INTIMATE PARTNER VIOLENCE AND INFANT SOCIOEMOTIONAL DEVELOPMENT: THE MODERATING EFFECTS OF MATERNAL TRAUMA SYMPTOMS

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ABSTRACT: The aim of the present study was to investigate the impact of intimate partner violence (IPV) on infant regulatory difficulties at 3 months of age and infant socioemotional problems at 12 months of age. Maternal trauma symptoms were explored as potential moderators of these associations. Participants included 120 primarily low-income, ethnically diverse women and their infants. Results revealed that infants whose mothers experienced IPV during pregnancy did not have significantly more regulatory difficulties at 3 months than did infants whose mothers did not experience prenatal IPV. However, infants whose mothers experienced IPV during the first year after birth displayed significantly more socioemotional problems at 12 months, as evidenced by both maternal report and observational data. Furthermore, maternal posttraumatic stress avoidance symptoms served as a moderator of the association between prenatal IPV and infant regulatory difficulties at 3 months whereas maternal posttraumatic stress hyperarousal and reexperiencing symptoms served as moderators of the association between IPV during the first year after birth and infant socioemotional problems at 12 months. The findings highlight the detrimental impact that IPV can have on very young children and the importance of maternal trauma symptoms as a context for understanding the effect of IPV on young children's functioning.

RESUMEN: La meta del presente estudio fue investigar el impacto de la violencia de la pareja íntima (IPV) sobre las dificultades regulatorias del infante a los 3 meses de edad y los problemas socio-emocionales del infante a los 12 meses de edad. Se exploraron los síntomas maternales de trauma como potenciales moderadores de estas asociaciones. Los participantes fueron 120 mujeres y sus infantes, primordialmente de bajos recursos y étnicamente diversos. Los resultados revelaron que los infantes cuyas madres experimentaron IPV durante el embarazo no tenían significativamente más dificultades regulatorias a los 3 meses que los infantes cuyas madres no habían experimentado IPV prenatal. Sin embargo, los infantes cuyas madres experimentaron IPV durante el primer año después del nacimiento mostraron significativamente más problemas socio-emocionales a los 12 meses, lo cual es evidente tanto a través de los reportes maternales como la información de observación. Es más, los síntomas maternales de anulación del estrés postraumático sirvieron como un moderador de la asociación entre IPV prenatal y las dificultades regulatorias del infante a los 3 meses; mientras que los síntomas maternales de híper excitación y re-experimentación del estrés postraumático sirvieron como moderadores de la asociación entre IPV durante el primer año después del nacimiento y los problemas socio-emocionales del infante a los 12 meses. Los resultados subrayan el perjudicial impacto que IPV puede tener sobre los muy pequeños niños y la importancia de los síntomas maternales de trauma como un contexto para la comprensión del efecto de IPV en el funcionamiento de los pequeños niños.

RÉSUMÉ: Le but de cette étude était de rechercher l'impact de la violence exercée par un partenaire intime (ici abrégé VPI en français, abrégé IPV en anglais) sur les difficultés regulatrices du nourrisson à l'âge de trois mois et les problèmes socio-émotionnels du bébé à l'âge de 12 mois. Les symptômes de trauma maternel sont explorés en tant que modérateurs potentiels sur ces liens. Les participants ont inclu 120 femmes d'horizons ethniques divers et de milieux défavorisés et leurs bébés. Les résultats révèlent que les bébés de mères ayant connu la VPI durant la grossesse n'avait pas de plus grandes difficultés de régulation à 3 mois que les bébés de mères n'ayant pas fait l'objet de VPI avant la naissance. Cependant les bébés de mères ayant connu la VPI durant la première année après la naissance faisaient preuve de plus de problèmes socio-émotionnels à 12 mois, comme le montrent à la fois les rapports faits par les mères et les données d'observation. De plus, les symptômes d'évitement de stress post-traumatique maternel ont servi de modérateur du lien entre la VPI prénatale et les difficultés régulatrices du nourrisson à 3 mois, alors que l'hypervigilance du stress post-traumatique maternel et le fait de revivre les symptômes ont servi de modérateurs du lien entre la VPI durant la première année après la naissance et les problèmes socio-émotionnels du bébé à 12 mois. Les résultats soulignent l'impact nuisible que la VPI peut avoir sur les très jeunes enfants et l'importance des symptômes de trauma maternel en tant que contexte pour la compréhension de l'effet de la VPI sur le fonctionnement des jeunes enfants.

ZUSAMMENFASSUNG: Das Ziel der vorliegenden Studie war es, die Auswirkungen von Gewalt in der Partnerschaft (intimate partner violence, IPV) hinsichtlich regulatorischer Schwierigkeiten bei 3 Monate alten Säuglingen sowie deren sozial-emotionale Probleme im Alter von 12 Monaten zu untersuchen. Mütterliche Traumasymptome wurden als potenzielle Moderatoren dieser Assoziationen erforscht. Die Stichprobe umfasste 120 Kinder und Mütter mit überwiegend niedrigem Einkommen und verschiedener Ethnizität. Die Ergebnisse zeigten, dass Kinder, deren Mütter während der Schwangerschaft IPV erlebten, mit 3 Monaten nicht signifikant mehr regulatorische Schwierigkeiten hatten als Kinder, deren Mütter keine pränatale IPV erlebt hatten. Allerdings zeigten Säuglinge, deren Mütter während des ersten Jahres nach der Geburt IPV erlebten signifikant mehr sozial-emotionale Probleme mit 12 Monaten, was sowohl durch mütterliche Berichte als auch durch Beobachtungsdaten nachgewiesen wurde. Darüber hinaus fungierten mütterliche posttraumatische Symptome der Stressvermeidung als Moderator beim Zusammenhang zwischen pränataler IPV und regulatorischen Schwierigkeiten der 3 Monate alten Säuglinge. Mütterliche posttraumatische Übererregbarkeit und Symptome des Wiedererlebens waren Moderatoren des Zusammenhangs zwischen IPV im ersten Jahr nach der Geburt und den sozial-emotionalen Problemen des Säuglings mit 12 Monaten. Die Ergebnisse unterstreichen die nachteiligen Auswirkungen, die IPV auf sehr junge Kinder haben kann und die Bedeutung der mütterlichen Traumasymptome als Kontext für das Verständnis der Wirkung von IPV auf das Funktonsniveau junger Kinder.

ABSTRACT: The aim of the present study was to investigate the impact of intimate partner violence (IPV) on infant regulatory difficulties at 3 months of age and infant social-emotional problems at 12 months of age.

