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The effect of item order on partner violence reporting: An examination of four versions of the revised Conflict Tactics Scales

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Abstract

In the early 1970's scholars reported some of the first estimates of intimate partner violence using an instrument known as the Conflict Tactics Scales (CTS) (Straus, M.A., Gelles, R.J., 1979. Measuring intrafamily conflict and violence: the Conflict Tactics Scales. Journal of Marriage and the Family 41, 75–88). Since that time, the CTS and the CTS2 have become one of the most widely used measures of interpersonal violence. Despite its long history, this instrument is not without criticism. At the same time, only a few other instruments have been developed to measure intimate partner violence and consequently, the body of research representing knowledge about this topic remains primarily based on the Conflict Tactics Scales. This widespread use has occurred with only limited methodological assessment of the structure of the scale beyond initial psychometric analyses during its development. The present study evaluated the extent to which item order and format affect victimization and perpetration reporting rates as well as reliability of the CTS subscales.

Keywords: Conflict tactics scale; Partner violence; Measurement; Item order

1. Introduction

The Conflict Tactics Scale (CTS) (Straus and Gelles, 1979) is perhaps the most widely used and accepted instrument to assess assaults by intimate partners. Moreover, it is one of only a handful of standardized instruments used to measure intimate partner violence

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(e.g., Hegarty et al., 1999; Marshall, 1992; Hudson and McIntosh, 1981). It is also the subject of a great deal of controversy, largely because it has often been used for a purpose for which it was not designed nor suited, to determine whether men and women are equally likely to be perpetrators (Straus, 1999; Dobash et al., 1992). Much of this debate centers around the results from national surveys using the Conflict Tactics Scales as the measure of violence (Straus, 1990; Straus et al., 1996). The findings from these large scale surveys, that women are as violent as men, directly contradicted what was being observed in domestic violence shelters and social service agencies. Moreover, studies that have promoted the gender equivalence argument rarely obtain additional evidence beyond the CTS such as motivations for violent acts and/or psychological effects. Those which do include this additional evidence or who examine different levels of violence do not find support for the gender equivalence argument (e.g., Johnson, 1995). Therein lies the controversy.

Despite the proliferation of research discussing this controversy, however, the fact remains that most researchers use the CTS (or slight modifications of it) as the primary measure of intimate partner violence (Shwartz, 2000). As a result, comparisons across different studies are possible and increasing amounts of psychometric research on the instrument are available (Straus, 2004; Schafer, 1996). Much of the methodological literature concerning the CTS, however, has focused on the factor structure of the subscales (e.g., Newton et al., 2001) and on gender differences in reporting (e.g., Mouradian, 2003). Only recently have attempts been made to go beyond this type of methodological analysis and examine the impact of item order on rates of intimate partner violence (Ramirez and Straus, 2006; Mouradian, 2003). Understanding this issue will aid researchers in their attempts to gain a true estimate of the problem of intimate partner violence. Consequently, more comprehensive methodological assessments are necessary. The current study expands the scope of existing research on the methodological properties of the CTS by considering the influence of item order on reports of intimate partner violence.

1.1. The Conflict Tactics Scales

The original CTS (Straus and Gelles, 1979) was introduced in the 1970s as a measure of the extent to which partners in intimate relationships engaged in psychological and physical attacks on one another as well as their use of reasoning or negotiation to deal with conflict. It does not purport to measure the reasons behind such behaviors or who instigated the conflict or behaviors, etc. Using the theoretical framework provided by Conflict Theory (Coser, 1956), this instrument included assessments for three modes of dealing with conflict; reasoning, verbal aggression, and physical aggression. Psychometric analyses of the CTS indicated high reliability for the verbal aggression and violence scales and low reliability for the reasoning scale (Straus, 1990). Moreover, factor analyses revealed three factors corresponding to the three subscales proposed to underlie the instrument (Straus, 1990).

In 1996, Straus and colleagues published a revision of the CTS, referred to as the CTS2. Addressing many of the concerns about the original CTS, the CTS2 added items pertaining to sexual coercion and injury, as well as additional items pertaining to the other forms of conflict resolution originally measured in the CTS. By expanding the number of items, the authors argued that it would likely increase the chances that the scale would be both reliable and valid (Straus et al., 1996). Preliminary psychometric data on the CTS2 indicated that all scales had good reliability, good construct validity,

and evidence of adequate discriminant validity (Straus et al., 1996). It should be noted, however, that the authors' published preliminary psychometric analysis did not include an analysis of factor structure.

More recently, however, the factor structure of the CTS2 was examined with a sample of high risk post-partum women (Newton et al., 2001). Newton and associates (2001) found high reliability scores for the negotiation, and psychological aggression subscales, but low scores for the physical assault scale. Confirmatory factor analyses indicated that a five factor solution (Negotiation, Minor Psychological Aggression, Severe Psychological Aggression, Minor Physical Assault, and Severe Physical Assault) provided a better fit than a three factor solution (Negotiation, Psychological Aggression, and Physical Assault). This study is limited, however, as it only examined aggression by females against their male partners. Similar results were found in a study using a sample of 359 incarcerated women (Lucente et al., 2001). In addition to only using samples of women, these two studies used specialized populations, thus decreasing the generalizability of their results.

1.2. Differences between the CTS and the CTS2

The original CTS were comprised of a list of 18 actions presented to the respondent as possible methods for dealing with conflict with their partner. The first few items were considered more socially acceptable modes of conflict resolution and were designed to give respondents the opportunity to present the positive behaviors in their relationship first. Initial completion estimates from the 1975 National Family Violence Survey suggested that this design was an effective one.

The revised CTS (CTS2) (Straus et al., 1996) expanded the original measure by adding more items to the three original scales and added two more scales (sexual coercion and physical injury from assaults). This brought the total item count up to 39 items from the original 18. Some of the ambiguous items were clarified by adding more contextual information and in addition to specific item changes, format changes were made as well. In the new format, respondents were asked first to indicate the extent to which they had engaged in each item, then the extent to which their partner had engaged in the same item. Thus, items were presented as pairs. The order of the items was also changed. The original hierarchical order of social acceptability was replaced in the revision and the items were presented in an interspersed order. This was then modified by placing two negotiation items at the beginning of the scale and two severe violence items at the end. Straus and associates (1996) argued that the negotiation items were needed at the beginning (rather than a true random order) so as establish some rapport before presenting the more severe violence items.

