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# Responsivity to Interviewer during Interview-Based Assessment of Physical Intimate Partner Violence

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## Abstract

**Objective:** Interview assessments of intimate partner violence (IPV) may provide more accurate behavior frequency estimates than self-report questionnaires. However, concerns have been raised about whether participants underreport IPV during interviews due to an emotional response to the interviewer.

**Method:** Participants were 42 mixed gender community couples (83 individuals) in which at least one partner endorsed physical IPV perpetration or victimization in their relationship. We examined whether participants were emotionally responsive to the interviewer during an interview about physical IPV. Responsivity was defined as the extent to which participants' emotional arousal, indexed by vocal fundamental frequency ( $f_0$ ), was predicted by interviewers' emotional arousal at the previous talk turn on a moment-by-moment basis. We then examined whether participants' responsivity predicted interview-based reporting of IPV relative to their own self-report on an IPV measure and to the highest other available report (including partner report).

**Results:** Repeated measures actor-partner interdependence models conducted in a multi-level modeling framework indicated that, on average, participants were responsive to interviewers' emotional arousal, even when controlling for responsivity to their own arousal, and that responsivity varied across participants. However, participants' responsivity to interviewer arousal did not significantly predict reporting of IPV perpetration or victimization during the interview relative to their own self-report or to the highest other available report.

**Conclusions:** Participants are emotionally responsive to interviewer arousal, but this responsivity does not appear to reduce interview-based reporting of IPV relative to self-report, supporting the utility of IPV interviews in clinical and research settings.

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### Keywords

domestic violence; violence assessment; interviewer arousal; voice stress; vocally encoded emotional arousal

Intimate partner violence (IPV) is highly prevalent in the United States, with approximately one in five couples experiencing at least one episode of physical violence between partners annually (McKinney et al., 2009; Schafer et al., 1998). The societal burden of IPV is substantial, including significant mental and physical health problems for victims (Dillon et al., 2013) and economic costs associated with treatment, lost productivity, and criminal justice involvement (Peterson et al., 2018). To further understand and reduce the burden of IPV, we need to better assess these behaviors. However, IPV research is currently limited by the lack of a "gold standard" measurement tool for IPV (Follingstad & Rogers, 2013). Self-report measures of IPV perpetration and victimization have historically been used in the study of IPV because direct observation of physical violence is neither ethical nor feasible. More recent work has advocated that interview methods are advantageous for obtaining more accurate reports of IPV (Hayes, 2018). Yet, further validation of interview-based methods for assessing IPV are needed to identify potential sources of bias and to evaluate their performance relative to other assessment methods. The purpose of the present study was to examine whether participants are emotionally responsive to interviewers during an IPV interview and whether such responsivity predicts participants' reporting on the interview relative to a self-report measure of IPV.

Interviews have long been used across research domains to assess a range of sensitive topics such as alcohol and substance use, sexual behaviors, and criminal behavior more broadly (e.g., Carey et al., 2001; Cervantes et al., 1994; Hjorthøj et al., 2012; Sutton et al., 2011). This has occurred despite views that the utility of interviews for addressing sensitive topics in social science research may be limited if participants respond to any reactions the interviewer may have (e.g., comments made, facial expressions; Babbie, 2014). Indeed, participants appear to prefer not to engage in face-to-face interviews for sensitive questions due to concerns about interviewer judgment (Pickard et al., 2016), and participants have been found to report fewer sexual behaviors (Tourangeau & Smith, 1996) and fewer stigmatized drug use behaviors (Newman et al., 2002) directly to an interviewer than they did via self-report. Consequently, although interviewers with a variety of backgrounds may be trained to conduct interviews, it is thought that well-trained interviewers are those who remain professional, emotionally calm, and objective while also facilitating participant disclosures of sensitive topics (McNeeley, 2012).

In the field of IPV research, the Revised Conflict Tactics Scales (CTS2; Straus et al., 1996), a self-report measure for assessing past-year IPV perpetration and victimization, has been the assessment device of choice. The main benefit of the CTS2 is that it is brief and does not need to be administered by trained assessors. Additionally, reports of IPV on the CTS2 appear to be minimally influenced by social desirability (Visschers et al., 2017). However, substantial methodological concerns have been raised as well (Follingstad & Rogers, 2013). A primary disadvantage is the potential for recall bias related to remembering, calculating,

and reporting behaviors that occurred over a year-long period (Chapman & Gillespie, 2019). Reports may also be biased by participants' interpretations of events because the CTS2 does not assess context that may aid researchers in determining if behaviors were truly aggressive (Lehrner & Allen, 2014).