抄録:この研究の目的は、親密なパートナー間暴力 intimate partner violence (IPV) が、3 ヶ月時の乳児の調節困難 regulatory difficulties および 12 ヶ月時の乳児の社会−情緒的問題に与える影響を調査することだった。母親の外傷症状は、これらの関連の潜在的調節因子 moderator として調査された。実験参加者には、120 組の主として低所得の多様な民族の女性とその乳児が含まれた。結果から、母親が妊娠中に IPV を体験した乳児は、出産前の IPV を体験しなかった母親の乳児よりも、3 ヶ月時に有意に多くの調節困難があることはないと、明らかになった。しかし、出産後 1 年間に IPV を体験した母親の乳児は、12 ヶ月時に社会情緒的問題を有意に多く示した。これな母親の報告と観察データの両方から根拠づけられた。さらに、母親の PTSD 回避症状は、母親の出産前 IPV と乳児の 3 ヶ月時の調節困難との間の関連の調節因子の役割を果たしたが、それに対し母親の PTSD 過覚醒症状と再体験症状は、出産後1年間の IPV と 12 ヶ月時の乳児の社会情緒的問題との間の関連の調節因子となっつの役割を果たした。所見は、IPV が非常に幼い子どもに与える有害な影響と、IPV が幼い子どもの機能に与える影響を理解するコンテクストとしての母親のトラウマ症状の重要性を強調する。

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During the first year of life, infants are incredibly dependent upon their caregivers for physiological and emotional regulation. Without assistance from caregivers and coregulation of physical and affective experiences, infants are left to experience unpleasant states of arousal on their own, which diminishes positive socioemotional learning opportunities and increases the probability of impaired socioemotional development (Emde, 1989; Schore, 2001). In turn, socioemotional development in the early years of life is an important contributor to life-long development and functioning (Sroufe, 2005; Sroufe, Egeland, Carlson, & Collins, 2005). Understanding risk factors that may threaten healthy socioemotional well-being in the first year of life, therefore, is important in developing interventions for at-risk families with very young children as well as in influencing prevention, policy, and advocacy efforts aimed at facilitating the best start possible for infants.

Since infants are so dependent upon their caregivers, risk factors that not only threaten the well-being of the infant but also that of the caregiver likely have a detrimental impact on the infant's socioemotional development. Intimate partner violence (IPV), along with maternal mental health sequelae such as posttraumatic stress disorder (PTSD) symptoms, are two such risk factors. Considerable research has documented the negative impact that IPV has on all domains of development for children older than 3 years of age, but there has been less research conducted with infants and toddlers. As the first 3 years of life are especially critical to children's development, particularly their neurobiological and socioemotional

development, it is important that researchers focus more attention on this area. The present study aimed to investigate how IPV and maternal PTSD symptoms during pregnancy and the first year after birth impact infant socioemotional development at 3 months and 12 months of age using a primarily low-income, community sample of women. Clinical application of findings to maternal, infant, and mother–infant well-being also are discussed.

RISK FACTORS FOR POOR SOCIOEMOTIONAL DEVELOPMENT IN INFANTS: IPV AND MATERNAL PTSD

Various factors may place infants at risk for poor socioemotional development. One factor that has been studied relatively little in regard to infants is exposure to IPV. In this article, IPV is conceptualized as male-to-female violence and may involve physically, sexually, and/or emotionally/psychologically abusive acts. Prevalence rates of IPV for women have varied based on location, methodology, and how IPV is operationalized, but consistently have indicated that IPV is quite common. For instance, the 2010 National Intimate Partner and Sexual Violence Survey (Black et al., 2011) found the following lifetime prevalence rates for women in the United States: 9.4% (rape), 32.9% (physical violence), 10.7% (stalking), and 48.4% (any psychological aggression). Women are particularly susceptible to IPV during the childbearing years. Recent international prevalence rate estimates of IPV have noted that approximately 0.9 to 36% of women have experienced IPV during

pregnancy (Devries et al., 2010; Taillieu & Brownridge, 2009). IPV tends to stay the same or increase in severity and/or frequency during pregnancy for 13 to 71% of women (Taillieu & Brownridge, 2009). Rates of IPV continue to be high during the postpartum period; recent studies have found rates that range between 20.9 and 30% (Charles & Perreira, 2007; Rosen, Seng, Tolman, & Mallinger, 2007).

IPV has numerous detrimental effects on women and exposed children. Many of these effects are beyond the scope of this article; therefore, only associations with maternal mental health, parenting, and infant socioemotional well-being will be briefly reviewed. First, research has documented a myriad of mental health consequences associated with experiencing IPV (e.g., Okuda et al., 2011). PTSD, in particular, may result from traumatic events that are generally characterized, according to the *Diagnostic and Statistical Manual of Mental Disorders, fifth edition* (American Psychiatric Association, 2013), by "exposure to actual or threatened death, serious injury, or sexual violence" and are accompanied by symptoms of reexperiencing, avoidance, negative changes in thoughts and affect, and increased arousal (p. 271). Many women who have experienced IPV have subsequently suffered from PTSD. Recent studies have reported PTSD diagnosis and symptom rates ranging from 16.3 to 57.4% among different samples of women who have experienced IPV, including samples of pregnant women (Mechanic, Weaver, & Resick, 2008; Nathanson, Shorey, Tirone, & Rhatigan, 2012; Norwood & Murphy, 2012; Rodriguez et al., 2008; Stampfel, Chapman, & Alvarez, 2010).

IPV also has negative consequences on a woman's ability to parent her children as well as negative consequences on the quality of the mother–infant relationship and a mother's perceptions of her infant, all of which may contribute to poor infant socioemotional well-being. Higher parenting stress, increased use of less effective parenting practices (e.g., diversion, spanking, permissiveness), and decreased use of effective parenting practices (e.g., positive reinforcement, physical affection, sensitivity) are common parenting consequences of IPV for mothers (Holden, Stein, Ritchie, Harris, & Jouriles, 1998; Levendosky, Leahy, Bogat, Davidson, & von Eye, 2006; Postmus, Huang, & Mathisen-Stylianou, 2012; Rea & Rossman, 2005; Ritchie & Holden, 1998), as is increased child abuse potential (Casanueva & Martin, 2007; Chan et al., 2012). Moreover, mothers in relationships characterized by higher conflict or violence are more likely to have distorted and negative views of their infants before and after birth (Huth-Bocks, Levendosky, Theran, & Bogat, 2004; Sokolowski, Hans, Bernstein, & Cox, 2007). They also tend to have less secure representations of their caregiving and less secure mother–infant attachments (Huth-Bocks, Levendosky, Bogat, & von Eye, 2004; Zeanah et al., 1999). Thus, recent research has suggested that mothers in violent relationships are more likely to parent their children in a less effective manner as well as harbor insecure internal representations of their infants and their own caregiving, thereby putting their children at risk for socioemotional problems.

Similarly, PTSD symptoms can make parenting a very young child difficult as well as impair the mother–child relationship, al-

though this is not an area that has been well researched. For instance, Chemtob and Carlson (2004) found that mothers who had experienced IPV and who met criteria for PTSD were more quick and impulsive in interactions with their children, underestimated the distress their children experienced, and were significantly less likely than were mothers without PTSD to seek services for their children. Other studies have found that mothers with PTSD symptoms were more likely to report difficulties bonding with their infants (Muzik et al., 2013), negative perceptions of their infants, and negative perceptions of their relationships and interactions with their infants (J. Davies, Slade, Wright, & Stewart, 2008; Tees et al., 2010). Last, Schechter and colleagues (2008; Schechter et al., 2005) found that the more PTSD symptoms a mother had, the more frequently she engaged in withdrawal or avoidant behaviors during interactions with her child and the more likely she was to have distorted (e.g., hostile, role-reversed, inconsistent, incoherent) mental representations of her child. Maternal PTSD symptoms, therefore, also place infants at risk of developing socioemotional problems due to the impact that these symptoms have on parenting, the mother–infant relationship, and a mother's perceptions of her infant.