In their more than 30 year history, the Conflict Tactics Scales have been heavily criticized, primarily on the issue of context (see, for example, Dobash et al., 1992). While an important and interesting topic, the purpose of the CTS is to provide simple estimates of violence, regardless of etiology or context (Straus, 1990; Straus et al., 1996). This paper does not address this criticism. What have not been addressed in evaluations of the CTS, until recently (see Mouradian, 2003; Ramierz and Straus, 2006; Hamby et al., 2005), are the methodological issues of the instrument itself. Given the reliance on the instrument as the principal assessment of the extent of intimate partner violence, attention to the structure of the items that comprise it is warranted.

1.3. The importance of item order

Much of the literature discussing the influence of item order in survey research is concerned with the position of particular questions in the survey instrument rather than the order of individual items in a scale. Many of the issues that affect question order on a survey instrument, however, can be applied to items within a specific scale. Bradburn (1983) argues that although there is little definitive evidence of a specific type of question order effect, it is important to understand how the order may affect results from a survey.

The original design of the CTS included items presented in a hierarchical order beginning with the most socially acceptable actions first. It was argued that respondents would be more likely to answer the more serious items if they were first presented with the opportunity to show their use of non-violent tactics (Straus, 1990). Babbie (1998) suggests that this strategy may be particularly important for self-administered surveys because the questions are less threatening. Moreover, with respect to victimization research the development of rapport with a respondent may be particularly important (Shwartz, 2000). The items included in the CTS2, however, are presented in an interspersed rather than in a hierarchical order. This change was made to reduce the possibility of response sets and to make the purpose of various subscales less obvious to respondents (Straus et al., 1996; Dahlstrom et al., 1990). Disagreement over the likely effect of question order on self-administered survey disclosure rates indicates the need for systematic examination of the issue particularly as it relates to measures of intimate partner violence.

For example, the order of presentation may convey to the respondent the relevance of a particular item or set of items. Bradburn calls this the saliency effect. Evans and Scott (1984) found this type of effect when looking at perception of seriousness of criminal behavior. Specifically, they found that when a particular offense followed a series of serious offenses, it was perceived as more serious. When it followed a series of offenses that were not seen as serious, it was perceived as less serious. This suggests that items measuring intimate partner violence presented in a hierarchical order could result in artificially deflated prevalence rates as the later items are presumed to be more serious and less socially desirable. Recent work using the CTS2, however, found no relationship between social desirability and self-reports of aggression for a sample of male inmates (Cook, 2002).

A second type of effect concerns how items are grouped together into meaningful sections. In the original CTS, the items that comprised each subscale were grouped together so that respondents were answering a series of questions on minor violence then a series of questions on severe violence. This item order increases the possibility for a consistency effect to occur when respondents answer one way early in the series of questions and do not want their responses to appear inconsistent at a later point in the survey. In the CTS2, this contextual grouping was eliminated. One possible consequence of item dispersion, however is that respondents may feel as if they are repeating themselves (a redundancy effect).

A third issue, which may be particularly relevant to the CTS2 concerns the length of the measure. The CTS2 is comprised of 39 pairs of items. This means there are 78 individual items in the measure and by the last item respondents may be fatigued. In addition, the CTS2 is typically administered in conjunction with other self-report instruments and is often not placed immediately at the beginning of a survey instrument. Respondents may suffer from fatigue if the items appear late in the survey or if the series of items in one section is especially long. At the same time, particularly sensitive questions, such as those in the CTS2 may not be appropriate at the beginning of the survey. To increase the rapport,

these items may work better in the middle of the survey instrument. Although the logic used in developing the original CTS item order, that respondents would be more likely to answer questions regarding more serious violence if they were first presented with questions on negotiating conflict, is sound, it has also been argued that randomizing items may be important (Dahlstrom et al., 1990). By presenting items in a random order the amount of intentional faking may be reduced. Moreover, if the items comprising the subscales are presented in a random order, the possibility of order effects between the scales may be reduced and respondent fatigue is spread equally across the scales (Smith, 1983).

1.4. Prior tests of the CTS item order

In one of the first attempts to examine if question order had any effect on disclosure rates of partner violence, Ramirez and Straus (2006) compared disclosure rates obtained using surveys with two different versions of the revised CTS. One version used the same item order as the original CTS, that is, the items were presented in what is assumed to be a culturally acceptable sequence beginning with the most socially desirable tactics and ending with the least desirable. The second version used the modified random order of the revised CTS results from their study suggested that the modified random order produced a higher rate of disclosure for physical assault, injury, and sexual coercion, but not for negotiation and psychological aggression. It should be noted that although item order was different on each survey, item pairs were kept intact. Additionally, the modified random order still kept two questions from the Negotiation scale at the beginning of the instrument, and the observed differences were significant only for the past year prevalence rate scoring method.

More recently, Mouradian (2003) looked at the effect of within pair question order on disclosure rates for different abuse types. In her study, a random half of the sample of 534 college students received the original version of the revised CTS, in which respondents are asked to indicate if they engaged in a particular conflict tactic then to report on their partner's behavior. The other half of the sample received a version in which the item-pairs were reversed (partner's behaviors were asked about first, then respondent's behaviors). Based on the results obtained by Ramirez and Straus (2006) item pairs were presented in a random order. The results indicated no significant difference in disclosure rates of physical or sexual aggression by within pair question order. Furthermore, these results remained when disclosure rates were examined separately for men and women.

Together, the results from these two studies suggest higher disclosure rates may be obtained with a modified random order, but that the within pair order has no effect. At the same time, it is important to note some of the limitations of each of the study designs. Both studies, for example, used relatively small samples and were only able to focus on one major issue involving question and item order. In addition, both used a modified rather than a true random order when investigating the effect of random versus culturally sequenced items. The present study addresses these limitations by using a larger sample and an experimental design with four different versions of the revised CTS.

2. Methodology

To examine questions regarding the effect of item order on reports of intimate partner violence perpetration and victimization, we developed four different questionnaire versions. These versions were identical to one another with the exception of the CTS question

ordering. All versions began with basic demographic information, including questions about respondent's and partner's gender, age, race or ethnicity, parent's education, respondent's educational level, family income, parent's marital status, respondent's partnership status, cohabitation, length of relationship, and whether or not sex is part of the relationship. These questions were followed by questions about video game usage, family commitment, social desirability, the Bem Sex-Role Inventory, and alcohol and controlled substance usage, one of four versions of the CTS, questions about witnessing of violence between parents or guardians, questions about victimization and help-seeking behaviors, attitudes toward domestic violence, and two items about pets.

