forms of interpersonal violence separately (Hamby & Grych, 2013).

The interpretation of study results often differs depending on the method used for scoring and whether studies account for multiple forms of violence. It is important for researchers and practitioners to be aware of these measurement issues and their implications. The

purpose of this paper is to summarize the major methods for scoring interpersonal violence measures with a specific focus on examining co-occurrence. We will use a data set examining the relationship between different types of interpersonal violence and PTSD symptoms—a well-known consequence of interpersonal violence (Gardner et al., 2019; Rees et al., 2011; Trevillion et al., 2012)—to illustrate the implications of different scoring approaches.

Goals/Purposes of Measuring Interpersonal Violence

Measuring interpersonal violence is important in many ways. First, these measures provide important information regarding the scope of the problem, a major focus of nationally representative surveys (e.g., Smith et al., 2018). They allow us to estimate the proportion of a population that has been affected by interpersonal violence (i.e., prevalence) and the emergence of new cases (i.e., incidence). This is important in identifying populations at risk, disparities between and within populations, and assessing trends in interpersonal violence across different dimensions such as time and geography. Second, measuring interpersonal violence is important for generating an understanding of its etiology and consequences. For example, interpersonal violence can be measured and analyzed as an outcome (i.e., dependent variable) to identify risk and protective factors (e.g., Yakubovich et al., 2018). This can help identify populations at risk and targets for interventions. When measured and analyzed as a predictor (i.e., independent variable), we can identify the health, social, and economic consequences of this problem (e.g., Bacchus et al., 2018). Lastly, it is important to measure interpersonal violence over time to evaluate the efficacy and effectiveness of interventions and policies (e.g., Trabold et al., 2020). This can indicate the importance of allocating resources and identifying what strategies work, for whom, and under what conditions.

Major Ways Interpersonal Violence Measures are Scored

Numerous strategies exist for scoring interpersonal violence measures. These methods provide researchers flexibility for answering different research questions and addressing data challenges (e.g., skewed distributions); however, the plethora of scoring options also creates challenges for method selection, interpretation, and comparison of results across studies. To help address these challenges, this section provides an overview of common methods used to score interpersonal violence measures and the strengths and weaknesses of each approach (Table 1).

Dichotomous

One of the most common approaches to scoring interpersonal violence measures is to dichotomize those who have and have not experienced the type of violence being examined. Using this method, those with one incident of abuse are combined with those who have experienced frequent and severe abuse, despite research showing that individuals with few incidents are often more similar to the no victimization group (Follingstad et al., 1999). While this presents perhaps the most straightforward analytic approach and addresses some challenges of other scoring methods (e.g., skewedness), the loss of ability to detect

differences and relationships that occur with repeated or severe violence is a clear drawback (Altman & Royston, 2006).

Number of Abuses

A second common method of scoring abuse tools is a summative method wherein the total number of abuses or incidents is added or reported by the participant to create a total score (e.g., Adverse Childhood Experiences Scale; Felitti et al., 1998). Numerical scores are then used in analysis as either continuous or categorical variables as a measure of abuse incidents. This method allows a more nuanced approach than the *yes/no* approach of dichotomous scoring, but still faces challenges. Counts of incidents are not truly interval level data—that is, each incident is not the same within or between individuals. Given the nature of violence and abuse, count level data also skew toward 0, making traditional statistical approaches more difficult. Grouping counts into categories is a strategy used by many to address both the skewing and lack of true interval level measurement concerns (Follingstad & Bush, 2014). However, this still requires the assumption that the underlying counts are an accurate reflection of the abuse incidents and that similar numerical reports result in similar outcomes.

Severity

While less common than dichotomous or summative scoring, tools that include scoring for severity are also present in the literature (e.g., Severity of Violence Against Women Scales; Marshall, 1992). These include measurement not just of the abusive behavior, but also definitions for placing behaviors into severity categories (e.g., mild, moderate, severe). By assigning behaviors into categories (e.g., strangulation with loss of consciousness = severe physical abuse, pressuring into sex = moderate sexual abuse, etc.), one can link behavioral categories and severity with outcomes in ways that have allowed researchers over time to understand the importance of severity on health outcomes. These measures generally require additional participant burden in answering more questions, and as each severity category needs to be assessed separately, analysis is more complex than with simple binary or linear measures.

Chronicity

Frequency is a factor not considered by any of the prior scoring methods, but often included in violence measures. Scales that include the number of times each abusive behavior occurred over time can be added to create summary scores that account for frequency of the act over time. As with severity measures, this allows for more nuanced and complex linkages between high and low prevalence of violence and health outcomes. However, as with the number of abuses, this method often results in a skewed distribution and requires an appropriate statistical approach (Bono et al., 2017).

Case Exemplar

This section presents an exemplar examining the relationship between interpersonal violence and PTSD symptoms to illustrate how scoring methods can affect study results and interpretation of findings. The data set used in this example is from a previous study

conducted by the first author (Williams, Cole, Girdler, & Cromeens, 2020; Williams, Girdler, Williams, & Cromeens, 2020). A brief summary of the methods is provided below; additional methodological details and study limitations are reported elsewhere (Williams, Cole, Girdler, & Cromeens, 2020; Williams, Girdler, Williams, & Cromeens, 2020).

