

Internal Consistency and Factor Structure of the Revised Conflict Tactics Scales in a Sample of Deaf Female College Students

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Abstract The Revised Conflict Tactics Scales (CTS2) is currently the most widely used measure for identifying cases of intimate partner violence within the hearing population. The CTS2 has been used successfully with individuals from various countries and cultural backgrounds. However, the CTS2 had not yet been used with Deaf individuals. The goal of the present study was to investigate the internal consistency reliability and the factor structure of the CTS2 within a sample of Deaf female college students. Psychometric analyses indicated that subscales measuring Victimization of Negotiation, Psychological Aggression, Physical Assault, and Injury proved both reliable and valid in the current sample. Three subscales did not evidence reliability and the factor structure was not valid for Perpetration items.

Keywords Intimate partner violence · Domestic violence · Deaf · Revised Conflict Tactics Scales

Relationships between intimate partners are often violent; in fact, this violence occurs so frequently that physical assault on a partner in an intimate relationship may be the most prevalent type of crime (Smithey and Straus 2004). The term “intimate

partner violence” has been used by researchers to describe a multitude of different behaviors. Used narrowly, intimate partner violence refers to acts of physical assault on a partner in a dating, cohabitating, or marital relationship. Used broadly, the term refers to “any behavior that demeans or controls the partner, including sexual coercion and psychological attacks” (Smithey and Straus 2004, p. 240).

One large-scale study of intimate partner violence, the National Family Violence Surveys (NFVS) of 1985, indicated that roughly one-sixth (16%) of American couples experienced at least one physical assault on a partner within the past year (Straus et al. 2003). While most couples experienced relatively minor violence (pushing, slapping, and throwing objects), 3.2 million couples experienced severe violence (kicking, punching, biting, and choking) (Straus et al. 2003). Moreover, these surveys found that when the criterion for intimate partner violence is set for at least one assault, over 6 million women in the United States are beaten per year. Unfortunately, this is considered a “lower bound” estimate and the true figure could easily be double that (Straus 1991, p. 30).

Intimate Partner Violence in the Deaf Community

In the United States, as many as 500,000 people are members of the Deaf¹ community—a culturally distinct group of people who share American Sign Language (ASL) as a primary language (Mitchell et al. 2006). Members of the Deaf community experience the effects of oppression

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¹ While deaf individuals vary greatly with respect to language-use, the focus of the current study was on culturally Deaf individuals who primarily utilize American Sign Language, as delineated by the capital letter *d* in *Deaf*.

much like other minorities. For example, culturally Deaf individuals tend to experience a greater incidence of substance abuse, unemployment or underemployment, isolation or segregation from others, and distrust of members of the mainstream society, similar to members of other minority groups who have experienced a history of oppression (Glickman 1996).

While Deaf individuals seem to experience the effects of oppression similar to other minority groups, Deaf people tend to enter therapy with the same problems as hearing people (Glickman 1996). With respect to intimate partner violence, approximately 25% of Deaf women are victims of intimate partner violence (ADWAS 1997), similar to the annual prevalence rates between 16% and 30% in the hearing community. While the percentage of intimate partner violence may be similar for Deaf and hearing women, Deaf women may be less likely to report abuse because of lack of information about intimate partner violence and lack of accessible resources and services, making the battering of Deaf people one of the most under-reported crimes in America (ADWAS 1997).

Detecting Intimate Partner Violence

Despite increased awareness of the prominent role of physical violence in couple relationships, and the benefits of detecting violence, most incidents of violence are not detected in couples counseling. A 1992 study conducted by O'Leary et al. found that more than half of all therapy cases involving physical violence are not detected during routine interviews. The inability to detect intimate partner violence may be due to both client- and therapist-based reasons. Clients may not disclose violence in the relationship due to beliefs that violent acts are tolerable and normal, or that physical violence is a necessary means to resolve conflict. Additionally, the client may choose not to discuss intimate partner violence because he or she wants to make a good impression, feels ashamed, fears further victimization, or still loves the partner (Aldarondo and Straus 1994).

On the other hand, violence may not be detected because the therapist may not be asking the right questions. For example, when queried about the existence of violence in a relationship, clients may report that no violence occurred because they did not appraise certain physical behaviors as violence. Yet, the “the single most important reason for the loss of vital information about [partner] violence is that the therapist doesn't ask the client about it” (Straus et al. 2003, p. 36). In fact, in a national survey of practicing psychologists, while 95% agreed that it is their responsibility to assist victimized clients, fewer than 19% routinely screen their clients for domestic violence (Samuelson and Campbell 2005).