IPV also is associated with numerous detrimental outcomes in children; however, research involving infants is very limited. Existing studies have indicated that IPV is associated with both physiological and emotional dysregulation in young children, including an increased likelihood of difficult infant temperament at 12 months of age (Burke, Lee, & O'Campo, 2008) and greater infant physiological dysregulation at 24 months of age, as indicated by increased cortisol reactivity (Hibel, Granger, Blair, & Cox, 2011). Moreover, exposure to IPV during infancy and toddlerhood has been found to be associated with infant trauma symptoms (Bogat, DeJonghe, Levendosky, Davidson, & von Eye, 2006; Zeanah & Scheeringa, 1997), increased distress when exposed to verbal conflict (DeJonghe, Bogat, Levendosky, von Eye, & Davidson, 2005), externalizing and internalizing symptoms, atypical/maladaptive problems, and difficulties with affect regulation (DeJonghe, von Eye, Bogat, & Levendosky, 2011; McDonald, Jouriles, Briggs-Gowan, Rosenfield, & Carter, 2007), as well as attachment disorders (Zeanah & Scheeringa, 1997). In addition, recent research has suggested that stress during the prenatal period is associated with adverse neurodevelopmental outcomes in children (O'Donnell, O'Connor, & Glover, 2009; Sandman, Davis, & Glynn, 2012). Thus, it is likely that exposure to IPV does not need to happen solely after birth to have an impact on the child.

Maternal prenatal and postnatal PTSD symptoms also may be a key contributor to the socioemotional effects of IPV for very young children, especially since the fetal environment greatly influences development and since very young children are dependent on their caregivers for physiological and emotional regulation. Recent research by Yehuda et al. (2005), for instance, found that pregnant women who had been exposed to the 9/11 terrorist attacks or exposed to the environmental aftermath of the 9/11 terrorist attacks for significant amounts of time and who then developed PTSD

had infants with lower cortisol levels during the first year of life. This finding was most evident for infants of mothers who were in their third trimester at the time of the attacks. Moreover, Brand, Engel, Canfield, and Yehuda (2006) found that the mothers who developed PTSD reported that their infants tended to be more distressed in response to novelty at 9 months of age, and maternal PTSD symptoms were positively correlated with severity of infant distress.

Furthermore, Schechter et al. (2011) found that maternal PTSD symptom severity, in the context of IPV, was associated with child (aged 18–48 months) PTSD, externalizing, and internalizing symptoms, accounting for 42, 23, and 10% of the variance, respectively. When IPV by the child's father was accounted for in predicting child PTSD symptom severity, maternal PTSD symptom severity still remained a strong predictor and accounted for 30 of 45% of the variance that these two predictors accounted for together. Moreover, the effect of IPV on child PTSD and externalizing symptoms was partially mediated by maternal PTSD symptom severity. Thus, previous research has suggested that both prenatal and postnatal PTSD symptoms may be influential in young children's functioning, particularly within the context of IPV. Although maternal PTSD symptoms, to the best of our knowledge, have not yet been investigated as a moderator of the effects of IPV on children's outcomes, research on the effects of other traumas (e.g., natural disasters) on child outcomes has suggested possible moderating effects (Spell et al., 2008).

THE PRESENT STUDY

In sum, past research has highlighted the detrimental effect that IPV and maternal PTSD symptoms, experienced prenatally and/or postnatally, may have on very young children. However, more research is needed in this area, especially during the first year of life, to better understand how IPV and maternal PTSD symptoms (a common mental health consequence of experiencing IPV) together impact infant well-being during the first year of life. As discussed earlier, recent research has suggested that maternal PTSD symptoms may be a critical component in how children are affected by trauma. If this is true for infants, then addressing maternal PTSD symptoms may prove to be one feasible and effective way of intervening on behalf of infants exposed to IPV. In the present study, it was hypothesized that (a) mothers who experienced IPV during their pregnancy, as compared to those who did not, would have infants with greater regulatory difficulties (i.e., crying, feeding, and sleeping difficulties) at 3 months of age; and (b) mothers who experienced IPV during the first year after birth, as compared to those who did not, would have infants with more socioemotional problems at 12 months of age. To better understand how maternal PTSD symptoms influence the association between IPV and infant socioemotional outcomes at both time points, maternal PTSD symptoms were examined as possible moderators through exploratory analyses.

METHOD

Participants

Participants included 120 primarily low-income women who participated in a five-wave longitudinal study on parenting over the course of pregnancy to the infant's third birthday. Data from Waves 1 to 3 of the larger study were used in the present study. Wave 1 of data was collected when the participants were in their third trimester of pregnancy; Wave 2 of data ($n = 119$; 99% retention) was collected when the participants' infants were 3.2 months old, on average (range $= 2.3$–9.7 months, $SD = 1.0$); and Wave 3 of data ($n = 114$; 95% retention) was collected when the participants' infants were 12.2 months old, on average (range $= 11.6$–14.6 months, $SD = 0.6$). Participants were between the ages of 18 and 42 ($M = 26.2$, $SD = 5.7$) years at study entry, 30% were pregnant for the first time, and 47% self-identified as African American, 36% as Caucasian, 12% as Biracial, and 5% as belonging to other ethnic groups. At Wave 1, 63% of participants reported that they were single (never married), 28% were married, 4% were separated, and 5% were divorced. Furthermore, 20% of participants reported having a high-school diploma/GED or less education, 44% reported having some college or trade school, and 36% reported having a college degree. The median monthly family income for participants was $1,500.00 (range $= 0–10,416.00), and participants reported receiving a variety of public social services: Women, Infants, and Children (WIC) program (73%); food stamps (52%); Medicaid, Mi-Child, or Medicare (76%); and public supplemental income (17%).

Participants were recruited via fliers advertising a study about parenting. Fliers were placed at areas primarily serving low-income or high-risk pregnant populations, such as several community-based health clinics serving low-income and/or uninsured individuals, the WIC office, a community "baby shower" hosted by community social service agencies, and student areas in one regional-level university and one community college. This study maintained University Internal Review Board approval throughout its duration.

Procedures

Fliers requested that pregnant women interested in the study contact the research office. Upon contacting the research office, participants were given information about the study purpose, and basic information was gathered from them to determine if they met eligibility criteria for the study. Participants were required to be pregnant, 18 years of age or older, and able to speak fluent English. Interested participants were scheduled for the first interview when they were in their third trimester of pregnancy. The first interview (Wave 1) was conducted in either the participant's home (81%) or at a research office on campus (19%), based on participant preference. Interviews lasted approximately $2^{1/2}$ to 3 hr and were conducted by two trained research assistants. After informed consent procedures, interviews included a brief demographic questionnaire, a semistructured, 1-hr, audio-recorded interview, and then a

number of questionnaires that were administered in the same pre-determined order for all participants. The lead research assistant read all questionnaires aloud to the participant and recorded her answers to minimize random responding and protect against possible literacy difficulties. Participants were, however, given a copy of the questionnaires with which to follow along.

At the end of the interview, the research assistant asked the participant's permission to stay in contact with her every 3 months until the next follow-up interview. Those agreeing to participate in follow-up interviews were asked to provide contact information for as many as three people who could provide information on their location in case they could not be reached at the next contact interval (These additional individuals were called "recontact people."). This procedure was used to help minimize attrition at the later interview time points. Last, participants were given a list of community resources and compensated with a $25 gift card.