Study Overview

In this cross-sectional observational study, data were collected through a self-report online survey from 250 adults with a self-reported history of interpersonal violence (i.e., IPV, SA, ACEs). Validated measures were used to assess constructs of interest, including interpersonal violence and PTSD symptoms.

Measures

For purposes of this case exemplar, we examine overall scores for each measure of interpersonal violence. It is important to note that interpersonal violence instruments often contain subscales to measure different domains (e.g., physical abuse, emotional abuse). The same considerations discussed in this paper would apply when using subscales.

Intimate Partner Violence—The Revised Conflict Tactics Scale–Victimization (32 items, $\alpha = .96$) was used to measure lifetime occurrence of violence victimization within intimate relationships (Straus & Douglas, 2004; Straus et al., 1996). It assesses psychological aggression, physical assault, sexual coercion, and injury. Participants were asked to report the number of times they experienced each item (*never, 1 time, 2 times, 3 or more times*).

Sexual Assault—The SES–Short Form Victimization (35 items, $\alpha = .96$) was used to identify unwanted sexual experiences since age 14, including unwanted sexual contact, attempted coercion, coercion, attempted rape, and rape (Koss et al., 2007). Participants reported the number of times they experienced each (*never, 1 time, 2 times, 3 or more times*).

Adverse Childhood Experiences—The Adverse Childhood Experiences Scale (17 items, $\alpha = .87$) examines childhood exposure to abuse, including experiences of psychological, physical, and sexual abuse, violence against the mother, and living with household members who were substance abusers, mentally ill or suicidal, or imprisoned (Felitti et al., 1998). Participants indicated if they experienced each event (*yes/no*).

PTSD Symptoms—The PTSD Checklist for DSM–5 (20 items, $\alpha = .96$) was used to assess the occurrence of the 20 DSM–5 symptoms of PTSD over the past month (Blevins et al., 2015; Weathers et al., 2013).

Analyses

Descriptive statistics were calculated for demographics, PTSD symptoms, and interpersonal violence variables. Interpersonal violence scores were calculated four different ways (i.e., prevalence, number of abuses, severity, and chronicity) following procedures described in the introduction. The correlations between interpersonal violence variables were examined

to check for multicollinearity, which may be an issue when examining multiple interpersonal violence scales in the same analytic models. Correlations were between 0.18 to 0.61, which does not provide evidence of multicollinearity. A series of linear regression models were conducted to examine the relationship between interpersonal violence and PTSD symptoms, adjusting for sex. First, each type of interpersonal violence (i.e., IPV, SA, ACEs) was entered separately as the primary independent variable. Then, all three interpersonal violence variables were entered to examine the effects of each interpersonal violence exposure while adjusting for exposure to the other types of interpersonal violence. Next, interaction terms were added between the interpersonal violence variables to examine potential effects of co-occurrence. Each regression model was calculated using the different interpersonal violence scoring methods. All analyses were conducted in IBM SPSS Statistics for Windows, Version 26.0 (IBM, 2019).

Ethical Approval and Informed Consent

The study protocol was approved by the University of North Carolina at Chapel Hill Institutional Review Board before engaging in study activities (18-1507). Informed consent was obtained from all participants prior to data collection.

Results

Participant Characteristics

The average age of participants was 28.78 (SD = 10.77). A majority of the sample were female ($n = 147$, 58.8%), White, non-Hispanic ($n = 136$, 54.4%), had at least some college education ($n = 185$, 74.0%), and were either employed full time ($n = 86$, 34.4%) or a student ($n = 81$, 32.4%). The sample had a mean PTSD checklist score of 26.59 (SD = 19.06, possible range = 0–80).

Interpersonal Violence Descriptives

Table 2 provides descriptive information for interpersonal violence based on four different scoring methods.

Prevalence.—To calculate prevalence, dichotomous scoring was used wherein participants who reported experiencing one or more items on the respective scale were classified as “yes” and those who reported “never” to all items on the scale classified as “no.” Over 90% of participants reported experiencing at least one type of ACE ($n = 233$, 93.2%) and IPV ($n = 226$, 90.4%). At least one type of SA was experienced by 70% ($n = 175$) of participants. The prevalence (dichotomous) scores were used to examine overlap of different interpersonal violence experiences across participants. There was high co-occurrence of interpersonal violence, with 60.4% ($n = 151$) reporting at least one occurrence of all types (Figure 1).

Number of Abuses.—Number of abuses was calculated by summing the number of affirmative responses to each item on the respective scale. Categories were created based on quintiles to provide a robust picture of the distribution of responses and a mean score was also calculated. The mean number of abuses were close to the midpoint for all three types of interpersonal violence and all had relatively wide standard deviations. Distribution patterns

differed across violence types when examining the number of abuse categories. For IPV and ACEs, there was a relatively even distribution across categories, with both being skewed slightly toward the fewer number of abuse categories. For SA, there is a bimodal distribution, with most respondents categorized as never experiencing SA or experiencing higher numbers (4 or more).