Regardless of the cause of poor detection, improving the recognition of intimate partner violence is critical. The detection and cessation of violence, regardless of its severity, is extremely important to prevent “mental health problems, severe injuries, and death” (Aldarondo and Straus 1994, p. 433). It is well known that physical violence is a risk factor for many psychological and physical health problems such as dissociative states, depressive symptoms, neurological deficits, repression of traumatic memories, anxiety symptoms, and sleep disorders (McCloskey and Grigsby 2005). In addition to alleviating psychological distress, detecting violence early in dating relationships is important for preventing chronic partner violence. Allowing violence to go undetected and unobstructed can allow detrimental patterns of abuse to become routine and habitual (Straus 2001).

Given the high percentage of undetected intimate partner violence and the consequences of this violence, there is a critical need for brief and valid methods of detection. Evidence indicates that even therapists who are trained to assess violence through interviews find considerably lower rates of physical violence than the rates found through self-report measures (O'Leary and Murphy 1992). Perhaps clients are not comfortable admitting the experience of violence face-to-face with a therapist. Another possible explanation is that clients may not consider the violence in their relationship to be a problem and, therefore, assume that it is not a matter to be discussed in therapy.

Regardless of the reasons behind this phenomenon, it is important to focus on the finding that self-report measures tend to find higher rates of physical violence compared to interviews. One brief self-report measure of intimate partner violence, Straus' Conflict Tactics Scales, has been found to greatly improve family therapists' ability to identify violence (O'Leary et al. 1992). The focus of the current study was to determine the appropriateness of this measure for Deaf individuals.

The Revised Conflict Tactics Scales

The Conflict Tactics Scales (CTS) is currently the most widely used measure for identifying intimate partner violence (Straus 2007). The original CTS was developed in the mid-1970s. One revision of this measure is relevant for the present study: the Revised Conflict Tactics Scales (CTS2), developed in the mid-1990s. The CTS2 measures the extent to which partners in an intimate relationship utilize psychological aggression, physical assault, negotiation, physical injury, and sexual coercion to deal with conflicts (Straus 2004). The scales consist of a list of behaviors directed toward a partner and deliberately exclude attitudes, emotions, and cognitive appraisal of these behaviors (Straus 2007). This measure requires

respondents to report the number of times they committed specific behaviors in the past year and how many times their partner committed the same behaviors (Straus 2001).

The CTS2 is appropriate for the practical needs of family therapists and other mental health professionals. First, the CTS2 requires only 15 min to administer and can be easily added to standard intake procedures (Straus et al. 2003). Second, the measure “targets specific behavior, and thus minimizes the demand for respondents to recognize their behavior as violent in order to respond” (Straus et al. 2003, p. 37). Third, in addition to identifying the occurrence of violence, the CTS2 also identifies the severity and chronicity of intimate partner violence (Straus et al. 2003). While the CTS2 is practically-suited to detect intimate partner violence, it is also statistically-suited for the identification of intimate partner violence. There is a growing body of evidence indicating its reliability and validity (Straus 2004).

Reliability and Validity of the CTS2

In a study of the reliability of the CTS2 subscales conducted by Straus et al. (1996), the researchers found internal consistency estimates ranging from .79 to .95 in a sample of college students. An additional 41 studies have also investigated the internal consistency of the CTS2. In these studies, alpha coefficients ranged from .34 to .94, with a mean of .77 (Straus 2007).

In terms of validity, a few studies have examined the factor structure of the CTS2 to ascertain if the factor structure is consistent with populations different from the college student population on which it was normed. One study investigated the factor structure of the CTS2 with 359 incarcerated female substance abusers and found that “for the most part, the highest loading for each item is on its intended scale” (Straus et al. 2003, p. 49). In another study of factor structure with a group of 295 postpartum women, “the CTS2 yielded results for this sample similar to results obtained from a sample of college students in a previous study” (Newton et al. 2001, p. 317). This evidence of a similar factor structure across subgroups supports the construct validity of the CTS2 (Straus et al. 2003).