As such, the interview-based Event History Calendar Interview (EHCI) methodology has been increasingly used in studies of IPV (Hayes, 2016; Marshall et al., 2017) to circumvent these potential biases. The primary benefit of the EHCI for the study of IPV is that trained interviewers are able to reduce recall bias by anchoring incidents of violence to significant life events, and interviewers can reduce false positives by discerning, based on incident context, whether a behavior was truly violent. The EHCI has been shown to yield high inter-partner concordance for assessing psychological intimate partner and parent-to-child aggression (Marshall et al., 2017). Further, using the same sample as the present study, Marshall et al. (2021) examined concordance between IPV reports on the CTS2 and EHCI within individuals and across partners within the same method (i.e., self-report or interview). Though significantly different behavior counts were not observed for the CTS2 and EHCI, the EHCI better detected whether or not any IPV occurred than did the CTS2. Inter-partner concordance was also greater on the EHCI than the CTS2, providing preliminary evidence that the EHCI methodology may be more reliable than the CTS2. Despite the many strengths of the EHCI, one concern unique to the EHCI is that individuals may be reluctant to disclose IPV victimization and perpetration directly to an interviewer. Although telephone-based reports of psychological intimate partner aggression during an EHCI were not correlated with social desirability (Marshall et al., 2017), to our knowledge, no prior studies have directly examined whether the presence of an interviewer impacts participant disclosures of IPV.

During face-to-face interactions more generally, individuals observe and respond to a range of subtle reactions from their interaction partner, such as body movements, facial expressions, and vocalizations (Chartrand & Bargh, 1999; Niederhoffer & Pennebaker, 2002), which may in turn influence their emotional reactions. In addition to subtle cues, individual characteristics, most notably gender, may further influence reporting of IPV during interviews. Men, in particular, may have difficulty reporting on IPV because men's IPV perpetration is typically viewed more negatively than women's IPV perpetration (Spencer et al., 2021) and because men may experience unique stigma about their IPV victimization (e.g., Tsui et al., 2010; 2012). To our knowledge, prior studies have not accounted for interpersonal processes that unfold between participants and interviewers on a moment-by-moment basis that could, in principle, bias reporting on the EHCI. During the EHCI, participants may perceive subtle reactions from the interviewer during their disclosure of IPV, including interviewers' momentary emotional arousal. The extent to which participants perceive and respond to interviewers' emotional arousal during the interview may influence their reporting of IPV.

One indicator of momentary emotional arousal is vocal fundamental frequency ( $f_0$ ), the lowest frequency harmonic of the speech sound wave (Juslin & Scherer, 2005).  $f_0$  is closely associated with the perceived pitch of the voice (Frick, 1985) and plays a central role in vocalizations that signal distress to others (Juslin & Scherer, 2005). Unlike other

physiological measures,  $f_0$  is an indicator of both experienced and *communicated* arousal, making it particularly well suited for assessing arousal within interpersonal interactions (Juslin & Scherer, 2005). Individuals have evolved to detect subtle changes in others' experience of stress and physiological arousal via the voice, some of which may occur below conscious awareness (Bryant, 2021; Weusthoff et al., 2018). A benefit of  $f_0$  is that it can be measured objectively and unobtrusively from voice recordings, which helps to mitigate biases of self-reported emotional experiences (Weusthoff et al., 2018). In addition, one's emotional arousal may increase or decrease in response to the arousal of the person with whom they are interacting (Butler, 2011), particularly during emotionally evocative interpersonal interactions. For the present study, we examined whether participants' momentary emotional arousal was responsive to interviewers' momentary arousal, both indexed by  $f_0$ , and, if so, the extent to which participants' responsivity to interviewer arousal predicted differential reporting of IPV on the EHCI relative to the CTS2.

Although responsivity to interviewer emotional arousal during an EHCI about IPV has not previously been investigated, prior research on participants undergoing clinical interviews about potentially stressful content indicates that, when discussing sensitive feelings and behaviors, participants are responsive to interviewers' emotional arousal expressed through the voice. For example, Bryan et al. (2018) demonstrated that, in the context of a suicide risk assessment interview, suicidal military personnel's emotional arousal, indexed by  $f_0$ , moved in tandem with interviewers' emotional arousal (Bryan et al., 2018). Thus, it is anticipated that individuals will respond to interviewers' vocally encoded emotional arousal during the EHCI while they report on relationship conflicts that involve IPV given that this context is also likely to elicit emotional arousal from both interviewers and participants. Bryan et al. (2018) did not examine whether participants' responsivity to interviewers' emotional arousal predicted their reporting of suicidal thoughts or behaviors. Consequently, to our knowledge, this is the first study to examine whether participants' emotional responsivity to an interviewer predicts participants' reporting during high stress clinical interviews in general. As related to assessment of IPV, this is an important area of inquiry because demonstration of differential reporting (or lack thereof) of IPV on the ECHI relative to a self-report measure will help to inform the field's understanding of the relative benefits or limitations of different methods of assessing IPV.

### The Present Study

In the present study, we sought to extend prior work by examining whether participant and interviewer emotional reactions predict reporting during the interview. The present study builds upon prior work by Marshall et al. (2021) by examining the emotional processes occurring between interviewers and participants, and it leverages micro timescale emotional arousal encoded in the voice to directly test whether participants' emotional responsivity to the interviewer predicts concordance between interview and self-report measures of IPV.