Severity.—Severity was calculated based on scoring instructions for the respective scale (ACEs does not have a severity scoring option). The majority of participants were classified in the most severe category for both IPV ($n = 199$, 79.6%) and SA ($n = 125$, 50.0%).

Chronicity.—Chronicity of interpersonal violence was calculated as a continuous variable based on a sum score across all items on the respective scale. The mean chronicity scores for IPV ($M = 28.53$, $SD = 24.34$, possible range: 0–96) and SA ($M = 22.28$, $SD = 26.75$, possible range: 0–105) were skewed toward the lower end of the possible range for the scales, whereas the ACEs' mean was close to the midpoint ($M = 6.48$, $SD = 4.46$, possible range: 0–17). Similar to the continuous scores for number of abuses, large standard deviations were observed. It is important to note, the Adverse Childhood Experiences Scale does not include frequency response options, thus, the chronicity mean score is the same as the mean score for number of abuses.

Relationships Between Interpersonal Violence and PTSD Symptoms by Scoring Method

Results for the relationship between interpersonal violence and PTSD symptoms are presented in Tables 3 and 4. After adjusting for sex, all three types of interpersonal violence were significantly associated with PTSD symptoms (Table 3); however, these relationships varied depending on the scoring method used. For IPV, only the two continuous scoring methods (number of abuses and chronicity) resulted in significant associations. For SA, dichotomous scoring did not result in a significant association, but the other three methods did. All scoring methods used for ACEs were significant. When the regression model was adjusted for exposure to other types of interpersonal violence (Table 4), IPV and SA were no longer associated with PTSD symptoms using the continuous scoring methods. Significant findings remained for the relationship between ACEs and PTSD symptoms. Finally, we examined the interactions of different interpersonal violence experiences to assess the effects of co-occurrence on PTSD symptoms. No significant associations were found.

Discussion

Our case exemplar shows that each of the four scoring methods provides a different picture of interpersonal violence experienced by participants. Prevalence scoring resulted in a large proportion of the sample being classified as experiencing interpersonal violence. While this dichotomous classification provides a straightforward method for calculating prevalence estimates and examining co-occurrence of violence, a great deal of sensitivity is lost. Number of abuses and severity scoring provide more nuanced information compared to prevalence. For number of abuses, we examined both mean scores and distributions across quintile categories. Looking at the data in both ways was particularly important for SA, given that the mean score was close to the midpoint, but was driven by a bimodal

distribution with most participants reporting SA numbers at the highest and lowest ends. This bimodal distribution is reflected in the wide standard deviation seen for the mean score. Comparing severity results with number of abuses also highlights some nuanced findings. SA severity demonstrated a bimodal distribution, consistent with the distribution for number of abuses. For IPV, most participants were classified in the severe category despite a relatively even distribution seen across number of abuse categories. This indicates that for IPV, number of abuse experiences may not be a good indicator of severity. Finally, chronicity scoring retained the largest amount of information from each scale, accounting for both frequency and number of abuses. Interpretation, nonetheless, is most limited with this method.

Our case exemplar also examined how scoring affects interpretation of the association between interpersonal violence and PTSD symptoms—an established consequence of violence (Gardner et al., 2019; Rees et al., 2011; Trevillion et al., 2012). The two continuous scoring methods (i.e., number of abuses and chronicity) provided the most power to detect significant associations across the interpersonal violence variables (Table 3). Given the large amount of co-occurrence seen in this sample, it was also important to examine how this overlap affected the relationship between interpersonal violence types and PTSD symptoms. When we controlled for exposure to other types of interpersonal violence, only ACEs were significantly associated with PTSD symptoms when using the continuous scoring methods (Table 4). This indicates that ACEs likely have a confounding effect on the other two types of interpersonal violence and highlights the importance of controlling for different types of violence. The interaction of multiple forms of violence did not appear to affect PTSD symptoms. This may reflect, in part, a “ceiling effect” wherein the relationship between ACEs and PTSD symptoms is so strong that the addition of another type of violence does not meaningfully increase this relationship.

Our examination of co-occurrence has important implications for the larger field of interpersonal violence which tends to be highly specialized and organized around single types of violence. Focusing on a single type of violence, such as IPV or child abuse, does not account for the well-known co-occurrence of different forms of interpersonal violence (Hamby & Grych, 2013; Hamby et al., 2018; Turner et al., 2010). As supported through our case exemplar, individuals who experience one type of interpersonal violence are more likely to experience multiple types of victimization over different contexts (Hamby & Grych, 2013). Not accounting for this co-occurrence can lead to inaccurate inferences and misleading results, for instance, by not controlling for the confounding effects of other types of violence. Despite calls for addressing the interconnections between different interpersonal violence types, co-occurrence is still not routinely examined (Finkelhor et al., 2007; Hamby & Grych, 2013; Slep & Heyman, 2001). Our ability to examine co-occurrence is hampered by a lack of instruments designed to measure multiple forms of violence. Currently, the most common approach for measuring co-occurrence is to use multiple instruments, as was done in the case exemplar. This is problematic due to the potential for multicollinearity among scales and the increased burden and potential for re-victimization of participants. The development of a single scale that can accurately and reliably measure multiple forms of violence is critical to reducing this burden.