2.1. The revised Conflict Tactics Scales (CTS2)

The CTS2 is a multi-scale instrument containing 39 pairs of items measuring the use of conflict tactics by a respondent and his or her partner. The instrument consists of items measuring negotiation, psychological aggression, physical aggression, sexual coercion and assault, and injury. Respondents indicate whether each item occurred in the previous 12 months and how often it occurred on a scale ranging from 0 (zero times) to 6 (20 or more times). The responses can be used to calculate a dichotomous incidence score representing whether or not the respondent has experienced the tactic at least once during the preceding year. The actual numerical score can be used to measure chronicity over the past year and would indicate the frequency with which victimization occurred over the last year. Similarly, researchers can calculate scores indicating whether the particular item has ever occurred during the relationship, referred to as prevalence. Readers interested in the coding of the CTS2 are referred to the Straus et al. (1996) summary of the scale and the coding scheme used. Because the chronicity scores are generally highly skewed, this study relies on the incidence and prevalence scores. Respondents report on their own conflict resolution tactics as well those of their partner.

The four CTS versions included the original CTS2 format and ordering (Version 1), a version that is identical to the original CTS2 except that the order of the pairing is reversed such that the respondent was asked about the partner's behavior and then about his/her own behavior (Version 2), a completely randomized version of the CTS2 with no pairings and no negotiation items at the beginning (Version 3), and finally an unpaired randomized version that included 2 negotiation items at the beginning of the CTS section (Version 4). While previous examinations of question order on disclosure using the CTS have relied upon only 2 versions, we elected to use multiple versions based upon Converse and Presser (1986) (in Shwartz, 2000) who argue that context may influence responses later in a questionnaire. They further suggest that split sample comparisons may be one way to examine if question order is an issue and that multiple versions of instruments are needed to be more certain of results.

2.2. Procedure

We counterbalanced the testing of the four versions of the survey together by placing five copies of each version in a stack of 20 questionnaires. These questionnaires were then distributed to 1982 students enrolled in Sociology and Anthropology courses at a southeastern university during the fall of 2001. The authors served as administrators of the questionnaires and explained the purpose of the project to the students prior to distributing the questionnaires. Students were told that the survey included questions on dating relationships and how they may have dealt with conflict in their relationships. Students were informed of their rights as

human subjects. They were told to read and remove the document attached to the front of the questionnaire that informed them of their rights and who to call if they had questions about the project. Participants were given a list of services that could assist them if they felt they needed assistance with any emotional distress that might have emerged as a result of the questionnaire administration. These procedures were approved by the university's Human Subjects Review Board. Students voluntarily participated in the data collection. All students completed the questionnaire during their regularly scheduled class in less than 75 min.

To be consistent with Straus and associates (1996) for the final analysis, only the responses from those respondents who reported that they were currently in a relationship of at least one-month duration or who recently ended a relationship of at least one-month duration were retained. The final sample size was 1360. These were fairly evenly distributed among the four versions. A total of 332 respondents meeting these criteria completed the original version (V1); 302 completed the version that switched the order of the pairings (V2); 361 completed the completely random, unpaired version (V3) and 360 completed the version that was unpaired and random except that negotiation items introduced the section (V4).

3. Analysis

We began by first calculating frequency distributions for the socio-demographic variables for the sample by version and identifying any statistically significant differences. We also calculated past year and life of relationship prevalence for each of the CTS2 subscales by version. Alpha reliability scores were calculated within each subsample (version) for each CTS2 subscale. We compared the alpha reliabilities of the subscales across the four versions of the CTS2 to address the question of whether there is a psychometrically 'best' format. This was followed by initial examination of the statistically significant differences between the various versions. Finally, we used logistic regression to extend our examination of the version differences. To identify any between version differences, we ran separate logistic regression analyses using prevalence scores from the CTS2 subscales as outcome measures, CTS2 version as the predictor variable, and cohabitation as a covariate.

4. Results

Frequency distributions were calculated to examine sample characteristics. The sample was not surprisingly young, the mean age was 19 years and 63% indicated that they were first-year students. Most of the respondents (63%) were female. With a median family income of $60,000–$69,999 per year, the sample could be described as predominantly middle-class. The sample, while overwhelmingly white, non-Hispanic (71%), was somewhat ethnically diverse. Nine percent of the respondents self-identified as African American and 12% as Hispanic. The median relationship length of the sample was about one year, 74% reported that the relationship was a sexually intimate one, and 13% of the sample reported that they were living with their partner. Nine percent of the respondents reported that they were engaged or married to their partner Table 1.

4.1. Conflict tactics

The results of initial analysis of the CTS2 items were consistent with the results of other college student-based studies using the CTS (e.g., Straus, 2001). Table 2 provides detailed

Table 1
Sample characteristics

Characteristic	Percent/Mean/Median				
	Version 1 $N = 332$	Version 2 $N = 307$	Version 3 $N = 361$	Version 4 $N = 360$	Total $N = 1360$
%Female	65	64	59	64	63
Year at University[a]					
First-year	56	63	66	67	63
Sophomore	16	13	13	14	14
Junior	13	13	10	10	12
Senior	14	11	11	7	11
Mean age[a]	20	19	19	19	19
Ethnicity/Race					
White, Non-Hispanic	72	72	74	67	71
Hispanic	10	12	11	13	12
African American/ Black	8	9	8	11	9
Other	11	8	7	8	8
Fathers median education	Assoc. Degree	Assoc. Degree	Assoc. Degree	Assoc. Degree	Assoc. Degree
Mothers median education	Assoc. Degree	Assoc. Degree	Assoc. Degree	Assoc. Degree	Assoc. Degree
Median yearly family income	$60,000–$69,000	$60,000–$69,000	$60,000–$69,000	$60,000–$69,000	$60,000–$69,000
% Cohabiting[a]	17	11	14	10	13
% Engaged or married	10	9	10	7	9
Median relationship length	About 1 year	About 1 year	About 1 year	6–11 months	About 1 year
% Relationship is sexually active	75	78	70	74	74
% Respondents who are homosexual	3	4	2	3	3
Mean score on social desirability	33	33	33	33	33

Note: Respondents who completed Version 1 were older, had completed more of their collegiate education and were more likely to live with their partner than respondents who completed Version 4. The mean age for Versions 1 and 4 were 19.75 and 18.98 years, respectively. There was one-quarter of 1 year difference in the amount of time spent toward their collegiate degree between respondents who completed Version 1 and Version 4.