The first aim of the present study was to determine whether participants' emotional arousal was responsive to interviewers' emotional arousal on a moment-by-moment basis during the interview. We proposed the following Aim 1 hypotheses: *Hypothesis 1*: Participant arousal would be positively predicted by interviewer arousal, such that, when interviewers were

more or less emotionally aroused at a given talk turn than usual, participants' arousal would move in the same direction in subsequent talk turns. As an exploratory analysis at this step, we tested whether these relations significantly varied across participants to determine if some participants were more (or less) sensitive to interviewer arousal relative to others. *Hypothesis 2:* Men would exhibit more responsivity to the interviewer, given that IPV is often viewed more negatively when men are the perpetrators (Spencer et al., 2021) and men may experience stigma when reporting victimization (Tsui et al., 2010; 2012). If the first hypothesis was supported, the second aim was to determine whether the extent of responsivity to interviewers' arousal predicted participants' reduced reports of perpetration and victimization on the EHCI relative to the CTS2.

We proposed the following Aim 2 hypotheses: *Hypothesis 3:* Participants who exhibit more responsivity to interviewers' emotional arousal would report less IPV on the EHCI relative to the CTS2. *Hypothesis 4:* Men would exhibit greater underreporting on the EHCI than women based on the same rationale that formed Hypothesis 2. To elucidate the impact of the interviewer on participant reporting of IPV, we use momentary changes in fundamental frequency to capture emotional processes between participant and interviewer that occur partly below conscious awareness. We separately compare individual EHCI reports to one's own self-report and to the highest other report available (i.e., own self-report, partner's self-report, or EHCI report). We examine these questions in a sample of trauma exposed community couples in which at least one partner screened positive for probable posttraumatic stress disorder (PTSD).

## Method

### **Participants**

The current sample was drawn from a prior study of relationships and stress that included 64 mixed gender trauma exposed community couples (128 individuals) recruited from rural or semi-rural Pennsylvania communities between 2008 and 2010. Couples completed lab-based couple conversations, interviews conducted separately with each member of the couple, and a self-report battery. We limited the present study sample to the 43 couples (86 individuals) in which at least one partner reported experiencing or perpetrating any acts of past year physical IPV in their relationship on either the CTS2 or the EHCI. Three individuals were excluded in the current study because of poor audio quality. Two were from the same couple. The partner of the third excluded participant was included, but their excluded partner's IPV data were available to examine in relevant analyses. The final analytic sample included 83 individuals from 42 couples.

The majority of the present study sample (N= 83) identified as white (81% of men; 85% of women), followed by Black (11.9% of men; 2.4% of women), multiracial (4.8% of men; 7.3% of women), and non-white Hispanic or Latino/a (2.4% of men; 4.9% of women). Most men were employed full time (51%); 30% were unemployed, and 19% were employed part time. Most women were employed part-time (44%); 33% were unemployed, and 23% were employed full-time. Average years of education was 14.37 (SD = 2.31) for men and 14.08 (SD = 2.20) for women. Average monthly income was \$1,958.39 (SD = \$1,502.35) for men and \$1,143.65 (SD = \$1,240.35) for women. Most participants were married (65%). Average

relationship length for partners within couples was approximately 8 years and 9 months (range 6 months to 30 years).

### Procedure

For the larger study, couples were included if at least one partner in each couple screened positive for probable *Diagnostic and Statistical Manual of Mental Disorders – Fourth Edition* (DSM-IV; American Psychiatric Association, 2000) PTSD based on a score of 44 or greater on the PTSD Checklist (Weathers et al., 1993). To generate a sample that was representative of the surrounding community, couples were excluded if their combined annual income was greater than \$100,000 or if either partner had six or more years of posthigh school education (n = 3 couples). During the in-person lab session, each individual first completed self-report measures, including a measure of IPV victimization and perpetration. Participants then completed various lab procedures, including an EHCI of IPV victimization and perpetration. Five interviewers were female clinical psychology graduate students, and two interviewers had a background in researching IPV. All participants provided informed consent and were compensated \$175 for completion of the full protocol, including procedures not described here.

#### Measures

**Self-Reported Intimate Partner Violence**—The CTS2 (Straus et al., 1996) assesses self-reported IPV perpetration and victimization and has demonstrated strong internal consistency (Straus et al., 1996), test-retest reliability (Vega & O'Leary, 2007), convergent validity (Slep & O'Leary, 2005), and discriminant validity (Straus et al., 1996). We used the 12-item physical assault subscale. Participants rated the frequency that they and their partner used each act of IPV (e.g., kicking, slapping, and beating up) in the past year using a 7-point scale (0 =Never, 1 =Once, 2 =Twice, 4 = 3 to 5 times, 8 = 6 to 10 times, 15 = 11 to 20 times, and 25 =more than 20 times).

Interview Assessment of Intimate Partner Violence—We used an Event History Calendar Interview (EHCI; Roberts & Horney, 2010), which is a semi-structured interview administered by trained interviewers to assess IPV perpetrated by oneself or one's partner. The interview begins by identifying significant events (e.g., holidays, vacations, etc.) over the past year, which is then used to help participants identify when incidents of IPV may have occurred. To help participants identify and recall physically aggressive behaviors, they were provided a list of 12 example behaviors consistent with the physical assault subscale of the CTS2. The principal investigator of the larger study extensively trained and observed interviewers until deemed appropriately trained to conduct interviews. Interviewers were trained to ask probing questions that identify less severe and self-defense behaviors along with contextual factors that can help exclude non-aggressive behaviors (e.g., play fighting). Across IPV incidents, perpetration and victimization behaviors were summed separately for each partner. To facilitate the assessment of differential reporting, items were recoded to be consistent with the response scale of the CTS2. The EHCI methodology has demonstrated test-retest reliability and convergent validity for lifetime IPV (Yoshihama et al., 2002) and convergent and discriminant validity for past year IPV (Marshall et al., 2017; Marshall et

al., 2021). Ten percent of interviews were selected to assess interrater reliability, which was excellent (intraclass correlation coefficient, ICC = 1.00).