The application of different scoring methods leading to varying interpretations highlights the need for researchers to be purposeful when selecting a method and/or apply multiple methods, if possible. The selection of a method should begin during the design of a research study, as methodological appropriateness can differ based on research question(s) or sample characteristics. Dichotomous or categorical scoring methods may be most appropriate for examining general incidence and prevalence of violence, examining population trends in violence over time, and prevention of new cases in intervention evaluations. Categorical scoring may also be beneficial when working with samples that have violence experiences at extreme ends of the scale (e.g., no violence vs. high levels of violence). For example, in our case exemplar, SA experiences followed a bimodal distribution with most participants reporting either no SA or high levels of severe SA. Using the severity scoring option allowed us to measure this bimodal distribution and examine its effects on PTSD symptoms. Continuous scoring methods may be more appropriate when examining relationships between interpersonal violence and other variables due to the increased power, and for examining increases and decreases in violence over time. In addition, continuous scoring provides a more accurate reflection of the nuanced experiences of violence in people's lives.

Further, more attention should be given to the role of interpersonal violence co-occurrence in research. Accounting for multiple forms of violence in a study can be challenging given variation across measurement tools (e.g., time frame, frequency categories) and increased sample size requirements. Again, addressing such issues during the design of a study can help to mitigate such challenges. A clear plan for analyzing multiple types of violence is also an important consideration. Our case exemplar provides one option for analyzing co-occurrence that allows for the examination of the unique and interactive effects of multiple types of interpersonal violence. Another approach that shows promise for analyzing co-occurrence is the use of person-centered analytical methods. Person-centered analyses, such as latent class analysis and latent class growth analysis, can be used to identify subgroups of individuals with similar characteristics and track changes in subgroups over time. This approach may be useful for examining interpersonal violence as victimization experiences often differ within a population. Identifying clusters of individuals with similar experiences and how those experiences influence outcomes can provide more targeted information for intervention.

Incorporating qualitative methods may also further dimensionalize research on interpersonal violence and the application of multiple methods can provide critical insights for the interpretation of findings (Burton et al., 2016). Such approaches can be especially helpful when working with populations that are outside the researchers' perspectives, in that information not measured through structured instrumentation may be conveyed through prosody and paralanguage (Burton et al., 2013; Dupuis & Pichora-Fuller, 2010), or through novel uses of language and/or syntax (Burton, 2016; Short et al., 2006). This can be especially useful in establishing chronicity and perceived severity of violence, as well as in cases where discrete subpopulations emerge in quantitative analysis. Additionally, qualitative research can be applied when the cross-cultural equivalency of a measure is of concern. Indeed, qualitative methods have been used to improve the relevance and validity of measures in cross-cultural mental health research (Alegria et al., 2004). We posit that when

dealing with sensitive and deeply nuanced issues such as interpersonal violence, the use of qualitative methods can provide far greater insights than can single-method exploration.

It is important to note this paper focused on the application of different scoring methods to interpersonal violence victimization. While some points discussed here could also apply to perpetration and bidirectional violence, there are likely additional considerations. For instance, research examining reports of violence within couples often collapse perpetration and victimization to create an overall pooled estimate of violence in the relationship (Schafer et al., 2002; Straus & Douglas, 2004). The intent of this scoring method is to account for the low level of agreement often seen among couples regarding the occurrence of violence (Caetano et al., 2009; Schafer et al., 2002). Research conducted by Derrick et al. (2014), however, shows that pooling may not accurately predict short-term consequences of violence and a better method may be to look at individuals' reports of violent experiences. Future work is needed to better understand scoring nuances associated with perpetration and bidirectional violence.

Conclusion

The numerous scoring options available for examining interpersonal violence is necessary for capturing the complexity of the field and have greatly advanced our understanding of violent experiences. At the same time, they can create challenges for researchers and practitioners when the methods and their implications are not fully understood. A careful consideration of the purpose for measuring violence, the distribution of violence experiences (including co-occurrence of violence) in the population being studied, and intended study results can help guide the selection of scoring methods. Future research should provide transparency in the selection of scoring methods and be explicit in the rationale for selecting a specific method. Future research should also focus on developing instruments that account for the co-occurrence of different forms of interpersonal violence. It is our hope that this paper will provide those working the area of interpersonal violence with the tools needed to critically evaluate scoring options and advance future research in the area of interpersonal violence.