Cross-Cultural Reliability and Validity of the CTS2

As the CTS2 has shown evidence of reliability and validity within groups of college students, post-partum mothers, and incarcerated females, there has also been research regarding the psychometric properties of the CTS2 in various cultural groups (Straus 2004). In 2004, Straus conducted a study investigating the dating relationships of college students that spanned 33 universities in 17 countries in order to investigate the cross-cultural reliability and validity of the CTS2. High levels of internal consistency were found, with

the lowest alpha coefficient (.74 for psychological aggression) exceeding the conventional standard of .70 (Straus 2004). Because the alpha coefficients of reliability for the five subscales of CTS2 are generally high across all 33 universities, this study supported the cross-cultural reliability of the CTS2 for university students.

In addition to the support of cross-cultural reliability of the CTS2, Straus also reported evidence of cross-cultural construct validity from two other studies. Straus claims that this evidence “suggests that the CTS2 is an appropriate instrument for measuring violence in partner relationships cross-culturally” (Straus 2004, p. 429). However, one limitation is that the study was conducted with samples of university students. Therefore, the results of this study may not apply to the general population (Straus 2004).

In order to make a more definitive conclusion about the cross-cultural reliability and validity of the CTS2, studies using this measure need to span a wider range of the population and include more minority groups. An instrument may have “excellent psychometric properties in one sociocultural context and may not in another” (Straus 2004, p. 409). Therefore, while the CTS2 may be reliable and valid within some cultural communities, it may not be in others. One community in which the CTS2 has yet to be investigated is the Deaf community.

Need to Establish the Reliability and Validity of the CTS2 in the Deaf Community

While the CTS2 has proven to be an efficient measure of identifying intimate partner violence cross-culturally, there has been no research regarding the CTS2 with members of the Deaf community. One obstacle to establishing reliability and validity of a measure in samples of Deaf individuals is the language in which the measure is written. It is important to keep in mind that the primary language of the Deaf community is American Sign Language (ASL). Therefore, English skills can, and do, vary widely (Moores 2001). In fact, the average English reading level of Deaf individuals is approximately the fourth-grade (Gallaudet Research Institute 2003). Understandably, it is sometimes necessary to alter standard psychological instruments in order to address reading and ASL needs specific to the Deaf population, either through written English revisions or translations into ASL on DVDs. While assessment responses are more valid in the client’s best language (Leigh et al. 1996), “English revisions of various psychological measures have demonstrated acceptable internal consistencies using a Deaf college-student population” (Leigh and Anthony-Tolbert 2001, p. 196).

Even though Straus reports that the CTS2 is written at a fourth-grade reading level, it cannot be assumed that this measure is appropriate for use with Deaf individuals.

Because ASL and English are grammatically and syntactically distinct (Moore 2001), certain English phrasings used in the measure may be misunderstood by individuals whose first language is ASL. Due to the potential complications with the written language of the measure, it is necessary to first assess the reliability and validity of the CTS2 within a Deaf sample before the measure can be accurately and effectively used to identify intimate partner violence with members of the Deaf community.

The goal of the present study was to investigate the internal consistency and factor structure of the CTS2 within a sample of Deaf female college students. It was hypothesized that in a sample of Deaf college females, the CTS2 would demonstrate statistically significant internal consistency as measured by coefficient alpha. Additionally, it was hypothesized that the obtained data from a sample of Deaf college females would adequately fit the existing factor model of the CTS2.

If both hypotheses are supported by the obtained data, this study provides some evidence for the effective and reliable use of the CTS2 to identify intimate partner violence with Deaf individuals.

Method

Participants

One hundred female undergraduate students attending a four-year university for the Deaf and hard of hearing in Washington, DC participated in the current study. Participants needed to meet the following inclusion criteria: they had to be female, between the ages of 18 and 25, and self-identify as Deaf or hard of hearing. The reason for these inclusion criteria was to focus the current study on the experiences of Deaf women in dating relationships, as well as to ensure that the current sample was comparable in age to potential hearing undergraduate comparison groups. Additionally, participants had to be in at least one relationship within the past year. The referent period for the CTS2 is the previous year; therefore, in order to respond to items about conflict-resolution behaviors in relationships, it was necessary that each participant was involved in at least one dating relationship in the past year. Demographic characteristics of the sample are listed in Table 1.

Measures

Demographic Questionnaire A brief background survey queried basic information about the participants' gender, ethnicity, age, educational background, socioeconomic status, hearing status, sexual orientation, and current relationship status.