Prior to the second interview (Wave 2) at 3 months postpartum, each participant was contacted by a research assistant approximately 2 weeks after the anticipated due date of her baby to confirm the baby's date of birth and obtain information regarding the baby's sex and name. The participant's contact information also was updated, and permission for future contact was again obtained. As mentioned earlier, Wave 2 of data collection occurred when the target infants were approximately 3.2 months of age (range = 2.3–9.7 months, $SD = 1.0$). This interview was typically conducted over the telephone, but occasionally (3%) at the participant's home. If participants could not be contacted directly, they were contacted through one of the recontact people whom they had listed at the first interview or, less frequently, through home visits. This second interview lasted approximately 30 to 45 min, and the main purpose was to obtain information about the mothers' and infants' health and well-being during the infants' first 3 months of life. After completing the interview, participants were sent a list of community resources and a $10 gift card.

The third interview (Wave 3) at 1 year after birth was conducted in the same manner as was the initial interview. Based on participant preference and location, interviews were conducted in either the participant's home (92%), at a research office (4%), or over the telephone (4%) and lasted approximately 3 hr. Mothers were informed ahead of time that the target infant needed to be present at this interview. After informed consent procedures, a brief demographic questionnaire was completed, a standardized assessment of infant emotion recognition was administered, and mothers were asked to engage in a 10-min, free-play interaction with their infant using a standard set of toys. Subsequently, the remaining questionnaires and a short, projective task assessing maternal attachment scripts were then administered in the same predetermined order. Again, the lead research assistant read all questionnaires aloud to the participant and recorded the participant's verbal answers, and participants were given a questionnaire packet with which to follow along for convenience. At the end of the interview, the research assistant asked the participant's permission to stay in contact with her until the next interview, and if she agreed, her contact information as well as that of her recontact people were updated. Last, participants were given a referral list of community resources and were compensated with $50 in cash and a baby gift.

Measures

Prenatal and postnatal IPV. The Conflict Tactics Scales-2 (CTS-2; Straus, Hamby, & Warren, 2003) was used at Waves 1 and 3 to assess for a history of violent intimate partner interactions during pregnancy and the first year after birth. The CTS-2 is a 78-item questionnaire designed to assess minor and severe experiences of psychological, physical, and sexual partner violence as well as injury caused by violence from a partner. Thirty-three items assess perpetration, and 33 items assess victimization. In addition, 12 items assess conflict negotiation. Due to the interests of the larger study, only the 33 items that assess experiences of victimization were used. Response categories for each item include: 0 (*never*), 1 (*once*), 2 (*twice*), 3 (*3–5 times*), 4 (*6–10 times*), 5 (*11–20 times*), 6 (*>20 times*), and 7 (*not during these time periods, but it happened before*). The CTS-2 is scored by using a weighting system in which values are recoded (1 = 1, 2 = 2, 3 = 4, 4 = 8, 5 = 15, and 6 = 25). Higher scores indicate greater severity (frequency) of IPV.

Good internal consistency reliability for each of the five subscales of the CTS-2 and evidence of convergent and discriminant validity have been reported, as has the tendency for each CTS-2 item to load highest on its intended subscale in factor analyses (Straus et al., 2003). In the current sample, CTS-2 coefficient αs were .93 at Wave 1 (pregnancy) and .95 at Wave 3 (1 year after birth) for total scores; however, presence/absence of IPV at each time period was used in analyses. Due to the severity of items, presence of IPV at each time period was indicated if the participant endorsed having experienced at least one incident of psychological, physical, or sexual partner violence in the last year. Psychological violence was included as a form of IPV because a growing body of literature has suggested that it makes unique and significant contributions to maternal outcomes, beyond physical and sexual violence (Huth-Bocks, Krause, Ahlfs-Dunn, Gallagher, & Scott, 2013; Mechanic et al., 2008; Norwood & Murphy, 2012).

Prenatal and postnatal maternal PTSD symptoms. The Posttraumatic Stress Disorder Checklist-Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993) was used at Waves 1 and 3 to assess maternal PTSD symptoms during pregnancy and at 1 year after birth. The PCL-C is a 17-item self-report questionnaire comprised of three subscales that correspond to the three *DSM-IV* (American Psychiatric Association, 1994) PTSD symptom clusters: (a) avoidance, (b) reexperiencing, and (c) hyperarousal. Participants report on the symptoms that they have been experiencing over the last month, and they rate items on a Likert-type scale ranging from 1 (*not at all*) to 5 (*extremely*). Higher scores on the subscales indicate greater severity of symptoms within the respective subscale/symptom cluster. A total PTSD symptom score also

can be calculated by summing the individual items; higher total scores indicate greater severity of PTSD symptoms.

High internal consistency reliability, acceptable 1-week test-retest reliability, and convergent validity have been reported for the PCL-C (Wilkins, Lang, & Norman, 2011). In the present study, the total PTSD symptom score and the three subscale scores from Wave 1 (pregnancy) and Wave 3 (1 year after birth) were used in analyses. The coefficient αs in the current sample at Wave 1 were .87 (total), .61 (avoidance), .83 (reexperiencing), and .63 (hyperarousal). At Wave 3, coefficient αs were .91 (total), .78 (avoidance), .84 (reexperiencing), and .58 (hyperarousal).

Infant socioemotional development at 3 months of age. The Cry-Feed-Sleep Interview (CFSI; McDonough, Rosenblum, Devoe, Gahagan, & Sameroff, 1998) was used at Wave 2 to assess infants' early emotional and physiological regulation involving crying, feeding, and sleeping. The current version of the CFSI is an unpublished 56-item measure designed to assess details of an infant's crying or fussiness, feeding, and sleeping patterns, and parents' perceptions of these patterns early in the first year of life. The crying and sleeping items were based on existing measures (Seifer et al., 1994; St James-Roberts & Halil, 1991), which have been previously used with success (e.g., Hairston et al., 2011; McGlaughlin & Grayson, 2001). Scoring of the CFSI is based on researcher aims. In the present study, two subscales (one based on fixed-response items assessing infant behavior and the other based on fixed-response items assessing maternal perception) were created for each of the three domains (i.e., crying, feeding, and sleeping). Based on correlational results and for conceptual reasons, individual domain composites (i.e., crying, feeding, and sleeping) were created by summing the two subscales for each domain. However, prior to creating these composites, all six subscales were first *z*-scored since they were made up of a different number of items and because some were scaled differently from each other. Z-scoring the six subscales allowed all of them to be weighted equally when summed to create the CFSI domain composites. The crying, feeding, and sleeping domain composites had 6, 9, and 31 items, respectively. Subsequently, because these three domain composites each had satisfactory internal consistency (α = .55, .50, and .74, respectively) and were found to be significantly correlated with each other (*r*s range = .48–.53), a total CFSI dysregulation composite was created by summing them. Higher scores indicate greater infant regulatory difficulties. In the present study, the total CFSI dysregulation composite was used in analyses. The coefficient α for this composite was .78.

Infant socioemotional development at 12 months of age. The Brief Infant Toddler Social and Emotional Assessment (BITSEA; Briggs-Gowan & Carter, 2006) was used at Wave 3 to assess infant socioemotional problems at 12 months of age. The BITSEA is a 42-item, parent-report, screening questionnaire designed to assess socioemotional and behavior problems or delays and socioemotional competence in young children aged 12 to 36 months. Items are rated on a scale of 0 (*not true/rarely*), 1 (*somewhat true/sometimes*),

and 2 (*very true/often*) regarding the child's behavior over the last month. Items compose a Problem scale (31 items) and a Competence scale (11 items). Higher scores indicate more socioemotional or behavior problems or greater socioemotional competence, respectively. Various studies have assessed the psychometric properties of the BITSEA and have found that it has strong internal consistency reliability; good temporal consistency reliability; and content, convergent, discriminant, concurrent, and predictive validity (Briggs-Gowan, Carter, Irwin, Wachtel, & Cicchetti, 2004: Karabekiroglu, Briggs-Gowan, Carter, Rodopman-Arman, & Akbas, 2010). In the present study, only the BITSEA Problem scale was used in analyses. The coefficient α for this scale was .77.