Acknowledgments

Research reported in this publication was supported by the National Institute on Alcohol Abuse and Alcoholism of the National Institutes of Health under Award Number K23AA027288. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

- Alegria M, Vila D, Woo M, Canino G, Takeuchi D, Vera M, Febo V, Guarnaccia P, Aguilar-Gaxiola S, & Shrout P (2004). Cultural relevance and equivalence in the NLAAS instrument: Integrating etic and emic in the development of cross-cultural measures for a psychiatric epidemiology and services study of Latinos. *International Journal of Methods in Psychiatric Research*, 13, 270–288. 10.1002/mpr.181 [PubMed: 15719532]
- Altman DG, & Royston P (2006). The cost of dichotomising continuous variables. *BMJ*, 332, 1080. 10.1136/bmj.332.7549.1080 [PubMed: 16675816]

- Bacchus LJ, Ranganathan M, Watts C, & Devries K (2018). Recent intimate partner violence against women and health: A systematic review and meta-analysis of cohort studies. *BMJ Open*, 8, e019995. 10.1136/bmjopen-2017-019995
- Blevins CA, Weathers FW, Davis MT, Witte TK, & Domino JL (2015). The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and initial psychometric evaluation. *Journal of Traumatic Stress*, 28, 489–498. 10.1002/jts.22059 [PubMed: 26606250]
- Bono R, Blanca MJ, Arnau J, & Gómez-Benito J (2017). Non-normal distributions commonly used in health, education, and social sciences: A systematic review. *Frontiers in Psychology*, 8, 1602. 10.3389/fpsyg.2017.01602 [PubMed: 28959227]
- Burton CW (2016). The health needs of young women: Applying a feminist philosophical lens to nursing science and practice. *Advances in Nursing Science*, 39, 108–118. 10.1097/ans.000000000000119 [PubMed: 27149225]
- Burton CW, Halpern-Felsher B, Rehm RS, Rankin S, & Humphreys JC (2013). “It was pretty scary”: The theme of fear in young adult women’s descriptions of a history of adolescent dating abuse. *Issues in Mental Health Nursing*, 34, 803–813. 10.3109/01612840.2013.827286 [PubMed: 24131412]
- Burton CW, Halpern-Felsher B, Rehm RS, Rankin SH, & Humphreys JC (2016). Depression and self-rated health among rural women who experienced adolescent dating abuse: A mixed methods study. *Journal of Interpersonal Violence*, 31, 920–941. 10.1177/0886260514556766 [PubMed: 25392389]
- Butchart A, & Mikton C, (2014). Global status report on violence prevention 2014. World Health Organization. https://www.who.int/violence_injury_prevention/violence/status_report/2014/report/report/en/
- Caetano R, Field C, Ramisetty-Mikler S, & Lipsky S (2009). Agreement on reporting of physical, psychological, and sexual violence among white, black, and Hispanic couples in the United States. *Journal of Interpersonal Violence*, 24, 1318–1337. 10.1177/0886260508322181 [PubMed: 18768744]
- Davis KC, Gilmore AK, Stappenbeck CA, Balsan MJ, George WH, & Norris J (2014). How to score the Sexual Experiences Survey? A comparison of nine methods. *Psychology of Violence*, 4, 445–461. 10.1037/a0037494 [PubMed: 25512879]
- Derrick JL, Testa M, & Leonard KE (2014). Daily reports of intimate partner verbal aggression by self and partner: Short-term consequences and implications for measurement. *Psychology of Violence*, 4, 416–431. 10.1037/a0037481 [PubMed: 25346861]
- Dupuis K, & Pichora-Fuller MK (2010). Use of affective prosody by young and older adults. *Psychology and Aging*, 25, 16–29. 10.1037/a0018777 [PubMed: 20230124]
- Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, Koss MP, & Marks JS (1998). Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. *American Journal of Preventive Medicine*, 14, 245–258. <https://www.ncbi.nlm.nih.gov/pubmed/9635069> [PubMed: 9635069]
- Finkelhor D, Ormrod RK, & Turner HA (2007). Poly-victimization: A neglected component in child victimization. *Child Abuse & Neglect*, 31, 7–26. 10.1016/j.chiabu.2006.06.008 [PubMed: 17224181]
- Follingstad DR, Bradley RG, Laughlin JE, & Burke L (1999). Risk factors and correlates of dating violence: The relevance of examining frequency and severity levels in a college sample. *Violence and Victims*, 14, 365–380. 10.1891/0886-6708.14.4.365 [PubMed: 10751045]
- Follingstad DR, & Bush HM (2014). Measurement of intimate partner violence: A model for developing the gold standard. *Psychology of Violence*, 4, 369–383. 10.1037/a0037515
- Gardner MJ, Thomas HJ, & Erskine HE (2019). The association between five forms of child maltreatment and depressive and anxiety disorders: A systematic review and meta-analysis. *Child Abuse & Neglect*, 96, 104082. 10.1016/j.chiabu.2019.104082 [PubMed: 31374447]
- Grych J, & Hamby S (2014). Advancing the measurement of violence: Challenges and opportunities. *Psychology of Violence*, 4, 363–368. 10.1037/a0037886
- Hamby S (2014). Intimate partner and sexual violence research: Scientific progress, scientific challenges, and gender. *Trauma, Violence, & Abuse*, 15, 149–158. 10.1177/1524838014520723