Table 1 Demographic characteristics of the sample ($n=100$)

Age	Mean: 20.65 years Range: 18–25 years
Year in college	Freshman: 18 Sophomore: 27 Junior: 23 Senior: 23 Other: 9
Hearing status	Deaf: 81 Hard of Hearing: 19
First language	ASL: 75 English: 21 Other: 4
Family heritage	African American: 8 Asian/Asian American: 7 European American: 51 Latina/Hispanic: 13 Native American: 2 Other: 19
Sexual orientation	Gay: 5 Bisexual: 12 Straight: 83
Current relationship status	Single: 64 In a Relationship: 35 Married: 1

CTS2 The CTS2 contains 78 items within five subscales that measure Physical Assault, Psychological Aggression, Negotiation, Physical Injury, and Sexual Coercion. The subscale items are interspersed throughout the test, but are presented in pairs rating self-behavior (Perpetration) and partner-behaviors (Victimization). Participants are instructed to rate the number of times within the previous year that they or their partner engaged in the conflict resolution strategies on the form. Choices are *Never*, *Once*, *Twice*, *3–5 times*, *6–10 times*, *11–20 times*, *More than 20 times*, and *Not in the past year, but it did happen before*. This measure takes approximately 10–15 min to administer. For information on reliability and validity, see the above section on *Reliability and Validity of the CTS2*.

Procedures

Subsequent to IRB approval, participants were recruited in three ways—posters, a university daily digest (an electronic distribution system for campus information), and flyers handed out in undergraduate psychology classes. Contact information for the principal investigator, as well as information about compensation, was provided on these advertisements. Students who wished to participate in the

study contacted the principal investigator via email. During this email correspondence, the principal investigator determined if the potential participant fit the inclusion criteria. If the individual met the criteria, appointments were arranged for multiple participants to come to the psychology computer lab to participate in the study simultaneously. Group appointments were conducted to promote anonymity by ensuring that the principal investigator could not connect email addresses with particular individuals.

Both questionnaires were placed on a secure website to allow participants to log in and complete the study online in the psychology computer lab. Together, the two questionnaires required approximately 15–30 min to complete. Participants were given 10 dollars to compensate for their time and effort, regardless of study completion.

Results

Internal Consistency Reliability

Responses from both questionnaires were entered into the SPSS statistical program. Data obtained from the CTS2 were then analyzed within SPSS for internal consistency and factor structure. To investigate the internal consistency reliability of the CTS2 with a sample of Deaf female college students, Cronbach's coefficient alpha was calculated for each subscale of the CTS2. A coefficient alpha value of $\geq .70$ was considered significant.

Table 2 shows that, in the current sample, the majority of the CTS2 scales had good internal consistency, with alpha levels above .70. The Negotiation, Psychological Aggression, and Physical Assault scales had high levels of internal consistency when measuring both Perpetration and Victimization. Additionally, the Injury Victimization subscale was found to be internally consistent.

However, the Injury Perpetration, Sexual Coercion Perpetration, and Sexual Coercion Victimization subscales were found to have moderate to low internal consistency. It is likely that these three subscales did not demonstrate high levels of internal consistency due to minimal variance on these items—very few participants reported experiencing the behaviors on these subscales. This is especially true for the Perpetration of Injury and Perpetration of Sexual Coercion subscales, which both contained an item with zero variance—none of the women reported using force to make their partner have oral or anal sex (#19) and none of the women reported causing their partner to pass out from hitting them on the head in a fight (#24).

An additional analysis was conducted to determine if any particular items from these subscales contributed to the low levels of internal consistency. This was done in order to provide justification for altering or deleting those particular

items. On the Injury Perpetration subscale, Cronbach's alpha did not significantly improve with the deletion of any particular item. However, on the Sexual Coercion Perpetration subscale, the deletion of item #15 (“I made my partner have sex without a condom”) resulted in a significant increase in Cronbach's alpha from .260 to .423. When this item is deleted, the mean of the Sexual Coercion Perpetration subscale drops considerably, indicating that the behavior of making one's partner have sex without a condom is reported much more frequently than the other behaviors in the Sexual Coercion scale. Similarly, when this item is deleted from the Sexual Coercion Victimization subscale, Cronbach's alpha increases slightly from .616 to .647 and the subscale's mean drops, again suggesting the relative frequency of reporting the coercion of condomless sex compared to other sexually coercive behaviors.