[a] Statistically significant differences between versions.

information about the prevalence and incidence of the use of the different types of conflict tactics used by the respondents by version. Not surprisingly, the vast majority of respondents reported that both they and their partner had used emotional and cognitive tactics regardless of the version completed. More than half of the respondents reported that both they and their partner had used minor psychological aggression tactics in the last year and about 20% reported using severe psychological aggression tactics. There was some variation depending upon the version completed. For instance, while those completing the original version of the CTS2 (V1) reported the highest rates of minor psychological aggression, those completing the random version with the introductory negotiation items (V4) reported the highest rates of severe psychological aggression.

Table 2
Percentage of respondents affirming that tactic had occurred

Subscale	Incidence					Prevalence				
	V1	V2	V3	V4	Total	V1	V2	V3	V4	Total
Negotiation subscale										
Emotional respondent	97	92	97	94	95	99	95	100	96	97
Emotional partner	97	90	97	97	96	99	93	100	99	98
Cognitive respondent	97	84	95	87	91	99	87	98	90	93
Cognitive partner	97	82	96	96	93	99	84	98	98	95
Psychological aggression subscale										
Minor respondent	79	66	77	63	71	81	68	76	66	73
Minor partner	78	69	74	68	72	79	71	77	71	74
Severe respondent	20	19	16	27	20	21	19	16	27	21
Severe partner	18	21	18	29	21	19	25	19	31	24
Physical aggression subscale										
Minor respondent	29	29	27	31	28	31	32	29	32	31
Minor partner	27	26	29	29	27	28	29	29	31	29
Severe respondent	13	9	10	15	12	13	10	10	16	13
Severe partner	12	15	11	15	13	13	17	14	16	15
Sexual coercion subscale										
Minor respondent	25	17	24	20	21	27	17	25	21	23
Minor partner	29	24	29	21	26	31	25	31	23	28
Severe respondent	4	3	4	7	4	4	4	5	7	5
Severe partner	4	4	6	8	5	5	5	6	8	6
Injury subscale										
Minor respondent	9	8	13	10	10	10	10	14	12	12
Minor partner	8	5	12	8	8	9	6	13	9	9
Severe respondent	5	2	4	5	4	5	3	5	5	5
Severe partner	5	2	3	5	4	5	2	4	5	4

Note: Version 1 is the original CTS2 format. Total refers to the pooled data across all versions.

Similar to past research, slightly more than one-quarter of the respondents reported that they and their partner had engaged in some type of physical aggression in the past year. The rates were slightly higher for the life of the relationship. In almost all instances, the highest rates were reported by those respondents who completed the random version with the introductory negotiation items (V4). In no instance was the rate the highest for those respondents who completed the original CTS2 (V1).

About one-fifth of the respondents reported that they had engaged in some form of minor sexual coercion and that more than one-quarter of their partners had done so in the previous year. Four percent reported engaging in severe sexual coercion and 5% reported being the victim of severe sexual coercion in the previous year committed by their partner. Meanwhile, 10% of the respondents reported a minor injury, 8% reported that their partner had received a minor injury, and 4% reported that they had a severe injury and that their partner had been severely injured in the previous year.

Those respondents completing the original CTS2 version (V1) reported the highest rates of minor sexual coercion, but those completing the random version with the introductory negotiation items (V4) reported the highest rates of severe sexual coercion. However, when examining the injury subscales, the results were not as consistent. Those respondents

completing the version that was constructed like the original CTS2 but just switched the order of the pairs (V2) reported the highest minor injury rates for both respondent and the partner. Meanwhile, the injury rates reported by respondents completing the original CTS2 (V1) and the random order with the introductory negotiation items version (V4) reported exactly the same incidence and prevalence rates of severe respondent and partner injury rates and those rates happened to be the highest.

4.2. Reliability and validity of different survey versions

The dimensionality for each of the five subscales (negotiation, psychological, physical, sexual coercion, and injury) was analyzed using maximum likelihood factor analysis with a Varimax rotation procedure. In nearly all cases, for all versions, the factors that emerged were the same as those identified by Straus et al. (1996). Those inconsistencies that emerged are similar to those that have been identified in previous psychometric tests of the CTS2.[1]

Alpha reliability scores were also calculated and examined for each subscale by version (Table 3). Overall, the unpaired, random version with negotiation items at the beginning (V4) was most reliable and the original format version (V1) was the least reliable. Of the 60 alpha reliability scores calculated, the reliability of the unpaired, random version beginning with negotiation items (V4) was the highest 44 times (73%) and the original version (V1) had the highest reliability score only once and it tied with the switched order version (V2). Alpha reliabilities were highest with the completely random version (V3) approximately 13% of the time. Clearly, an analysis of the alpha reliability scores would suggest that the most reliable version tested is the random with introductory negotiation items version (V4). In contrast the original version of the CTS2 (V1) and the version that had the order of the pairs switched (V2) had the lowest reliabilities.

4.2.1. CTS2 version and demographic differences

In our initial evaluations of the socio-demographic characteristics of the respondents completing the four versions, we noted only three statistically significant differences between the versions. Respondents who completed the original CTS2 version were older, had completed more years of college, and were more likely to live with their partner. Although age and year in school were believed to be developmentally insignificant for the findings, the rate of cohabitation among this group was considered important as it has previously been identified as a risk factor for interpersonal violence. Consequently, we included cohabitation in the logistic regression models to examine the relative impact that this variable might have on version differences in reporting rates.

Using the prevalence and incidence scores as the dependent variables and version and cohabitation as the independent variables, a series of logistic regression models were examined. Cohabitation was found to have a statistically significant effect on some of the models. Details of the statistically significant results for cohabitation can be found in Table 4. Here, we discuss the results of version comparisons in light of the goals of the paper.

[1] More detailed information is available upon request from the authors.