- Hamby S, Taylor E, Jones L, Mitchell KJ, Turner HA, & Newlin C (2018). From poly-victimization to poly-strengths: Understanding the web of violence can transform research on youth violence and illuminate the path to prevention and resilience. *Journal of Interpersonal Violence*, 33, 719–739. 10.1177/0886260517744847 [PubMed: 29411696]
- Hamby S, & Grych J (2013). *The web of violence: Exploring connections among different forms of interpersonal violence and abuse*. Springer.
- IBM Corp. (2019). *IBM SPSS Statistics for Windows, Version 26.0*. Armonk, NY: IBM Corp.
- Koss MP, Abbey A, Campbell R, Cook S, Norris J, Testa M, Ullman S, West C, & White J (2007). Revising the SES: A collaborative process to improve assessment of sexual aggression and victimization. *Psychology of Women Quarterly*, 31, 357–370. 10.1111/j.1471-6402.2007.00385.x
- Marshall LL (1992). Development of the severity of violence against women scales. *Journal of Family Violence*, 7, 103–121. 10.1007/BF00978700
- Rees S, Silove D, Chey T, Ivancic L, Steel Z, Creamer M, Teesson M, Bryant R, McFarlane AC, Mills KL, Slade T, Carragher N, O'Donnell M, & Forbes D (2011). Lifetime prevalence of gender-based violence in women and the relationship with mental disorders and psychosocial function. *JAMA*, 306, 513–521. 10.1001/jama.2011.1098 [PubMed: 21813429]
- Saini SM, Hoffmann CR, Pantelis C, Everall IP, & Bousman CA (2019). Systematic review and critical appraisal of child abuse measurement instruments. *Psychiatry Research*, 272, 106–113. 10.1016/j.psychres.2018.12.068 [PubMed: 30580133]
- Schafer J, Caetano R, & Clark CL (2002). Agreement about violence in U.S. couples. *Journal of Interpersonal Violence*, 17, 457–470. 10.1177/0886260502017004007
- Short MB, Mills LC, & Rosenthal SL (2006). When adolescent girls say, “I don’t know”. *Journal of Pediatric & Adolescent Gynecology*, 19, 267–270. 10.1016/j.jpjag.2006.05.001 [PubMed: 16873030]
- Slep AMS, & Heyman RE (2001). Where do we go from here? Moving toward an integrated approach to family violence. *Aggression and Violent Behavior*, 6, 353–356. 10.1016/S1359-1789(00)00028-8
- Smith SG, Zhang X, Basile KC, Merrick MT, Wang J, Kresnow M, & Chen J (2018). *The National Intimate Partner and Sexual Violence Survey (NISVS): 2015 data brief—Updated release*. National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. <https://www.cdc.gov/violenceprevention/pdf/2015data-brief508.pdf>
- Straus MA, & Douglas EM (2004). A short form of the Revised Conflict Tactics Scales, and typologies for severity and mutuality. *Violence and Victims*, 19, 507–520. 10.1891/vivi.19.5.507.63686 [PubMed: 15844722]
- Straus MA, Hamby SL, Boney-McCoy S, & Sugarman DB (1996). The Revised Conflict Tactics Scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues*, 17, 283–316. 10.1177/019251396017003001
- Suliman S, Mkabile SG, Fincham DS, Ahmed R, Stein DJ, & Seedat S (2009). Cumulative effect of multiple trauma on symptoms of posttraumatic stress disorder, anxiety, and depression in adolescents. *Comprehensive Psychiatry*, 50, 121–127. 10.1016/j.comppsy.2008.06.006 [PubMed: 19216888]
- Thompson MP, Basile KC, Hertz MF, & Sitterle D (2006). *Measuring intimate partner violence victimization and perpetration: A compendium of assessment tools*. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.
- Trabold N, McMahon J, Alsobrooks S, Whitney S, & Mittal M (2020). A systematic review of intimate partner violence interventions: State of the field and implications for practitioners. *Trauma, Violence, & Abuse*, 21, 311–325. 10.1177/1524838018767934
- Trevillion K, Oram S, Feder G, & Howard LM (2012). Experiences of domestic violence and mental disorders: A systematic review and meta-analysis. *PLoS ONE*, 7, e51740. 10.1371/journal.pone.0051740 [PubMed: 23300562]
- Turner HA, Finkelhor D, & Ormrod R (2010). Poly-victimization in a national sample of children and youth. *American Journal of Preventive Medicine*, 38, 323–330. 10.1016/j.amepre.2009.11.012 [PubMed: 20171535]