In addition, a 10-min mother–infant, video-taped, free-play interaction was used at Wave 3 to assess infant socioemotional problems at 12 months of age. A standard set of developmentally appropriate toys were provided, and mothers were asked to engage with their infants as they normally would. Using the video-tapes, infants were later coded for social engagement, positive affect, negative affect, and flat/withdrawn affect by three trained and reliable coders. Social engagement was characterized as the degree to which the infant engaged with the mother in social activities or social games. Positive, negative, and flat/withdrawn affect were characterized as the overall degree to which the infant expressed each respective emotion during the interaction. On each of these subscales, infants were given a global rating ranging from 1 (*no instances or evidence of the construct*) to 5 (*very high instances or evidence of the construct*) for the entire 10-min period. Coders were first trained in-depth on the subscales by a doctoral-level graduate student who served as the "gold standard" coder. After training, two coders established interrater reliability on approximately 20% of randomly chosen mother–infant interaction tapes from the present study. Once interrater reliability was established, coders were given a random subset of the interaction videos to code. Throughout coding, the gold standard coder randomly selected videotapes to double-code. Final reliabilities on each of the subscales reflect a combination of the initial and ongoing reliability calculations; average intraclass correlation coefficients in the current sample were: .86 (social engagement), .95 (positive affect), .95 (negative affect), and .89 (flat/withdrawn affect).

RESULTS

Missing Data

Missing item-level and scale-level data on the CTS-2 and the PCL-C were minimal (<10%) and were imputed using an expectation maximization algorithm from SPSS 17.0 before any data analysis occurred. Subsequently, scale scores on these two measures were available for all 120 participants at both time periods. On the CFSI, data from 2 participants were missing and estimated, data from 4 participants were missing but not estimated due to lack of birth confirmation and lengthy maternal separation from the infant

after birth, and data from 5 other participants were excluded due to completion of the measure outside of the study-designated 2- to 4-month age range (Infants outside of this age range would be expected to be substantially different in their regulatory capacities.); thus, analyses using the CFSI were based on 111 participants. Analyses revealed that the 9 excluded participants differed from the 111 included participants on only family income and relationship status. The excluded participants had a significantly lower average family income, $t(28.36) = 4.29$, $p < .001$, and were significantly more likely to be divorced than were the included participants, $\chi^2 (3, N = 120) = 17.07$, $p < .01$. The excluded participants, however, continued to be followed through 12 months after birth, and some were retained for other analyses. BITSEA data from 8 participants were missing, and infant observational data from 13 participants were missing. On both of these variables, missing data from 5 participants were not estimated due to lack of birth confirmation and lengthy separation from the child; thus, analyses including these variables were based on 115 participants. Participants whose BITSEA and infant observational data were not estimated were significantly more likely to be divorced than were included participants, $\chi^2 (3, N = 120) = 33.67$, $p < .001$. Estimated CFSI, BITSEA, and infant observational data were again imputed as described earlier before data analysis occurred.

Descriptive Statistics

Overall, rates of IPV during pregnancy and the first year after birth were high for the sample. During pregnancy, 22% of women reported experiencing at least one incident of physical or sexual violence; this increased to 78% when psychological violence was included. Moreover, during the first year after birth, approximately 18% of women reported experiencing at least one incident of physical or sexual violence; this increased to 79% when psychological violence was included. Severity of PTSD symptoms at both time points was relatively low. In the third trimester of pregnancy, participants reported an average total PTSD score of 29.76 (range = 17–67); at 1 year after birth, they reported an average total PTSD score of 28.43 (range = 17–63). Mothers reported a wide range (−5.34–16.20) of infant crying, feeding, and sleeping difficulties at 3 months of age, and an average total score of 11.10 (range = 1–38) for infant socioemotional problems at 12 months of age; the latter indicates somewhat low levels of maternal-reported infant problems for the sample as a whole. Last, infants displayed low to moderate levels of social engagement ($M = 3.23$, range = 2–5), positive affect ($M = 2.70$, range = 1–4), negative affect ($M = 1.60$, range = 1–4), and flat/withdrawn affect ($M = 2.69$, range = 1–4) while interacting with their mothers.

IPV and Infant Socioemotional Development at 3 Months of Age

The Mann–Whitney test was used (due to data not meeting parametric assumptions; in particular, normality and homogeneity of variance) to examine the hypothesis that mothers who experienced IPV during their pregnancy, as compared to those who did not,

TABLE 1. *Mann–Whitney Test of Infant Socioemotional Problems at 12 Months of Age Between Intimate Partner Violence (IPV) Groups*

Variable	IPV During the First Year After Birth		Test Statistic
	Presence (n = 90) *Mdn*	Absence (n = 25) *Mdn*	
Mother-Reported Problems (BITSEA)	11.00	8.00	$U = 684.00$, $z = -3.00$**
Social Engagement	3.00	3.00	$U = 994.50$, $z = -.96$
Positive Affect	3.00	3.00	$U = 875.00$, $z = -1.76$*
Negative Affect	1.00	1.00	$U = 1103.50$, $z = -.16$
Flat/Withdrawn Affect	3.00	2.00	$U = 837.00$, $z = -2.15$*

BITSEA = Brief Infant Toddler Social and Emotional Assessment.
*$p < .05$, one-tailed. **$p < .01$, one-tailed.

would have infants with greater regulatory difficulties (i.e., crying, feeding, and sleeping difficulties) at 3 months of age. This hypothesis was not supported. Infant regulatory difficulties at 3 months of age as reported by mothers who had experienced IPV during pregnancy ($Mdn = -1.04$) were not significantly higher than infant regulatory difficulties reported by mothers who had not experienced IPV during pregnancy ($Mdn = .56$), $U = 934.00$, $z = -1.00$, $p > .05$.

IPV and Infant Socioemotional Development at 12 Months of Age

The Mann–Whitney test also was used to examine the hypothesis that mothers who experienced IPV during the first year after birth, as compared to those who did not, would have infants with more socioemotional problems at 12 months of age. This hypothesis was partially supported. Infant socioemotional problems on the BITSEA at 12 months of age as reported by mothers who had experienced IPV during the first year after birth were significantly higher than infant socioemotional problems reported by mothers who had not experienced IPV during the first year after birth (see Table 1). Furthermore, after controlling for the presence of IPV during pregnancy, presence of IPV during the first year after birth continued to be significantly associated with mother-reported infant socioemotional problems at 12 months of age, $F(1, 112) = 7.47$, $p < .01$. Presence of IPV during pregnancy (in this case, the covariate) was not significantly related to mother-reported infant socioemotional problems at 12 months of age, $F(1, 112) = .03$, $p > .05$.

Only some differences emerged for infant observational codes. More specifically, infants of mothers who had experienced IPV during the first year after birth were not significantly less likely to socially engage with their mothers nor were they significantly more likely to display negative affect than were infants whose mothers had not experienced IPV during the first year after birth (see Table 1). However, infants of mothers who had experienced IPV during the first year after birth were significantly less likely

to display positive affect and significantly more likely to display flat/withdrawn affect than were infants whose mothers had not experienced IPV during the first year after birth (see Table 1). After controlling for the presence of IPV during pregnancy, presence of IPV during the first year after birth continued to be significantly associated with infant flat/withdrawn affect at 12 months of age, $F(1, 112) = 4.15$, $p < .05$. Presence of IPV during pregnancy (in this case, the covariate) was not significantly related to infant flat/withdrawn affect at 12 months of age, $F(1, 112) = .53$, $p > .05$.