**Vocally Encoded Emotional Arousal**—Vocal fundamental frequency ( $f_0$ ) was used as an index of emotional arousal.  $f_0$  is measured in hertz (Hz), with higher values indicating higher levels of emotional arousal. When air from the lungs passes over the vocal folds opening and closing in the larynx, vibrations are produced and determine the  $f_0$ , with more rapid opening and closing of the folds reflecting greater emotional arousal (Juslin & Scherer, 2005). An advantage of  $f_0$  is that it is measured unobtrusively and captures both experienced and communicated emotional arousal (Weusthoff et al., 2018). With respect to validity, greater  $f_0$  is observed with greater emotional intensity (Bachorowski & Owren, 1995) and is associated with other measures of physiological arousal (e.g., heart rate, skin conductance) during emotionally evocative situations (Eckland et al., 2019; Johnstone et al., 2007). In addition, partners in IPV relationships displayed trajectories of emotional arousal (using  $f_0$ ) during conflict discussions in a manner consistent with prior theoretical and empirical research (Wojda et al., 2022), further supporting the validity of  $f_0$  as an index of emotional arousal among individuals in IPV relationships.

We manually segmented interviewer and participant speech from the recorded IPV interviews into talk turns using Audacity 2.4.2, and background noise, overlaps in speech, and nonverbal vocalizations (e.g., laughing, crying) were removed. We used Praat software (Boersma & Weenink, 2013) to extract an estimate of mean  $f_0$  for every quarter second with a bandpass filter of 75 to 300 Hz, which represents the range of human adult speech (Owren & Bachorowski, 2007). These estimates were then averaged to create an estimate for each talk turn for each individual. Resulting estimates of  $f_0$  mean for each talk turn during an interview were visually inspected for outliers and potential artifacts (e.g., background noises), which were then removed if confirmed based on a review of the respective audio recordings.

### **Analytic Approach**

All models were conducted in a multilevel modeling framework using PROC MIXED in SAS 9.4 (SAS Institute Inc, 2013) with restricted maximum likelihood estimation. To address Aim 1, Hypothesis 1, we used the two-intercept repeated measures actorpartner interdependence model (RM-APIM; Kenny et al., 2006). The two-intercept RM-APIM models actor and partner effects for participants and interviewers separately but simultaneously and thus allows a direct examination of how participants emotionally respond to interviewers' emotional arousal from one talk turn to the next (i.e., partner effect) while also controlling for the extent to which participants are responsive to their own emotional arousal at the prior talk turn (i.e., actor effect) – the self-regulatory dynamics in individuals' own emotional arousal – as well as interviewers' responsivity to their own and participants' emotional arousal. Although partners in the same relationship are conceptually nested within a couple, given that partners were interviewed separately and the fact that the average f<sub>0</sub> over the course of the interview was not correlated across partners (r = -.012, p= .942), nesting of participants within couples was not included in the Aim 1 model. Over the course of the EHCI interview, variabilities in the average level of f<sub>0</sub> for participants (p

= .138) and interviewers (p = .083) did not differ significantly across different interviewers. Thus, participants' observations were not nested within interviewers.

In the basic RM-APIM (Supplemental Figure S1), responsivity to conversation partner for the participant and the interviewer (i.e., partner effects) were estimated by regressing mean  $f_0$  during a given talk turn on their conversation partner's mean  $f_0$  during the prior talk turn (t-1); responsivity to one's own arousal (i.e., the actor effect) was estimated by regressing mean  $f_0$  during a given talk turn (t) on one's own mean  $f_0$  during their previous talk (t-1). Prior to modeling, data were preprocessed. For interviewers, there was a negative and significant effect for talk turn (B = -0.141, p < .001), indicating that interviewers' arousal decreased across the interview. Data were subsequently detrended using person-specific regressions to represent the deviation at each time point from their usual level of arousal within the EHCI. The effect of talk turn was not significant for participants (B = 0.013, p = .403); thus, no detrending was conducted. Instead, at each talk turn, participants' mean f<sub>0</sub> was person mean centered to represent the deviation at each time point. Random effects for responsivity to one's own arousal and to conversation partner's arousal were included for participants but not interviewers (due to lack of significant variability). Participant and interviewer residuals at consecutive talk turns were allowed to correlate. Power analyses for Aims 1 and 2 were conducted using Monte Carlo simulation based on the sample size and model structure to identify the smallest detectable effect in 80% (equivalent to 80% power) of 1,000 simulated models (Snijders, 2005). Based on simulations of a multilevel model with the smallest possible *n*s for level 1 (n = 59) and level 2 (n = 120), we had 80% power to detect a relationship explaining 5% of the variance for Aim 1, consistent with a correlation of .22 or a small effect.