- U.S. National Library of Medicine. (2015, August 26). Confronting violence, improving women's lives: Nurses take a stand. Retrieved August 16, 2019, from <https://www.nlm.nih.gov/exhibition/confrontingviolence/exhibition2.html>
- Weathers FW, Litz BT, Keane TM, Palmieri PA, Marx BP, & Schnurr PP (2013). The PTSD checklist for DSM-5 (PCL-5). National Center for PTSD. <https://www.ptsd.va.gov/professional/assessment/adult-sr/ptsd-checklist.asp>
- Winstok Z (2017). Critical review of Hamby's (2014) article titled "Intimate partner and sexual violence research, scientific progress, Scientific challenges, and gender." *Trauma, Violence, & Abuse*, 18, 134–144. 10.1177/1524838015596962
- Williams JR, Cole V, Girdler S, & Cromeens MG (2020). Exploring stress, cognitive, and affective mechanisms of the relationship between interpersonal trauma and opioid misuse. *PLoS One*, 15(5), e0233185. 10.1371/journal.pone.0233185 [PubMed: 32413081]
- Williams JR, Girdler S, Williams W, & Cromeens MG (2020). The effects of co-occurring interpersonal trauma and sex on opioid use and misuse. *Journal of Interpersonal Violence*. Advance online publication. 10.1177/0886260519900309
- Yakubovich AR, Stöckl H, Murray J, Melendez-Torres GJ, Steinert JI, Glavin CEY, & Humphreys DK (2018). Risk and protective factors for intimate partner violence against women: Systematic review and meta-analyses of prospective-longitudinal studies. *American Journal of Public Health*, 108, e1–e11. 10.2105/AJPH.2018.304428

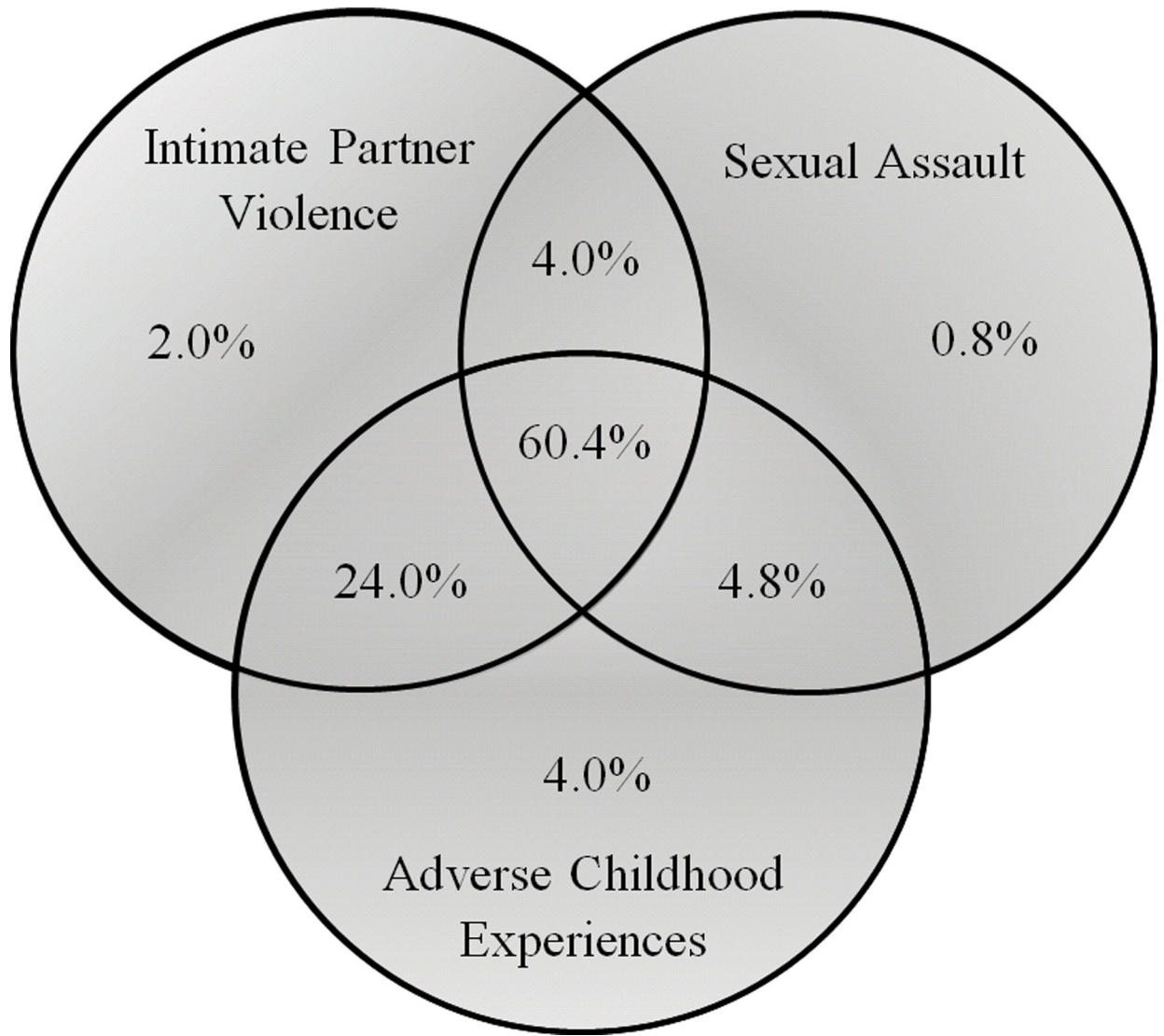


Figure 1.
Co-Occurrence of Interpersonal Violence (N=250)