Maternal PTSD Symptoms as a Moderator

Regression analyses were used to explore maternal PTSD symptoms as a moderator of the association between presence of IPV and infant socioemotional outcomes at 3 and 12 months of age. Analyses revealed that specific PTSD symptom clusters moderated the associations between IPV and infant socioemotional outcomes; however, total PTSD symptoms did not moderate these relationships. Specifically, the association between presence of IPV during pregnancy and infant regulatory difficulties at 3 months of age was moderated by prenatal maternal PTSD avoidance symptoms, $\beta = .39$, $p < .05$. Post hoc analyses revealed a significant negative slope for low avoidance symptoms, but not for high avoidance symptoms (see Figure 1).

The associations between presence of IPV during the first year after birth and infant socioemotional problems at 12 months of age also were moderated by maternal PTSD symptoms. Specifically, the association between presence of IPV during the first year after birth and mother-reported infant socioemotional problems at 12 months of age was moderated by maternal PTSD hyperarousal symptoms at 1 year, $\beta = .40$, $p < .05$. There also was a main effect for presence of IPV, $\beta = .26$, $p < .01$, such that presence of IPV was associated with more infant socioemotional problems. Post hoc analyses revealed a significant positive slope for high hyperarousal symptoms, but not for low hyperarousal symptoms (see Figure 2). In addition, the association between presence of IPV during the first year after birth and observed infant social engagement was moderated by maternal PTSD hyperarousal symptoms at 1 year, $\beta = -.43$, $p < .05$, as well as maternal PTSD reexperiencing symptoms, $\beta = .82$, $p < .05$. There was a main effect for hyperarousal symptoms, $\beta = .37$, p < .05, as well as a main effect for reexperiencing symptoms, $\beta = -.94$, $p < .05$. Post hoc analyses revealed a significant negative slope for high hyperarousal symptoms, but not for low hyperarousal symptoms (see Figure 3), as well as a significant negative slope for low reexperiencing symptoms, but not for high reexperiencing symptoms (see Figure 4). The association between presence of IPV during the first year after birth and observed infant positive affect also was moderated by maternal PTSD hyperarousal symptoms at 1 year, $\beta = -.47$, $p < .05$. Post hoc analyses revealed a significant negative slope for high hyperarousal symptoms, but not for low hyperarousal symptoms (see Figure 5).
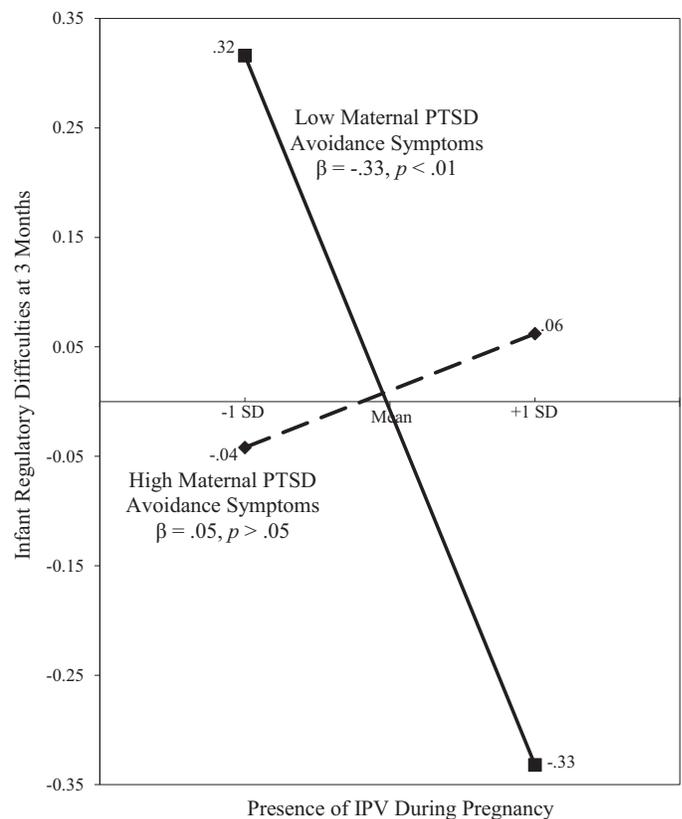

FIGURE 1. Maternal posttraumatic stress disorder avoidance symptoms during pregnancy as a moderator of the association between presence of intimate partner violence during pregnancy and infant regulatory difficulties at 3 months of age.

DISCUSSION

As research in the area of IPV, maternal PTSD, and infant socioemotional development during the first year of life is limited, greater knowledge in this area is incredibly important for clinical efforts that are aimed at bettering the lives of young children and their families. The purpose of the present study was to investigate how IPV during and after pregnancy impacts infant socioemotional development at two different time points during the first year of life (3 months and 12 months) as well as to explore how maternal trauma symptoms may influence the association between IPV and infant socioemotional outcomes. In this study, mothers who had experienced IPV during pregnancy, as compared to those who had not, did not report that their infants had significantly more regulatory difficulties at 3 months of age. However, mothers who had experienced IPV during the first year after birth, as compared to those who had not, had infants with more socioemotional problems at 12 months of age, even when IPV during pregnancy was controlled for. The latter findings were expected and are consistent with past research that has found IPV to be associated with negative outcomes for infants around 12 months of age (e.g., Bogat et al., 2006; McDonald et al., 2007; Zeanah & Scheeringa, 1997).
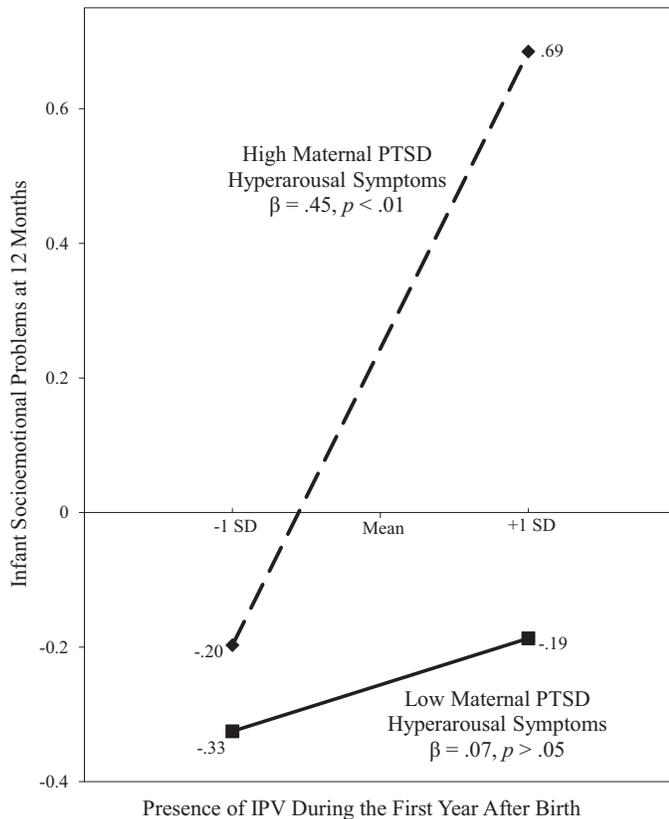
FIGURE 2. Maternal posttraumatic stress disorder hyperarousal symptoms at 1 year after birth as a moderator of the association between presence of intimate partner violence during the first year after birth and mother-reported infant socioemotional problems at 12 months of age.
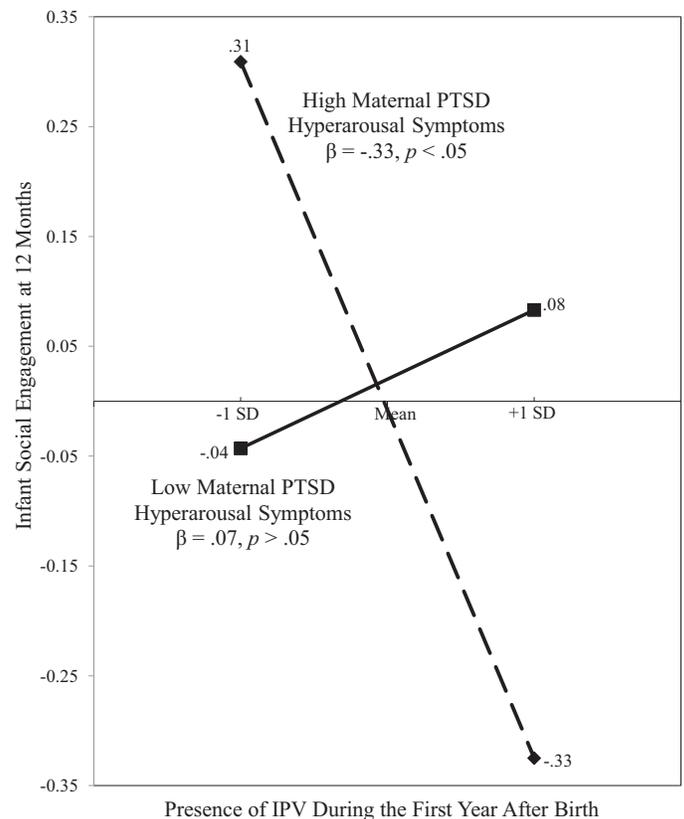