Table 3
Alpha Reliabilities for incidence and prevalence subscales by version for CTS subscales compared to original CTS2 reliabilities reported by Straus

Subscale	Incidence				Prevalence				
	Orig CTS2	V2	V3	V4	Orig CTS2	V2	V3	V4	CTS2[a]
Negotiation subscale									
Emotional respondent	.62	.65	.63	.71	.42	.60	.42	.68	
Emotional partner	.64	.62	.64	.52	.39	.58	.48	.36	
Cognitive respondent	.61	.79	.67	.80	.55	.78	.57	.79	
Cognitive partner	.63	.77	.68	.60	.56	.78	.59	.69	
Negotiation respondent	.76	.84	.79	.87	.66	.82	.66	.85	.86
Negotiation partner	.77	.82	.80	.75	.67	.81	.69	.67	
Psychological aggression subscale									
Minor respondent	.69	.75	.68	.76	.70	.75	.69	.76	
Minor partner	.67	.71	.73	.75	.67	.73	.72	.75	
Severe respondent	.52	.54	.65	.57	.63	.56	.71	.60	
Severe partner	.50	.50	.72	.68	.57	.55	.76	.71	
Psychological aggression respondent	.69	.72	.70	.76	.70	.73	.72	.77	.79
Psychological aggression partner	.68	.71	.76	.78	.70	.73	.77	.79	
Physical aggression subscale									
Minor respondent	.71	.72	.73	.80	.74	.73	.74	.81	
Minor partner	.73	.76	.77	.79	.75	.76	.80	.81	
Severe respondent	.79	.85	.78	.84	.82	.85	.89	.85	
Severe partner	.71	.79	.75	.88	.75	.77	.84	.88	
Physical aggression respondent	.83	.82	.81	.86	.85	.83	.85	.87	.86
Physical aggression partner	.81	.84	.83	.89	.83	.84	.88	.89	
Sexual coercion subscale									
Minor respondent	.61	.59	.45	.68	.61	.59	.51	.71	
Minor partner	.51	.65	.49	.69	.57	.65	.54	.73	
Severe respondent	.83	.83	.74	.90	.89	.82	.85	.91	
Severe partner	.72	.82	.73	.86	.82	.81	.87	.86	
Sexual assault respondent	.67	.72	.61	.80	.70	.74	.71	.82	.87
Sexual assault partner	.58	.72	.63	.79	.69	.74	.75	.80	
Injury subscale									
Minor respondent	.51	.63	.56	.66	.62	.59	.59	.72	
Minor parner	.29	.47	.42	.74	.40	.45	.50	.72	
Severe respondent	.75	.89	.70	.95	.78	.87	.85	.95	
Severe partner	.81	.94	.80	.91	.86	.95	.90	.92	
Injury respondent	.75	.78	.70	.91	.77	.77	.81	.90	.95
Injury partner	.77	.86	.71	.89	.80	.87	.82	.90	

[a] Presented in Straus et al., 1996.

4.2.2. Comparing Versions 2 and 4 to the original CTS2 (Version 1)

There were no statistically significant version differences for the physical assault scales when they were examined by level (i.e., minor and severe separately). Version 2 (the switched order version) was less predictive than the original version (V1) all the negotiation scales and the random with introductory negotiation items (V4) was less predictive of respondent negotiation scores than the original version (V1). Similarly, Versions 2 and 4 were less predictive of minor psychological aggression scores for both respondent and partner than the original CTS2 (V1). However, the random with introductory negotiation

Table 4
Logistic regression predicting scores on CTS subscales with original CTS2 as reference category

Subscale	V2	V3	V4	Cohab	Model χ^2	Nagelkerke R^2
Negotiation						
Incidence						
R Emotional	.30***	.97	.39**		18.06***	.04
R Cognitive	.18***	.28	.23***		50.57***	.08
Resp Total	.26**	.94	.40 *		16.68	.04
P Emotional	.29***	.68	.85		25.58***	.06
P Cognitive	.15***	.74	.80		67.95***	.12
Total partner	.23***	.84	.75		21.04***	.05
Prevalence						
R Emotional	.15***	3.25	.19**		30.45***	.10
R Cognitive	.10***	.77	.13***		66.42***	.12
Total resp	.18**	3.25	.31		20.88***	.08
P Emotional	.15***	2.20	1.11		37.86***	.13
P Cognitive	.08***	.91	.69		92.86***	.19
Total partner	.14**	3.28	.82		30.41***	.12
Psychological aggression						
Incidence						
R Minor	.54***	.89	.47***	1.56*	36.11***	.04
R Severe	.91	.73	1.46*		15.48**	.02
Total respondent	.68*	.82	.69*	1.902**	17.18***	.02
P Minor	.66**	.84	.63**	1.86*	20.77***	.02
P Severe	.34	.95	1.85***		16.03**	.02
Total partner	.52***	.86	.51***	1.54*	30.58***	.03
Prevalence						
R Minor	.53***	.89	.49***	1.67**	34.66***	.04
R Severe	.89	.73	1.44*		16.48**	.02
Total respondent	.51***	.86	.53***	1.65*	30.09***	.0312
P Minor	.64**	.85	.66*	1.80**	18.09***	.02
P Severe	1.46*	1.04	1.97***		20.23***	.02
Total partner	.68*	.83	.71	1.93**	16.57**	.02
Physical aggression						
Incidence						
R Minor	1.00	.87	1.08		2.86	.00
R Severe	.68	.71	1.18	1.65*	11.86*	.02
Total respondent	.81	1.00	.79	1.28	5.93	.01
P Minor	.96	1.10	1.13		3.48	.00
P Severe	1.34	.94	1.29		4.53	.01
Total partner	.63**	.92	.89	1.69**	15.39**	.02
Prevalence						
R Minor	1.07	.89	1.09		5.42	.01
R Severe	.76	.78	1.29	1.77**	13.07**	.02
Total respondent	.60**	.90	.84	1.88***	21.59***	.02
P Minor	1.06	1.07	1.19		4.48	.00
P Severe	1.42	1.11	1.37		4.81	.01
Total partner	.76	1.00	.80		7.67	.01

Table 4 (*continued*)