Factor Structure

To investigate factor structure of the subscales of the CTS2, exploratory factor analysis (EFA) was used to ascertain if items loaded similarly with this sample of Deaf female college students and previously studied populations. EFA is used to explore the underlying factor structure of a set of observed variables without imposing a preconceived structure on the outcome (Child 1990). Scales with good measurement properties should exhibit high factor loadings on the latent factors of which they are indicators; conversely, these same indicators should exhibit small loadings on factors that are measured by differing sets of indicators. Such results provide evidence of convergent and discriminant validity of scale items (Segars and Grover 1993).

Two separate analyses were conducted—one for Victimization items and one for Perpetration items. Principal components analysis was conducted utilizing a quartimax rotation, an orthogonal rotation that minimizes the number of factors needed to explain each variable and attempts to load each variable mainly on one factor (Garson 2008).

Victimization Factor Structure The initial analysis of Victimization items retained five factors. Three criteria were used to determine the appropriate number of factors to retain: eigenvalue, variance, and scree plot. The five retained factors all had eigenvalues above 1, accounted for 64.78% of the total variance, and were confirmed by the Cattell scree test. The Cattell scree test plots factors as the X axis and the corresponding eigenvalues as the Y axis. As one moves to the right, toward later factors, the eigenvalues drop. When the drop ceases and the curve makes an elbow toward less steep decline, Cattell's scree test suggests dropping all further factors after the one starting the elbow (Garson 2008). Five factors fell before the elbow in Cattell's scree.

Table 2 Internal consistency reliability of the CTS2 with a sample of deaf female undergraduates

Scale	Number of items	Cronbach's alpha	
		Perpetration	Victimization
Negotiation	6	.883	.892
Psychological aggression	8	.705	.795
Physical assault	12	.746	.924
Injury	6	.406**	.795
Sexual coercion	7	.260**	.616*

*moderate internal consistency,
**low internal consistency

Item loadings onto the five factors are listed in Table 3. A rule of thumb for determining if an item loads on a factor is a rotated factor loading of at least .40 (Garson 2008). Therefore, an item is listed as loading on a factor if its factor loading is .40 or above.

For the Victimization items, the five factors found with the current data do not perfectly match the factor structure found in previously studied populations. All Negotiation items load cleanly on Factor 2. However, all Physical Assault Items and Injury items load together on Factor 1, indicating little discriminant validity between these scales. Additionally, Sexual Coercion and Psychological Aggression items load on multiple factors, with some items loading highly on multiple factors. However, it is important to note that it is not unexpected that a few items will load on unintended scales.

Although the Victimization items do not load perfectly on their five intended scales, the majority of items do load most highly on their intended scale, supporting the structural validity of the Victimization scales of the CTS2. However, the data support a four-factor structure of the CTS2, with Physical Assault and Injury combining to form a single scale.

Perpetration Factor Structure Three items from the Perpetration scale were not entered into the factor analysis due to zero variance—that is, all 100 subjects reported never experiencing that particular behavior. The items not entered

into the factor analysis were #19 (“I used force (like hitting, holding down, or using a weapon) to make my partner have oral or anal sex”), #21 (“I used a knife or gun on my partner”), and #24 (“My partner passed out from being hit on the head by me in a fight”).

The analysis of Perpetration items retained nine factors. The nine retained factors all had eigenvalues above 1, accounted for 65.06% of the total variance, and were confirmed by the Cattell scree test. Item loadings onto the nine factors are listed in Table 4. Items are listed as loading on a factor if the factor loading is .40 or above.

Unlike the Victimization items, in which the majority of items loaded onto their intended factor, the Perpetration items of the CTS2 did not load as neatly. While all the Negotiation items loaded onto Factor 1, items querying Physical Assault, Psychological Aggression, Injury, and Sexual Coercion loaded randomly onto multiple factors. Some individual items loaded highly on more than one factor; some items did not load highly onto any factor.

The current data do not provide support for the intended factor structure of the Perpetration items of the CTS2. However, this is not necessarily a reflection of the measurement properties of the CTS2. Rather, the unconfirmed factor structure of the CTS2 is likely due to a number of influences, including the limited variance of participant responses, which will be outlined in the Discussion and Limitations sections.