To address Aim 2, person-specific responsivity coefficients for participants were derived from the basic RM-APIM in Aim 1 and used as predictors of differences in IPV reporting on the EHCI relative to the CTS2 to examine whether the degree of participants' emotional responsivity to the interviewer predicted differential reporting. Differential reporting was determined in two ways: 1) an individual's reports on the EHCI relative to the individual's reports on the CTS2, and 2) an individual's reports on the EHCI relative to the highest available report via any other indices (i.e., their own CTS2 report, their partner's report on the CTS2, or their partner's report on the EHCI). We compared to the highest report because partner reports of IPV are often discrepant (e.g., Caetano et al., 2009). Difference scores were calculated by subtracting the reports of IPV on the EHCI from the report of IPV on the other measure (own CTS2 report or highest report). Extreme outliers (EHCI: two perpetration, three victimization; CTS2: two perpetration, one victimization) were truncated prior to taking the difference. Because participants were included in the sample if either partner reported any IPV, it was possible for participants to have reported zero behaviors for either perpetration or victimization. Thus, to avoid inflation of concurring reports across the measures due to the non-occurrence of IPV perpetration or victimization, difference scores were only calculated for those with at least one act of aggression on either measure comprising the difference. For comparisons of one's own reports on the CTS2 and EHCI, there were 48 participants for perpetration and 41 for victimization. For comparisons to the highest other report, there were 60 participants for perpetration and 61 for victimization. Because individual reports of IPV were nested within couples, data

were analyzed dyadically by allowing partners' residuals to correlate to account for the interdependence within a couple. Simulations of a multilevel model suggested that with the smallest possible *n*s for level 1 (n = 30) and level 2 (n = 41), we had 80% power to detect a relationship explaining 7% of the variance for Aim 2, consistent with correlations equivalent to .26 or a small effect.

To test Hypotheses 2 and 4, we examined aforementioned models accounting for the moderating effect of participant gender (effect coded as men = 1, women = -1). Because PTSD was a recruitment criterion for the sample, we conducted similar models with PTSD severity as the moderator, but we did not find evidence to support a moderating role of PTSD (see supplemental materials). For all models, we calculated effect sizes for the fixed effects via a partial correlation from the *t*-statistic for each parameter (Altman, 1991). We used the following equation:  $r_k = \frac{t_k}{\sqrt{t_k^2 + df}}$  where *k* represents the parameter. Effect sizes were interpreted as small (*r* = .10), medium (*r* = .30), and large (*r* = .50; Cohen, 1988).

### Results

#### **Descriptive Analyses**

Within couples, on both the EHCI and CTS2, men (EHCI: M = 1.05, SD = 2.06; CTS2: M = 1.36, SD = 2.95) reported significantly less IPV perpetration than women (EHCI: M = 1.90, SD = 2.27; t = -2.32, p = .025; CTS2: M = 2.67, SD = 4.29; t = -2.08, p = .044); yet, no significant differences emerged for victimization (EHCI: M = 1.36, SD =3.31 for men, M = 2.10, SD = 4.89 for women, t = -1.11, p = .272; CTS2: M = 1.90, SD = 3.46 for men, M = 2.38, SD = 5.47 for women, t = -0.70, p = .490). There was no significant difference between IPV perpetration reported by oneself and one's partner (i.e., victimization report) on either the EHCI or CTS2 for men (EHCI: t = -1.71, p = .095; CTS2: t = -1.97, p = .056) or women (EHCI: t = 1.19, p = .242; CTS2: t = 1.58, p = .122). Kendall's tau correlations suggested that EHCI perpetration reports were associated with CTS2 reports (r = .72 for men; .37 for women) and the highest other report (r = .59 for men; .41 for women). EHCI victimization reports were associated with CTS2 reports (r=.64 for men; .55 for women) and the highest other report (r=.52 for men; .55 for women). The average difference between individual reports on the CTS2 and EHCI was 0.92 (SD = 4.74) for perpetration (t = 1.34, p = 0.187) and 0.85 (SD = 6.30) for victimization (t = -0.87, p = 0.187) 0.390). The average difference in reports on the highest other report and the EHCI was 3.98 (SD = 7.75) for perpetration (t = -3.98, p < .001) and 3.62 (SD = 6.80) for victimization (t = -3.98, p < .001)-4.16, p < .001).

There was a total of 5,516 talk turns across men's interviews and 4,924 across women's interviews. On average, men's interviews had 132.67 (SD = 45.79) talk turns and were 21.62 minutes (SD = 7.76); women's had 120.10 (SD = 68.38) talk turns and were 18.74 minutes (SD = 7.22). Consistent with research finding higher vocal pitch for women than men (Owren & Bachorowski, 2007), men's average f<sub>0</sub> across interviews was 109.03 Hz (SD = 12.08) and women's was 168.34 Hz (SD = 16.16). Interviewers' mean f<sub>0</sub> was 180.09 Hz (SD = 18.94) across men's and 180.17 Hz (SD = 19.23) across women's interviews.