Subscale	V2	V3	V4	Cohab	Model χ^2	Nagelkerke R^2
Sexual coercion						
Incidence						
R Minor	.62**	.94	.78	1.70**	16.04**	.02
R Severe	.80	1.07	1.79		5.63	.01
Total respondent	.98	1.04	1.21		3.25	.00
P Minor	.76	1.01	.66*		11.71*	.012
P Severe	1.06	1.40	1.94*		5.58	.011
Total partner	.958	.448	.519		4.17	.004
Prevalence						
R Minor	.58***	.91	.74	1.88***	23.58***	.03
R Severe	.91	1.13	1.75		4.55	.0103
Total respondent	1.10	.91	1.10	1.45*	6.51	.01
P Minor	.74	1.02	.67*		13.05**	.01
P Severe	.92	1.32	1.77		5.80	.01
Total partner	1.11	1.04	1.29		5.39	.00
Injury						
Incidence						
R Minor	.85	1.49	1.14		5.73	.01
R Severe	.40*	.81	.99		5.79	.01
Total respondent	.58	1.31	1.08		8.94	.01
P Minor	.63	1.52	1.06		10.05*	.02
P Severe	.38*	.62	.99		6.28	.02
Total partner	.74	1.26	1.03		5.18	.01
Prevalence						
R Minor	.92	1.46	1.16		5.93	.01
R Severe	.51	1.02	1.03		4.44	.01
Total respondent	.86	1.26	1.06		3.98	.00
P Minor	.58	1.45	.95		11.83*	.02
P Severe	.38*	.80	.99		5.49	.01
Total partner	.54*	1.25	.98		10.53*	.02

Reference category is Version 1 (Original CTS2); V2, Switched pair order; V3, Completely random; V4, Random with introductory negotiation items.

Cohabitation is coded 1 = cohabiting.

Note: The numbers in the table are Odds Ratios; a significant Model χ^2 indicates that the variables, taken together, provide a significant fit to the data.

* $P < .05$.

** $P < .01$.

items version (V4) was more likely to predict both respondent's and partner's severe psychological aggression than the original CTS2 (V1). The switched order version (V2) was less predictive of respondent minor sexual coercion than the original CTS2 (V1). Likewise, the random version with introductory negotiation items (V4) was less predictive of minor sexual coercion by the partner compared to the original CTS2 version (V1), but more predictive of the incidence of partner perpetrated severe forms of sexual coercion. Finally, the switched order (V2) was less predictive than the original CTS2 in predicting severe forms of respondent and partner perpetrated incidence of injury and respondent perpetrated prevalence of injury.

4.2.3. Comparisons between Versions 2–4

Because of the nature of our research questions, we also conducted logistic regression analyses using Version 2 and Version 4, respectively as reference categories (Tables 5 and 6). Table 5 shows that when the switched pair order version (V2) was the reference group, in most instances the other three versions were significantly better predictors of both respondent and partner negotiation. In addition, when statistically significant differences emerged they were nearly always in the direction favoring one of the other three versions of the CTS2. This certainly suggests that Version 2 may not be the best predictor of violence. It is worth noting, however, that in only two of the physical assault subscales were there significant version differences. The random with introductory negotiation items version (V4) was a better predictor of both the incidence and prevalence of respondent severe physical assault.

Table 6 shows the results of logistic regression analyses using the random with introductory negotiation items version (V4) as the reference category. It is clear that compared to Version 4, the original CTS2 (V1) and the completely random version (V3) were better predictors of respondent negotiation and that the switched pairs version (V2) was a worse predictor of partner negotiation. Interestingly, for the psychological aggression subscales, Version 4 was worse at predicting minor aggression and better at predicting severe aggression. Version 4 also was a better predictor of respondent severe physical aggression. Although there were few significant version differences for the sexual coercion and injury subscales, the switched pairs version (V2) was frequently less predictive than the random with introductory item version (V4). Additionally, the original CTS2 (V1) and the completely random version (V3) were better predictors of partner minor sexual coercion.

5. Discussion

Prior work on survey construction indicates that issues such as item order can be critical and should be taken into consideration when developing a survey instrument. At the same time, most of this work has focused on the placement of particular sets of questions within a survey rather than items within a scale. Each of the above findings indicates that with regard to the CTS2, item order may be an important factor to consider. Below we consider the argument for each of the four versions examined within the context of the results of our analyses.

5.1. Negotiation items as introduction

The first issue to examine is whether or not it is better or necessary to have negotiation items at the beginning of the CTS section of the questionnaire. If having negotiation items first matters, then we would expect the original CTS2 (V1) and the unpaired, random version with introductory negotiation items (V4) to be more reliable and have higher disclosure rates than the other two versions. As stated above, the unpaired, random version with introductory negotiation items (V4) is more reliable across the several subscales than any of the remaining versions. The logistic regression analyses controlling for cohabitation showed that consistent with the hypothesis, Version 2 was significantly less likely than Version 1 to predict most forms of violence. In contrast, Version 3 was not significantly different from Version 1 on any of the subscales. When Version 4 was used as the reference group, however, it was a better predictor for only some of the subscales and therefore, our results were only partially consistent with the hypothesized relationships. It appears,

Table 5
Logistic regression predicting scores on CTS subscales with Version 2 as the reference category

Subscale	V3	V4	Cohab	Model χ^2	Nagelkerke R^2
Negotiation					
Incidence					
R Emotional	3.26**	1.30		18.06***	.04
R Cognitive	3.71***	1.30		50.47***	.08
Resp total	3.60**	1.54		16.68**	.04
P Emotional	4.07***	3.69***		25.58***	.06
P Cognitive	4.97***	5.36***		67.95***	.12
Total partner	3.63***	3.27**		21.04***	.05
Prevalence					
R Emotional	21.56**	1.30		30.44***	.10
R Cognitive	7.85***	1.27		66.42***	.12
Total resp	17.77**	1.71		20.88***	.08
P Emotional	14.56***	7.33***		37.86***	.13
P Cognitive	11.98***	9.04***		92.86***	.19
Total partner	22.82**	5.70**		30.41***	.12
Psychological aggression					
Incidence					
R Minor	1.65**	.87	1.56*	36.11***	.04
R Severe	.81	1.60*		15.48**	.02
Total respondent	1.65**	.99	1.54*	30.58***	.03
P Minor	1.27	.96	1.86**	20.77***	.02
P Severe	.84	1.53*		16.03**	.02
Total partner	1.22	1.02	1.90**	17.80***	.02
Prevalence					
R Minor	1.69**	.93	1.67*	34.66***	.04
R Severe	.82	1.62**		16.48**	.02
Total respondent	1.69**	1.04	1.65*	30.09***	.03
P Minor	1.32	1.03	1.80**	18.09**	.02
P Severe	.72	1.35	1.93**	20.23***	.02
Total partner	1.23	1.05		16.57**	.02
Physical aggression					
Incidence					
R Minor	.87	1.07		2.86	.00
R Severe	1.05	1.72*	1.65*	11.86*	.02
Total respondent	.88	1.10		4.17	.00
P Minor	1.15	1.18		3.48	.00
P Severe	.70	.97		4.53	.00
Total partner	1.06	1.24		3.25	.00
Prevalence					
R Minor	.83	1.01		5.42	.00
R Severe	1.02	1.69*	1.78**	13.07*	.02
Total respondent	.82	1.00	1.45*	6.51	.01
P Minor	1.01	1.12		4.48	.00
P Severe	.78	.96		4.81	.00
Total partner	.94	1.17		5.39	.00