Table 3 Exploratory factor analysis, quartimax rotation – factor loadings for CTS2 victimization subscales

Factor	Items loading above 0.4	Intended CTS2 Scale
1	8, 10, 18, 22, 28, 34, 38, 44, 46, 54, 62, 74 11, 23, 31, 41, 55, 71 26, 30, 68 58	Physical Assault Injury Psychological Aggression Sexual Coercion
2	2, 4, 14, 40, 60, 78	Negotiation
3	20, 48, 52, 58, 76	Sexual Coercion
4	6, 36, 50	Psychological Aggression
5	16, 52, 64 68	Sexual Coercion Psychological Aggression

Table 4 Exploratory factor analysis, quartimax rotation—factor loadings for CTS2 perpetration subscales

Factor	Items loading above 0.4	Intended CTS2 scale
1	1, 3, 13, 39, 59, 77	Negotiation
	5, 35	Psychological Aggression
2	17, 27, 45, 53	Physical Assault
	5, 35, 49	Psychological Aggression
	12	Injury
3	9, 33, 37	Physical Assault
	12	Injury
	75	Sexual Coercion
4	57, 75	Sexual Coercion
	56	Injury
5	43, 61, 73	Physical Assault
	12, 72	Injury
6	7, 27, 61	Physical Assault
	69	Psychological Aggression
7	32, 42	Injury
	65	Psychological Aggression
8	51, 63	Sexual Coercion
9	67	Psychological Aggression
	15	Sexual Coercion

Discussion

This study investigated the utility of the CTS2 with Deaf female undergraduate students. Using a sample of 100 respondents, data were analyzed including the scales’ reliability and validity.

Reliability

Overall, the five scales of the CTS2 demonstrated good internal consistency within this sample of Deaf female undergraduates, with 7 of the 10 subscales exhibiting Cronbach’s alpha values above .70. The Negotiation, Psychological Aggression, and Physical Assault scales proved reliable when measuring both Perpetration and Victimization. Additionally, the Injury Victimization subscale showed evidence of reliability. Therefore, these seven subscales are reliable indicators of the number of conflict behaviors that the current sample experienced within the past year.

While the majority of scales showed evidence of reliability within this sample, three scales did not: Injury Perpetration, Sexual Coercion Perpetration, and Sexual Coercion Victimization. The low level of internal consistency in the subscales is likely due to the minimal variance in participant responses for many of the items on these scales. Indeed, for items measuring Injury Perpetration and Sexual Coercion Perpetration, very few participants

reported perpetrating these behaviors. Moreover, on a few items from these scales, no participants reported ever perpetrating the queried behavior. It is likely that this lack of response variance accounts for low levels of internal consistency for the Injury Perpetration and Sexual Coercion Perpetration subscales, indicating a need for a sample with more diverse experiences for future research.

However, for the Sexual Coercion Victimization subscale, variance in participant responses did not seem to be an issue, with over half the sample reporting its occurrence at least once in the past year. Rather, one particular item seems to be responsible for low internal consistency of the subscale—the item querying coercion of condomless sex. In both the Sexual Coercion Victimization and Perpetration subscales, responses to this item inflate the mean of the Sexual Coercion scale. Relative to other Sexual Coercion items, many participants report perpetrating and experiencing this behavior. Therefore, the discrepancy between making one’s partner (or being made to) have sex without a condom and the remainder of the items on the Sexual Coercion subscales seems to be causing low internal consistency.

It is not completely clear why the coercion of condomless sex is reported so much more frequently than other sexually coercive behaviors. One possibility is that coercion into having sex without a condom actually is a more frequent occurrence. Another possibility is that the way the question is worded may not fully express the coercive nature of the behavior. In other words, using the phrase “made my partner have sex without a condom” may not accurately reflect the concept of sexual coercion. Additionally, participants may have skimmed over the word “made” without recognizing its coercive connotation. Rather, if the item used the phrase “forced my partner to have sex without a condom,” the coercive intent may have been understood more clearly. It is possible that this item is picking up responses from participants who had sex without a condom, rather than being coerced or coercing others to do so. However, regardless of the presence of coercion, the frequency of Deaf female undergraduates engaging in sex without a condom is, in its own right, cause for concern.

Although three CTS2 subscales evidenced low or moderate levels of internal consistency, the majority of scales reliably measure conflict behaviors within this sample of Deaf female undergraduates. However, to ensure the consistency of all the subscales, further research should be conducted with a sample of Deaf women who have experienced and perpetrated a wider range of conflict behaviors.