### Are Participants Responsive to Interviewer Emotional Arousal?

Consistent with Hypothesis 1, results from the basic RM-APIM indicated that, on average, participants were responsive to interviewers' arousal after accounting for participants' responsivity to their own arousal, such that increases or decreases in interviewer arousal at the previous talk turn were positively and significantly associated with corresponding increases or decreases in participant arousal at the next talk turn, with a large sized effect (Table 1). However, interviewers were neither consistently responsive to their own arousal or to participants' arousal. The random effect for the responsivity index (partner effect) was significant, indicating between-person differences in participants' responsivity to interviewers' arousal (see Supplemental Figure S2 for graph). Contrary to Hypothesis 2, gender did not significantly moderate the extent to which participants were responsive to interviewer arousal (p = .422; Table 2).

# Does Participant Responsivity to the Interviewer Predict Differential Reporting on the EHCI relative to the CTS2?

Across multilevel regression models predicting differential reporting of IPV, the effects of responsivity to the interviewer were nonsignificant and small, and they did not differ significantly as a function of gender for either perpetration or victimization, failing to support Hypotheses 3 and 4. For both perpetration and victimization, this includes comparisons of EHCI reports to one's own report on the CTS2 (Table 3) and of EHCI reports to the highest other report (i.e., partner's report on either measure or self-report on CTS2; Table 4). Results remained nonsignificant and small when gender was not included in the models. We conducted sensitivity analyses with participants whose relationship length could not be confirmed to be more than one year (i.e., time frame the CTS2 and EHCI were anchored to) removed (n = 2 couples). Overall, the pattern of findings remained the same (results available upon request).

### Discussion

This study builds upon a growing body of research using the EHCI methodology to assess IPV (Hayes et al., 2016). A general concern with IPV assessment is the potential for underreporting (Follingstad & Rogers, 2013), and this study is among the first to empirically examine whether the interpersonal context of the interview may bias reporting. We did so by examining whether participants' emotional responsivity to interviewers' emotional arousal predicted reporting of physical IPV during the EHCI relative to self-report. To address study aims, we used vocally encoded emotional arousal ( $f_0$ ) as an index of emotional arousal during the interview and employed dyadic intensive longitudinal data analytic techniques to determine participant responsivity to interviewer emotional arousal on a moment-by-moment basis. We then used the degree of participant emotional responsivity to predict physical IPV reporting on the EHCI relative to self-reports on the CTS2. Because partners are often inconsistent in their IPV reports (Caetano et al., 2009; Marshall et al., 2011), an important strength of this work is that we compared EHCI reports to the highest other report available, including partner reports.

Participants were responsive to interviewers' arousal, such that participant arousal moved in tandem with interviewer arousal, supporting Hypothesis 1. This finding is similar to research finding that participants were responsive to interviewers' emotional arousal (also indexed by  $f_0$ ) during a suicide risk assessment interview (Bryan et al., 2018). The EHCI about IPV shares some similarities to the suicide assessment with regard to structure (i.e., question-response format, less collaboration between interviewer and respondent) and content (i.e., high-risk, potentially violent behavior). Thus, during structured assessments of sensitive experiences, respondents' emotional reactions may be influenced, to some extent, by the interviewer's emotional arousal. Consistent with research suggesting that  $f_0$  plays an important role in signaling emotional distress (Juslin & Scherer, 2005), one interpretation of these results is that individuals experience stress in response to subtle cues they perceive from the interviewer while reporting on IPV.

However, the finding that interviewers did not exhibit responsivity to the participants' emotional arousal provides an important context through which to interpret participants' responsivity. That is, interviewers' emotional control during the interview suggests that they were not exhibiting stress reactions that the participant may have perceived via the interviewer's voice. This may reflect good clinical practice, as exhibiting intense emotional reactions to participant emotions can be problematic within the professional relationship (e.g., countertransference; Dahl et al., 2012). This generally speaks to effective interviewing in the current sample, given that some research suggests that therapists matching vocal pitch with patients negatively impacts patient outcomes (Reich et al., 2014). Interviewers in the current study appear to have maintained appropriate emotional control during interviews, and participant emotional responsivity may be due to following the interviewer's affective lead rather than due to the stress of the interview or concerns about the interviewer's impression, per se.

Despite participants exhibiting emotional responsivity to the interviewer during the EHCI, we did not find evidence for Hypothesis 3, which proposed that responsivity would impact the extent of interview-based reporting of IPV. That is, we did not observe significant associations between responsivity to the interviewer and less reporting of perpetration or victimization during the interview relative to participants' own report on the CTS2 or relative to the highest other report available, and effect sizes were small in magnitude, ranging from -0.19 to 0.13. This suggests that IPV reports on the EHCI are minimally impacted by their emotional responsivity to the interviewer, which is consistent with findings suggesting that motivation to present oneself favorably has minimal impact on reporting of IPV during the EHCI (Marshall et al., 2017) and on the CTS2 (Visschers et al, 2017). Consistent with prior research finding that women report more IPV than men (Archer, 1999), women reported more IPV perpetration than men in the current sample and moderate associations in their reports across measures. However, contrary to Hypotheses 2 and 4, we did not find evidence that gender moderated the role of emotional responsivity on reporting across models.