(*continued on next page*)

Table 5 (*continued*)

Subscale	V3	V4	Cohab	Model χ^2	Nagelkerke R^2
Sexual coercion					
Incidence					
R Minor	1.50*	1.25	1.69**	16.31**	.02
R Severe	1.32	2.22*		5.63	.01
Total respondent	1.45*	1.41	1.69**	15.39**	.02
P Minor	1.33	.87		11.71*	.01
P Severe	1.33	1.84		5.58	.01
Total partner	1.23	.97		5.93	.01
Prevalence					
R Minor	1.58*	1.29	1.88***	23.58***	.03
R Severe	1.24	1.93		4.55	.01
Total respondent	1.50*	1.40	1.88***	21.59***	.02
P Minor	1.38	.91		13.00*	.01
P Severe	1.43	1.91*		5.80	.01
Total partner	1.32	1.06		7.67	.01
Injury					
Incidence					
R Minor	1.76*	1.34		5.73	.01
R Severe	2.04	2.48**		5.79	.01
Total respondent	1.71*	1.40		5.18	.01
P Minor	2.40**	1.68		10.05*	.02
P Severe	1.62	2.58*		6.28	.02
Total partner	2.24**	1.86*		8.94	.01
Prevalence					
R Minor	1.59	1.26		5.93	.01
R Severe	2.00	2.02		4.44	.01
Total respondent	1.47	1.23		3.98	.00
P Minor	2.49**	1.64		11.83	.02
P Severe	2.08	2.58*		5.49	.01
Total partner	2.34**	1.81*		10.53*	.02

Reference Category is Version 2 (Switched pair order); V1, Original CTS2; V3, Completely random; V4, Random with introductory negotiation items.
Cohabitation is coded 1 = cohabiting.
Note: The numbers in the table are Odds Ratios; a significant Model χ^2 indicates that the variables, taken together, provide a significant fit to the data.
* $P < .05$.
** $P < .01$.
*** $P < .001$.

therefore, that although Version 1 and Version 4 do not consistently predict higher disclosure rates than the other two versions, there are some instances in which they are better. Thus, the results did not conclusively support the need for negotiation items at the beginning of the CTS2 administration, nor did it refute this need.

5.2. Pairing

The second question of the effect of pairing actually involves two issues. First, what is the effect of placing items pertaining to the same behavior but by the respondent and the

Table 6
Logistic regression predicting scores on CTS subscales with Version 4 as reference category

Subscale	V3	Cohab	Model χ^2	Nagelkerke R^2
Negotiation				
Incidence				
R Emotional	2.52*		18.06***	.04
R Cognitive	2.86***		50.47***	.08
Resp total	2.34*		16.68**	.04
P Emotional	1.10		25.58***	.06
P Cognitive	.93		67.95***	.12
Total partner	1.11		21.04***	.05
Prevalence				
R Emotional	16.90**		30.44***	.10
R Cognitive	6.15***		66.42***	.12
Total resp	10.37*		20.88***	.08
P Emotional	1.99		37.86***	.13
P Cognitive	1.32		92.86***	.19
Total partner	4.00		30.41***	.12
Psychological aggression				
Incidence				
R Minor	1.89***	1.56*	36.11***	.04
R Severe	.50***		15.48**	.02
Total respondent	1.67**	1.54*	30.58***	.03
P Minor	1.33	1.86**	20.77***	.02
P Severe	.55***		16.03**	.02
Total partner	1.19	1.90**	17.80**	.02
Prevalence				
R Minor	1.81***	1.67*	34.66***	.03
R Severe	.50***		16.48**	.02
Total respondent	1.62**	1.65*	30.09***	.03
P Minor	1.28	1.80**	18.09***	.02
P Severe	.53***		20.23***	.02
Total partner	1.17	1.93**	16.57**	.02
Physical aggression				
Incidence				
R Minor	.81		2.86	.00
R Severe	.61*	1.65*	11.86*	.02
Total respondent	.80		4.17	.00
P Minor	.98		3.48	.00
P Severe	.72		4.53	.01
Total partner	.86		3.25	.00
Prevalence				
R Minor	.82		5.42	.00
R Severe	.61*	1.77**	13.07*	.02
Total respondent	.83	1.45*	6.51	.01
P Minor	.90		4.48	.00
P Severe	.81		4.81	.01
Total partner	.80		5.39	.00

(*continued on next page*)

Table 6 (*continued*)

Subscale	V3	Cohab	Model χ^2	Nagelkerke R^2
Sexual coercion				
Incidence				
R Minor	1.20	1.69**	16.31**	.02
R Severe	.59		5.63	.01
Total respondent	1.03	1.69**	15.39**	.02
P Minor	1.53*		11.71*	.01
P Severe	.72		5.58	.01
Total partner	1.27		5.93	.01
Prevalence				
R Minor	1.22	1.88***	23.58***	.02
R Severe	.64		4.55	.01
Total respondent	1.07	1.88***	21.59***	.02
P Minor	1.52*		13.00*	.01
P Severe	.75		5.80	.01
Total partner	1.25		7.67	.01
Injury				
Incidence				
R Minor	1.31		5.73	.01
R Severe	.82		5.79	.01
Total respondent	1.22		5.18	.01
P Minor	1.43		10.05*	.02
P Severe	.63		6.28	.02
Total partner	1.21		8.94	.01
Prevalence				
R Minor	1.26		5.93	.01
R Severe	.99		4.44	.01
Total respondent	1.19		3.98	.00
P Minor	1.52		11.83*	.02
P Severe	.99		4.44	.01
Total partner	1.29		10.53*	.02