Validity

The exploratory factor analyses provide moderate support for the structural validity of the CTS2. When measuring

Victimization, the majority of items load most highly on their intended scale. However, items measuring Physical Assault and Injury load on one individual scale, indicating a lack of discriminant validity between the two scales. While a four-factor structure is not the intended structure of the CTS2, the union of Physical Assault and Injury makes sense—injury is the result of physical assault. When the original CTS was developed, Injury and Physical Assault were created as separate scales because it was believed that these concepts are loosely linked—a minor assault may result in a severe injury, while a severe assault may result in no injury at all (Straus 1990). However, it is important to note that when an injury does occur, it is the result of a physical assault. Therefore, while it theoretically makes sense for Physical Assault and Injury to remain separate scales, the items from each scale converge during factor analysis because they are measuring an assaultive behavior and the consequence of that behavior.

While the majority of Victimization items conformed to the intended factor structure of the CTS2, the Perpetration items did not. With the exception of the Negotiation items, in which all items loaded on the intended scale, items measuring the Perpetration of Physical Assault, Psychological Aggression, Injury, and Sexual Coercion did not separate out into their intended scales. It is likely that the failure to replicate the intended factor structure is again due to lack of variance in the data. Three items were not permitted to enter into the factor analysis because all 100 participants reported that they had never perpetrated the three queried behaviors. Moreover, relatively few participants perpetrated any conflict behaviors when compared to the number of behaviors that participants experienced. However, the participants did “perpetrate” a large range of Negotiation behaviors—the reason that the Negotiation items converged so neatly. Additionally, in studies of factor structure with hearing samples that include male participants (and therefore more variance on Perpetration items), the Perpetration scales tend to load appropriately. Therefore, it seems that the lack of accurate convergence of the Perpetration subscales is due to a lack of variance in participant responses, again indicating the need to investigate the psychometric properties of the CTS2 in a sample including males as well as females with more conflict experiences in order to validate the hypothesized factor structure within the Deaf community.

Although three subscales of the CTS2 did not evidence reliability and the factor structure was not validated for Perpetration items, descriptive statistics from the Victimization of Negotiation, Psychological Aggression, Physical Assault, and Injury can still be reliably interpreted. Descriptive statistics and prevalence rates from the current study are reported in Anderson and Leigh (in press).

Limitations and Future Research

The current study is limited by the small number of participants, the result of a small undergraduate cohort from which to recruit (approximately 600 female undergraduates in Fall 2008). Indeed, a 100 participant sample is quite small when computing a factor analysis. Tabachnick and Fidell (1996) suggest that a data set include at least 300 cases for a factor analysis to return reliable factors. A sample size of 100 is considered to return factors with poor reliability. Therefore, in order to conduct more reliable factor analyses of the CTS2, future research should aim to collect data from 300 Deaf women from around the country.

An additional limitation of the current study is the lack of variance in participant responses, which is likely due to the young age and educational background of the participants. It is important to note that the current sample is comprised of educated women under the age of 25. Therefore, the reported experiences of the current sample are not necessarily representative of the experiences of the Deaf community in the United States or Deaf communities in other countries. Future research should recruit Deaf women of various ages who utilize domestic violence resources in order to obtain a larger range of intimate partner violence experience in participant responses. This increased variance will likely improve the internal consistency and structural validity of the CTS2, supporting the reliability and validity of its use with Deaf women. By validating all of the scales of the CTS2, more complete data on the prevalence of Negotiation, Psychological Aggression, Physical Assault, Injury, and Sexual Coercion can provide an even fuller picture of the experiences and needs of Deaf female survivors of intimate partner violence.

References

- ADWAS: Abused Deaf Women's Advocacy Services. (1997). *Justice for all: A domestic violence handbook for Deaf people*. Seattle: Abused Deaf Women's Advocacy Services.
- Aldarondo, E., & Straus, M. A. (1994). Screening for physical violence in couple therapy: methodological, practical, and ethical considerations. *Family Process*, 33, 425–439.
- Anderson, M. L., & Leigh, I. W. (in press). Intimate partner violence against deaf female college students. *Violence Against Women*.
- Child, D. (1990). *The essentials of factor analysis* (2nd ed.). London: Cassel Educational Limited.
- Gallaudet Research Institute. (2003). *Literacy and deaf students*. Retrieved December 16, 2007, from <http://gri.gallaudet.edu/Literacy/#reading>.
- Garson, G. D. (2008). *Factor analysis. Statnotes: Topics in multivariate analysis*. Retrieved January 11, 2009 from <http://www2.chass.ncsu.edu/garson/pa765/statnote.htm>
- Glickman, N. S. (1996). What is culturally affirmative psychotherapy? In N. S. Glickman & M. A. Harvey (Eds.), *Culturally affirmative psychotherapy with deaf persons* (pp. 11–37). Mahwah: Erlbaum.