Further study is needed before adopting a gold standard assessment tool for IPV, but the current study suggests that emotional responsivity to interviewers does not decrease reporting relative to self-report. In fact, the lack of interviewer effects on reporting during

the EHCI should be considered in conjunction with previously documented advantages of the EHCI relative to the CTS2. Primary advantages include reduction of memory biases in reporting of IPV (Chapman & Gillespie, 2019), contextualization of incidents to discern truly aggressive behaviors (Lehrner & Allen, 2014), and reducing the extent to which individual characteristics (e.g., PTSD symptoms) contribute to discrepancies of partner reports (Marshall et al., 2021). Together, these results suggest that the EHCI continues to be a viable candidate as the preferred alternative to the CTS2.

### Limitations

The present study is not without limitations. First, the larger study was not designed to address the research questions in this study; thus, we were unable to investigate other variables that may further inform the results (e.g., participant and interviewer self-reported emotions during the interview, interviewers' personal characteristics or training experiences). Further, f<sub>0</sub> is an index of emotional arousal but does not inform specific emotions driving the arousal (i.e., positive or negative affect), precluding conclusions about how to train interviewers to best conduct an EHCI (e.g., appropriate extent of interviewer affective displays). This study reflects experiences of a fairly small sample of predominantly White participants in mixed gender relationships from rural to semi-rural communities when interacting with White, well-educated female interviewers, and the lack of diversity may limit the generalizability of the results. Given the larger study aims, participants were recruited based on endorsement of PTSD symptoms by at least one partner, which may also limit generalizability of results to other populations.

### **Future Research Directions**

Future research may address these limitations by examining other aspects of the interview that may impact reporting, such as assessment of interviewer characteristics that could influence participants' emotional arousal and reporting (e.g., interviewer gender, interviewer's self-reported comfort assessing IPV) and of participants' subjective experiences during the EHCI (e.g., whether they found the EHCI to be stressful, their impression of negative evaluation from the interviewer). Future research may also leverage the strengths of the EHCI for measuring context to address gaps in IPV research (e.g., defining and assessing self-defensive IPV). Finally, future research should be conducted among larger samples with greater systematic variance (e.g., diversity with respect to racial, ethnic, gender, and sexual identities, clinical samples) and samples reporting more severe and other forms of IPV (e.g., psychological, sexual). This would allow for further examination of random effects to identify for whom the observed responsivity to the interviewer may be more or less pronounced and examination of other potential systematic biases in IPV reporting. For example, future research may examine the recently proposed upward victimization score bias, which suggests that IPV perpetrators may bias their victimization reports upwards to justify their perpetration (Herrero et al., 2020).

### **Prevention and Clinical Implications**

The finding that individuals are emotionally responsive to interviewers' arousal when discussing physical violence within their relationships may generalize more broadly to clinical, research, or real-world settings when sensitive matters are discussed with

interviewers. Despite this emotional responsivity, individuals do not appear to underreport physical IPV during the interview relative to a self-report measure. Thus, the current study supports the use of interviews to obtain accurate reports of physical IPV. Given the richness of information that interviews may offer relative to self-report assessments, this may allow for improved IPV research, as well as better prevention and intervention for such behaviors within clinical and real-world settings.

### **Supplementary Material**

Refer to Web version on PubMed Central for supplementary material.

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### Table 1

Repeated Measures Actor-Partner Interdependence Model of Participant and Interviewer Responsivity to Others' and Own Emotional Arousal

Variable		В	SE	t	95% CI	р	r
Fixed Effec	ts						
Participa	nt Responsivity to Interviewer	0.07	0.01	5.03	[.04, .09]	<.0001	0.57
Participa	nt Responsivity to Self	0.11	0.02	5.77	[.07, .15]	<.0001	0.57
Interviev	ver Responsivity to Participant	0.00	0.02	0.02	[04, .04]	0.989	0.0003
Interviev	ver Responsivity to Self	0.03	0.01	1.82	[002, .05	0.069	0.03
Random Ef	fects						
Participa	nt Responsivity to Interviewer	0.004	0.002			0.046	
Participa	nt Responsivity to Self	0.011	0.004			0.004	
Residual	Interviewer	276.78	7.27			<.001	
	Participant	489.02	9.60			<.001	
	Cross-partner covariance	-0.07	0.12			0.574	

*Note.* CI = confidence interval. Responsivity to interviewer = extent that participant arousal at one talk turn is predicted by interviewer arousal at previous talk turn. Responsivity to participant = extent that interviewer arousal at one talk turn is predicted by participant arousal at previous talk turn. Responsivity to self = extent that an individual's (participant or interviewer) arousal at one talk turn is predicted by their own arousal at previous talk turn.