Table 1

Common Scoring Approaches for Interpersonal Violence Scales

Scoring Approach	Purpose/Research Question	Scoring Method	Level of Measurement	Strengths	Weaknesses
Dichotomous	Prevalence Has someone experienced any victimization?	Affirmative response to any item on the scale	Dichotomous: 0 = no victimization 1 = victimization	Ease of interpretation Addresses statistical challenges of skewed distributions	Loss of statistical power Underestimates variation between groups Conceals any non-linearity in the relation between violence and the outcome of interest
Number of Abuses	Total number of abuses (regardless of type) How many abuses has someone experienced?	Total number of affirmative responses to each item on the scale	Continuous: Sum score for affirmative responses Categorical: Number of abuses collapsed into categories 0 = no abuses 1 = 1–2 abuses 2 = 3–4 abuses 3 = 5+ abuses	Allows for more variation in data while maintaining ease of interpretation Improved statistical power	Different abuse types are treated as equivalent Interval frequency categories are often unequal Continuous method is vulnerable to skewed distributions
Severity	Severity of abuse What was the most severe abuse experienced?	Assignment of severity classification to different types of abuse	Categorical: 1 = mild 2 = moderate 3 = severe	Provides a method for weighting different types of abuse experiences Allows for more variation in data while maintaining ease of interpretation Addresses statistical challenges of skewed distributions	Loss of statistical power Does not account for frequency of abuse experiences
Chronicity	Combination of abuse frequency and number of abuses How chronic is the abuse?	Sum of scale items with weighted values based on abuse frequency 0 = none 1 = 1 time 2 = 2 times 3 = 3+ times	Continuous: Sum score for responses to all items on the scale	Statistical power Improved ability to make statistical inferences due to larger number of data points	Vulnerable to skewed distributions

Table 2
Descriptive Results Based on Different Scoring Methods for Interpersonal Violence Scales (N=250)

	Prevalence		Number of Abuses		Severity		Chronicity				
	<i>Dichotomous</i>	<i>n</i>	<i>%</i>	<i>Number of affirmative responses to each scale item</i>	<i>Severity Category</i>	<i>Severity scoring for scale</i>	<i>Sum score across all scale items</i>	<i>SD</i>			
Intimate Partner Violence	No:	24	9.6	None:	24	9.6	None:	24	9.6	28.53	24.34
				1-7:	74	29.6					
	Yes:	226	90.4	8-15:	68	27.2	Minor:	27	10.8	Possible Range: 0-96	
				16-23:	45	18.0					
			24-31:	39	15.6	Severe:	199	79.6			
			<i>Mean: 12.22 SD: 9.24</i>								
Sexual Assault	No:	75	30.0	None:	75	30.0	None:	75	30.0	22.28	26.75
				1:	19	7.6	Sexual contact by any tactic:	6	2.4	Possible Range: 0-105	
				2-3:	32	12.8	Attempted rape by verbal coercion:	7	2.8		
	Yes:	175	70.0	4-5:	69	27.6	Rape by verbal coercion:	16	6.4		
				6-7:	55	22.0	Attempted rape by intoxication or physical force:	21	8.4		
			<i>Mean: 3.20 SD: 2.66</i>			Rape by intoxication or physical force:	125	50.0			
Adverse Childhood Experiences	No:	17	6.8	None:	17	6.8	Not applicable			6.48	4.46
				1-4:	89	35.6					
				5-8:	57	22.8				Possible Range: 0-17	
	Yes:	233	93.2	9-12:	58	23.2					
				13-17:	29	11.6					
			<i>Mean: 6.48 SD: 4.46</i>								

Note: SD = standard deviation

Table 3
Associations Between Interpersonal Violence and Post-Traumatic Stress Disorder Symptoms, Adjusted for Sex (N=250)

	Prevalence			Number of Abuses			Severity			Chronicity		
	B	SE	p-value	B	SE	p-value	B	SE	p-value	B	SE	p-value
Intimate Partner Violence	-.198	4.105	.961	.480	.127	< .001	1.092	1.904	.567	.199	.048	< .001
Sexual Assault	3.720	2.628	.158	.923	.452	.042	1.215	.541	.026	.128	.045	.004
Adverse Childhood Experiences	18.249	4.660	< .001	2.012	.240	< .001	--	--	--	2.012	.240	< .001

Note: SE = Standard Error

Table 4
 Associations Between Interpersonal Violence and Post-Traumatic Stress Disorder Symptoms, Adjusted for Sex and Other Types of Interpersonal Violence (N=250)

	Prevalence			Number of Abuses			Severity			Chronicity		
	B	SE	p-value	B	SE	p-value	B	SE	p-value	B	SE	p-value
Intimate Partner Violence	-.967	3.995	.809	.123	.133	.354	.656	1.900	.730	.083	.057	.141
Sexual Assault	3.822	2.568	.138	.658	.441	.137	1.195	.545	.029	.028	.050	.584
Adverse Childhood Experiences	18.305	4.658	<.0001	1.924	.252	<.001	--	--	--	1.852	.249	<.001

Note: SE = Standard Error