- Leigh, I. W., & Anthony-Tolbert, S. (2001). Reliability of the BDI-II with deaf persons. *Rehabilitation Psychology, 46*(2), 195–202.
- Leigh, I. W., Corbett, C. A., Gutman, V. A., & Morere, D. A. (1996). Providing psychological services to deaf individuals: a response to new perceptions of diversity. *Professional Psychology: Research and Practice, 27*(4), 364–371.
- McCloskey, K., & Grigsby, N. (2005). The ubiquitous clinical problem of adult intimate partner violence: the need for routine assessment. *Professional Psychology: Research and Practice, 36*(3), 264–275.
- Mitchell, R., Young, T., Bachleda, B., & Karchmer, M. (2006). How many people use ASL in the United States? Why estimates need updating. *Sign Language Studies, 6*, 306–335.
- Moore, D. (2001). *Educating the deaf: Psychology, principles, and practices* (5th ed.). Boston: Houghton Mifflin.
- Newton, R. R., Connelly, C. D., & Landsverk, J. A. (2001). An examination of measurement characteristics and factorial validity of the Revised Conflict Tactics Scale. *Educational and Psychological Measurement, 61*(2), 317–335.
- O’Leary, K. D., & Murphy, C. (1992). Clinical issues in the assessment of spouse abuse. In R. T. Ammerman & M. Hersen (Eds.), *Assessment of family violence: A clinical and legal sourcebook* (pp. 26–46). New York: Wiley.
- O’Leary, K. D., Vivian, D., & Malone, J. (1992). Assessment of physical aggression against women in marriage: the need for multimodal assessment. *Behavioral Assessment, 14*, 5–14.
- Samuelson, S. L., & Campbell, C. D. (2005). Screening for domestic violence: recommendations based on a practice survey. *Professional Psychology: Research and Practice, 36*(3), 276–282.
- Segars, A. H., & Grover, V. (1993). Re-examining perceived ease of use and usefulness: a confirmatory factor analysis. *MIS Quarterly, 1993*, 517–526. December.
- Smithey, M., & Straus, M. A. (2004). Primary prevention of intimate partner violence. In H. Kury & J. Obergfell-Fuchs (Eds.), *Crime prevention—New approaches* (pp. 239–276). Mainz/Germany: Weisser Ring Gemeinnützige Verlagsgmbh.
- Straus, M. A. (1990). Injury and frequency of assault and the “Representative sample fallacy” in measuring wife beating and child abuse. In M. A. Straus & R. J. Gelles (Eds.), *Physical violence in American families* (pp. 75–91). Edison: Transaction Publishers.
- Straus, M. A. (1991). Conceptualization and measurement of battering: Implications for public policy. In M. Steinman (Ed.), *Woman battering: Policy responses* (pp. 19–47). Cincinnati: Anderson Publishing Co.
- Straus, M. A. (2001). Prevalence of violence against dating partners by male and female university students worldwide. *Violence Against Women, 10*(7), 790–811.
- Straus, M. A. (2004). Cross-cultural reliability and validity of the Revised Conflict Tactics Scales: a study of university student dating couples in 17 nations. *Cross-Cultural Research, 38*(4), 407–432.
- Straus, M. A. (2007). Conflict tactics scales. In N. A. Jackson (Ed.), *Encyclopedia of domestic violence* (pp. 190–197). New York: Taylor & Francis Group.
- Straus, M. A., Hamby, S. L., Boney-McCoy, S., & Sugarman, D. B. (1996). The Revised Conflict Tactics Scales (CTS2): Development and preliminary psychometric data. *Journal of Family Issues, 17*(3), 283–316.
- Straus, M. A., Hamby, S. L., & Warren, W. L. (2003). *The conflict tactics scales handbook*. Los Angeles: Western Psychological Services.
- Tabachnick, B. G., & Fidell, L. S. (1996). *Using multivariate statistics* (3rd ed.). New York: HarperCollins.

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