### Table 2

Repeated Measures Actor-Partner Interdependence Model of Participant and Interviewer Responsivity to Others' and Own Emotional Arousal with Moderation by Gender

Variable		В	SE	t	95% CI	р	r
Fixed Effects	3						
Particip	ant Gender	0.06	0.23	0.24	[40, .51]	0.807	0.003
Particip	ant Responsivity to Interviewer	0.07	0.01	5.12	[.04, .10]	<.0001	0.56
x Par	ticipant Gender	-0.01	0.01	-0.81	[04, .02]	0.422	-0.32
Particip	ant Responsivity to Self	0.12	0.02	5.54	[.07, .16]	<.0001	0.50
x Par	ticipant Gender	0.00	0.02	0.16	[04, .04]	0.872	0.02
Intervie	wer Responsivity to Participant	0.00	0.02	0.02	[04, .04]	0.989	0.0003
Intervie	wer Responsivity to Self	0.03	0.01	1.82	[002, .05]	0.069	0.03
Random Effe	ects						
Participant	Responsivity to Interviewer	0.004	0.002			0.039	
Participant	Responsivity to Self	0.012	0.004			0.004	
Residual	Interviewer	276.84	7.33			<.001	
	Participant	489.02	9.60			<.001	
	Cross-partner covariance	-0.07	0.12			0.569	

*Note.* CI = confidence interval. Responsivity to interviewer = extent that participant arousal at one talk turn is predicted by interviewer arousal at previous talk turn. Responsivity to participant = extent that interviewer arousal at one talk turn is predicted by participant arousal at previous talk turn. Responsivity to self = extent that an individual's (participant or interviewer) arousal at one talk turn is predicted by their own arousal at previous talk turn. Gender coded as men = 1 and women = <math>-1.

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# Table 3

Models of Participant Responsivity Predicting Concordance of Reporting of Perpetration or Victimization on Event History Calendar Interview Relative to Self-Report on the Revised Conflict Tactics Scales (CTS2; Straus et al., 1996)

				Perpetr	ation				Victim	ization	
	Variable	В	SE	t	95% CI	r	В	SE	t	95% CI	r
Fixed Effects	Intercept	0.48	3.03	0.16	[-5.87, 6.83]	0.04	2.52	4.66	0.54	[-7.14, 12.17]	0.11
	Gender	-0.88	3.02	-0.29	[-7.21, 5.46]	-0.07	0.33	4.49	0.07	[-9.02, 9.67]	0.02
	Responsivity to Interviewer	19.61	34.34	0.57	[-52.48, 91.70]	0.13	-17.07	41.77	-0.41	[-102.93, 68.78]	-0.08
	x Participant Gender	18.30	34.21	0.54	[-53.57, 90.18]	0.13	-0.64	38.55	-0.02	[-80.52, 79.23]	-0.004
	Responsivity to Self	-8.10	16.60	-0.49	[-42.72, 6.53]	-0.11	-7.78	28.13	-0.28	[-65.70, 50.15]	-0.06
	x Participant Gender	-3.45	16.61	-0.21	[-38.09, 31.18]	-0.05	-1.17	27.62	-0.04	[-58.13, 55.78]	-0.01
Random Effects	Men	19.27 ***	7.27	I	I	I	30.14 **	10.37	1	ł	ł
	Women	1.58	4.71	I	I	I	19.68	9.44	1	ł	ł
	Covariance	27.53 **	7.36	I	I	I	50.33 **	15.21	1	I	ł

interviewer = coefficient representing extent that participant arousal at one talk turn is predicted by interviewer arousal at previous talk turn. Gender coded as men = 1 and women = -1. \* p < .05, \*\* p < .01, Note. CI = confidence interval. Responsivity to self = coefficient representing extent that participant arousal at one talk turn is predicted by the participant's arousal at previous talk turn. Responsivity to \*\*\* *p* < .001 Author Manuscript

# Table 4

Models of Participant Responsivity Predicting Concordance of Reporting of Perpetration or Victimization on Event History Calendar Interview Relative to the Highest Other Available Report

				Perpeti	ration				Victimi	zation	
	Variable	В	SE	t	95% CI	r	В	SE	t	95% CI	r
Fixed Effects	Intercept	9.94	4.82	$2.06^{*}$	[0.12, 19.77]	0.35	9.42	3.78	2.49*	[1.82, 17.03]	0.34
	Gender	7.72	4.52	1.71	[-1.58, 17.01]	0.32	7.50	3.67	2.04	[0.11, 14.89]	0.29
	Responsivity to Interviewer	-46.42	54.96	-0.84	[-158.59, 65.75]	-0.19	-58.61	36.20	-1.62	[-131.27, 14.06]	-0.12
	x Participant Gender	-53.11	51.06	-1.04	[-158.48, 52.27]	-0.19	-48.51	34.53	-1.40	[-117.98, 20.96]	-0.20
	Responsivity to Self	-26.84	24.84	-1.08	[-77.58, 23.89]	-0.15	-19.97	22.18	-0.90	[-64.50, 24.56]	-0.22
	x Participant Gender	-25.37	24.29	-1.04	[-75.07, 24.33]	-0.21	-31.21	21.59	-1.45	[-117.98, 20.96]	-0.20
Random Effects	Men	77.81 <sup>***</sup>	20.96	I	I	I	39.43 ***	9.79	1	ł	ł
	Women	43.17 ***	10.35	I	I	I	57.24 **	16.63	ł	ł	ł
	Covariance	24.22 *	10.72	I	ı	I	11.29	8.99	ł	:	ł

interviewer = coefficient representing extent that participant arousal at one talk turn is predicted by interviewer arousal at previous talk turn. Gender coded as men = 1 and women = -1. \* p < .05, \*\*p < .01, Note. CI = confidence interval. Responsivity to self = coefficient representing extent that participant arousal at one talk turn is predicted by the participant's arousal at previous talk turn. Responsivity to \*\*\**p*<.001