FIGURE 3. Maternal posttraumatic stress disorder hyperarousal symptoms at 1 year after birth as a moderator of the association between presence of intimate partner violence during the first year after birth and infant social engagement at 12 months of age.

The lack of a significant association at 3 months of age, however, was unexpected. To our knowledge, no prior research has examined the effects of IPV on infants this young. It is possible that this unexpected finding suggests that 3 months of age is too early to identify detrimental effects of IPV on infants. Infant regulatory capacities at this time are still rapidly developing, and much of development at this time is being driven by internal regulatory mechanisms (D. Davies, 2004); therefore, the impact of IPV exposure may need time to "catch up" to the infant's behavior. Furthermore, increased self-regulation is expected in the second half of the infant's first year of life (D. Davies, 2004). The effects of early IPV exposure may be more evident, therefore, during later developmental periods when the infant's regulatory abilities more clearly differ from what is behaviorally expected.

Importantly, the present study revealed that specific maternal PTSD symptoms moderated the association between IPV and infant socioemotional outcomes at two different time points during the first year of life. First, the association between IPV during pregnancy and infant regulatory difficulties at 3 months of age was moderated by prenatal maternal PTSD avoidance symptoms; specifically, the presence of IPV was related to fewer regulatory

difficulties when the mother had low levels of avoidance—a result that was unexpected. These counterintuitive findings may be explained by specific maternal behavior, as past research has found that mothers who have experienced IPV and/or who have PTSD symptoms tend to engage differently with their infants as well as perceive them differently (e.g., Huth-Bocks, Levendosky, Theran, & Bogat, 2004; Levendosky et al., 2006; Schechter et al., 2008; Schechter et al., 2005). Relevant to the current study, mothers with low avoidance may be less likely to withdraw from their infants' needs, especially if IPV continues to be present after pregnancy and a distressed infant increases the threat of IPV. In this case, IPV may have less of a detrimental effect on early infant regulation, as low maternal avoidance may help protect the infant. Another possible explanation for these counterintuitive findings is that the presence of IPV and low avoidance may prevent the mother from accurately perceiving and reporting on her infant's difficulties. For mothers who endorse low avoidance in the face of IPV, attention may be focused on their own IPV experiences and their own distress, which may prevent them from being attuned with their infants. Lack of attunement may, therefore, contribute to less accurate reporting of infant regulatory difficulties when IPV is present.
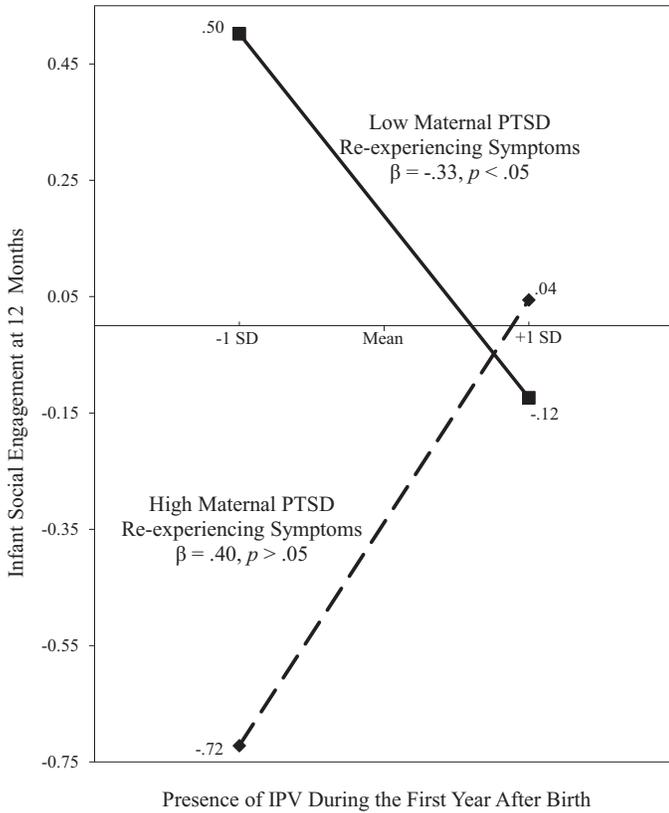
FIGURE 4. Maternal posttraumatic stress disorder reexperiencing symptoms at 1 year after birth as a moderator of the association between presence of intimate partner violence during the first year after birth and infant social engagement at 12 months of age.
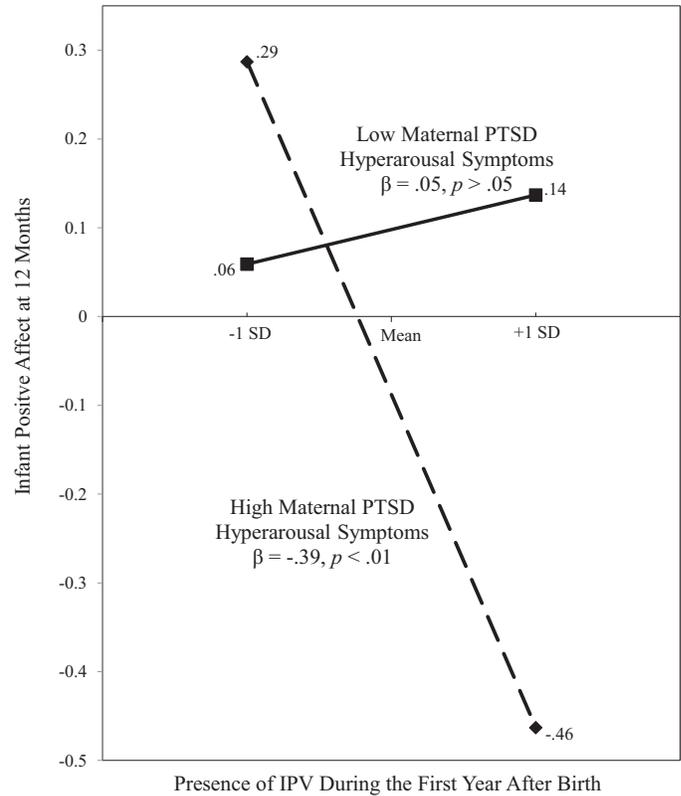