Reference Category is Version 4 (Random with Introductory negotiation items); V1, Original CTS2; V2, Switched pair order; V3, Completely random.
Cohabitation is coded 1 = cohabiting.
Note: The numbers in the table are Odds Ratios; a significant Model X^2 indicates that the variables, taken together, provide a significant fit to the data.
* $P < .05$.
** $P < .01$.
*** $P < .001$.

partner together on reliability and reporting rates? This addresses the issue of response set. If we are to assume that pairing items does not lead to response set, we would expect that the original version (V1) and the switched paired version (V2) would not differ significantly from the unpaired versions (V3 and V4). However, as already noted, the original version was one of the least reliable and the unpaired, random version with negotiation items at the beginning was the most reliable. Similarly, the logistic regression analyses clearly demonstrated that Version 1 differed from Version 4 and that Version 2 differed from Version 3. In addition, both Versions 3 and 4 were frequently significantly more predictive of

violence compared to Version 2. It would appear then from these analyses that pairing, or rather using unpaired items does matter.

In looking at the direction of these differences we can see that most of the time, compared to the original version (V1) the random with introductory negotiation items version (V4) was less predictive of violence (13 out of 18 significant differences). Version 4 was more predictive for severe forms of psychological aggression (respondent and partner) and partner severe sexual coercion. When compared to the switched pairs version (V2), the completely random version (V3) was more predictive of negotiation, respondent minor psychological aggression, respondent minor and severe sexual coercion, and respondent minor injury. The random with introductory items version (V4) was more predictive of partner negotiation, severe psychological aggression (respondent and partner), respondent severe physical aggression, and respondent severe sexual coercion. We would conclude therefore that the original version elicits higher rates than the alternative versions most of the time, however, the switched pairs version elicited lower rates. This then leads to the second part of the issue regarding the pairing of items.

Does it matter if respondents are asked to report on their own behavior or that of their partner first? If the order of the pairings matters, we would expect to find differences between the original version and the switched paired version. There was no difference in the reliability between the switched paired version the original version. Examinations of the logistic regression show that Version 2, the switched pair order version, was consistently less predictive of rates of reporting compared to the original version. The one exception was for partner severe psychological aggression. These findings suggest that higher disclosure rates would be obtained by leaving the pair order in the original format.

5.3. Examination of randomized versions

Because analysis revealed that the randomized, unpaired versions resulted in higher alpha reliabilities, we examined the number of cases in which the alpha reliability scores are highest. Once again, the unpaired, random version with negotiation items at the beginning (V4) had substantially more instances in which the alpha reliability score was highest. However, when looking at the disclosure rates there are inconsistencies. For the negotiation subscales, respondents completing the unrandomized versions reported the highest rates of using negotiation techniques. This pattern does not remain for the other subscales, however. Indeed, both the reliability scores and the disclosure rates are higher for the randomized version with the negotiation items at the beginning when examining all other subscales on the whole. The logistic regression analyses indicated that the completely random version (V3) was not significantly different than the original CTS2 on any of the subscales. When introductory negotiation items were included, however, the version was often less predictive than the original. In other words, significant differences between the original version and the alternative random versions emerged when negotiation items were included at the beginning of the instrument and these differences demonstrated that the original version was overall a better predictor of violence.

6. Conclusions

The results of the logistic regression analysis are not altogether supportive of the need to change the format of the CTS2. The results do not indicate that the measurement

properties of the CTS2 are compromised in any way. This finding is especially important with regard to the physical aggression scales, which are the scales traditionally most central to the concept of IPV and the scales most commonly used by researchers. On the other hand, researchers who are most interested in examining more severe forms of psychological aggression or sexual aggression that is consistent with legal definitions of rape and sexual assault may want to consider placing negotiation items first and completely randomizing the order of the remaining scale items. This type of item ordering, exemplified by the present Version 4, resulted in statistically significantly higher rates of reporting of severe psychological aggression and severe sexual coercion, did not differ from the original CTS2 format in capturing physical aggression, and exhibited the highest internal consistency reliabilities of any tested format in the majority of comparisons.

The Conflict Tactics Scales were first introduced for the study of violence within intimate partner relationships more than 25 years ago. Since that introduction, the scales have been revised and the original and revised versions have been used to measure the occurrence of intimate partner violence as well as other forms of family violence by hundreds of researchers with hundreds of populations. The present paper compared three alternate versions of the revised scales to the original CTS2 to determine if the order of the pairing of the items, leading with the negotiation items at the beginning of the scales, and unpairing the items affects scale reliability and response rates.

Although our analyses found significant differences between versions it is also important to consider whether or not these differences are functionally meaningful as many of the differences in reports of perpetration and victimization are small. We would argue, however, that even small improvements in the ability to detect victimization and perpetration may be important particularly for low base rate phenomena like sexual intimate partner violence. Moreover, for some of the scales although the percentage differences between versions is not large, rates of reporting differ by as much as 25% (physical aggression) to nearly double (severe sexual violence) differences that most definitely should be considered functionally meaningful.

While the results suggest that future research using the revised CTS might better capture the prevalence and incidence rates of intimate partner violence if the items were unpaired, they are not entirely conclusive or without concern. First, the differences that emerged were not substantially large. Thus, there is no evidence to suggest that past research that utilized the original format is in question. Moreover, this analysis is based upon a sample of college students, part of a unique population. In addition, while the sample is sufficiently large and is fairly diverse ethnically, the sample is relatively young; and therefore, the majority of the respondents would not have had significantly long relationships upon which to report. In addition, the sample is overwhelmingly middle-class, making it impossible to generalize to college students in general. In addition, while modified versions of the CTS and CTS2 have been used to measure violence in other family relationships, our results cannot be extended to those efforts. Additional research is needed to examine the effects of format on reliability and disclosure rates when the CTS2 is used to detect aggression in other interpersonal dyads. At the same time, however, this study marks one of only a handful that have attempted to examine some of the methodological properties of the CTS2 as they related to item order. Furthermore, the current study used both a large sample and an experimental research design that allowed for multiple comparisons, consequently improving upon the limited existing research. Given the wide use of this measurement tool, research such as the present study is of vital importance in advancing the field of violence research.

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