FIGURE 5. Maternal posttraumatic stress disorder hyperarousal symptoms at 1 year after birth as a moderator of the association between presence of intimate partner violence during the first year after birth and infant positive affect at 12 months of age.

Results also revealed that the association between IPV during the first year after birth and infant socioemotional problems at 12 months of age was moderated by maternal PTSD hyperarousal and reexperiencing symptoms at 1 year after birth. Specifically, the presence of IPV was related to more mother-reported and researcher-observed infant socioemotional problems (i.e., more problems on the BITSEA and less observed infant social engagement and positive affect) when the mother had high levels of hyperarousal and low levels of reexperiencing. Mothers with high hyperarousal symptoms may intensify the effects of the already frightening IPV environment on infant socioemotional development through constantly being "on guard," feeling fearful and anxious, and perceiving danger even when the environment is safe. In other words, their struggles to feel safe and secure may prevent them from facilitating feelings of safety and security in their infants, which are critical to healthy infant socioemotional development. Similarly, they may be overstimulating and intrusive with their infants, startle easily in response to normative infant behaviors such as distress and frustration, and may have outbursts of anger with their infants. These maternal behaviors may inadvertently contribute to the infant's need to socially disengage from interactions as well as contribute to other infant socioemotional difficulties.

On the other hand, the findings concerning maternal reexperiencing symptoms as a moderator of the association between IPV during the first year after birth and infant socioemotional problems at 12 months of age suggest that not only are high reexperiencing symptoms problematic even when IPV is not present but also that low reexperiencing symptoms do not help protect against the effects of IPV. The direction of the findings suggests the possibility that infants, who have mothers with high reexperiencing PTSD symptoms, may attempt to socially engage with their mothers more when there is the added risk of IPV. Reexperiencing PTSD symptoms are primarily internal (e.g., flashbacks, intrusive memories, physiological reactions), and high levels may lead a mother to be absent or preoccupied with her own distress while engaging with her infant. Therefore, in the context of the threat created by IPV, infants may be more inclined to attempt to socially engage with their preoccupied mothers to increase the likelihood that she will provide attention and protection if needed.

As this is the first study, to our knowledge, to investigate maternal PTSD symptoms as a moderator of the association between IPV and child outcomes, and this study was correlational, additional research would help explicate the meaning of these particular findings. Parenting behavior may be one mechanism through which different PTSD symptoms moderate the impact of IPV on

young children; therefore, future research should consider investigating whether parenting changes, particularly in light of IPV, as a function of a mother's particular presentation of PTSD. Future research also should continue to use multimethod assessments of infant socioemotional development, as results and implications appear to differ somewhat based on type of outcome assessed. Overall, because caregivers have a considerable influence on infant development, it is important to continue to investigate maternal functioning when trying to understand the impact of IPV on very young children.

Strengths and Limitations

This study has both strengths and limitations. Strengths include the longitudinal nature of the study, investigating effects of IPV at two different time points very early in an infant's life, and including both mother-report and observational assessments of infant socioemotional development. This is the first known study to investigate the effects of IPV on infants as young as 3 months of age, and it highlights the need to conduct more research with infants this young. Although the demographic characteristics of the sample and the limited geographic location as well as the use of convenience sampling as a recruitment strategy may limit the generalizability of the results, the composition of the sample (e.g., diverse, highly traumatized) is considered a strength of the study (Mechanic & Pole, 2013). Community recruitment allowed for a broader range of IPV experiences to be represented than what may be found within a shelter-only sample, and women who may not seek out support services also were able to be represented. In addition, the characteristics of this sample are likely to be similar to the population that may present for infant and early childhood community mental health services, thereby making findings especially relevant for clinical implications.

Clinical Implications

Several clinical implications can be drawn from the results of this study. First, as previous research has demonstrated, the presence of IPV during a child's first year of life can be detrimental to his or her socioemotional well-being. Babies are not protected from the effects of IPV, as some may believe, and the effects of IPV are likely differentially related to infants' outcomes based on the mother's trauma symptoms. Clinicians should not only regularly ask about IPV exposure but also assess the mother's functioning, paying particular attention to PTSD and the presentation of her specific trauma symptoms. Results of this study highlight that maternal well-being during stressful and frightening circumstances is important to infant socioemotional well-being. It is not enough to solely consider the direct effect of trauma exposure, such as IPV, on very young children; how caregivers are functioning also must be taken into consideration (Scheeringa & Zeanah, 2001).

Leaving a relationship characterized by IPV is rarely easy for a mother with young children (Even if she does leave, she may still be experiencing psychological distress; see Adkins & Dush, 2010)

nor may it immediately be the safest option (Campbell et al., 2003). Therefore, safety planning with the mother and providing her with resources and psychoeducation may be very beneficial to her own well-being and that of her infant. Supporting her mental health and parenting in light of a history of IPV also is critically important. As infant socioemotional well-being develops within the context of relationships (Rosenblum, Dayton, & Muzik, 2009), when a mother is able to function well as a parent and be a secure base and haven of safety for her infant, her infant will be more likely to function well socially and emotionally, despite difficult circumstances. Clinicians may be able to use their understanding of the mother's presentation of PTSD symptoms and the strengths and challenges evident within the mother–infant relationship as a means to develop a treatment plan that is individualized to the mother, her infant, and their unique relationship. Employing evidence-based treatments, such as child–parent psychotherapy (Lieberman & Van Horn, 2005, 2008) when indicated also would be helpful for families with very young children and a history of IPV.

Furthermore, it is important that violent partners be targeted for interventions to reduce, and possibly prevent, IPV. Unfortunately, the effectiveness of intervention programs for violent partners tends to be unclear and varies, and methodologically strong research on these programs is limited (for a review, see Eckhardt et al., 2013). Therefore, to reduce the occurrence of IPV and associated detrimental effects on women and children, efforts should be directed at identifying and establishing effective intervention programs for partners who perpetrate relationship violence. Families should then be provided with information on effective programs.

In conclusion, these findings elucidate the effects of IPV on infants' socioemotional development during the first year of life as well as the importance of maternal trauma symptoms in understanding that association. Continuing to raise awareness about the negative effects that IPV can have on very young children as well as increasing community supports and resources for families in need are important to the well-being of infants. When providing resources to families experiencing IPV, it would be helpful to keep a focus on the mother–infant relationship and aim to provide appropriate supports to the mother so that she may be able to be attuned to and protective of her infant. Focusing on the mother–infant relationship and supporting the mother may help very young children be resilient despite detrimental environmental circumstances.

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