ARTICLE

FORGOTTEN SURVIVORS OF INTIMATE-PARTNER VIOLENCE: THE ROLE OF GENDER AND MOTHERING IN INFANT DEVELOPMENT

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ABSTRACT: Although gender and mothering are critical factors in the development of infants exposed to intimate-partner violence (IPV), the majority of research has focused on school-age and adolescent populations. The aim of this study was to investigate the moderating effect of gender in the relationship between mother–infant interaction and infant development in families of IPV. Maternal report was used to measure infants' cognitive and social functioning while mother–infant interaction quality was assessed through an observational measure. Participants consisted of 44 mothers and their infants (4–43 months of age). While male infants showed poorer fine motor, problem-solving, and personal-social skills than did their female counterparts, comparable gross motor and communication skills were demonstrated. Moderator analysis for gender indicated that the association among maternal cognitive growth fostering and gross motor skills was significantly stronger for boys than it was for girls. No other moderator effects were detected. Analysis examining age, gender by age, and infant competencies did not reveal significant effects. Implications for clinical practice are considered, with special attention paid to women as mothers.

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Infants and young children exposed to intimate-partner violence (IPV) may share many of the adjustment difficulties experienced by survivors of direct physical and psychological abuse (Graham-Bermann & Levendosky, 1998; Hughes, 1988; Litrownik, Newton, Hunter, English, & Everson, 2003). Studies that have examined young children in violent families have revealed greater internalizing and externalizing difficulties (Yates, Dodds, Sroufe, & Egeland, 2003) as well as trauma symptoms than have standardized norms (Bogat, Dejonghe, Levendosky, Davidson, & von Eye, 2006). Some investigators have documented poor competencies such as impaired verbal and motor abilities, although research in this area remains limited (Graham-Bermann & Levendosky, 1998; Huth-Bocks, Levendosky, & Semel, 2001; Westra & Martin, 1981).

The majority of the literature on the effects of childhood exposure to IPV catalog children's negative developmental outcomes (e.g., Jaffe, Wolfe, & Wilson, 1990; Kolbo, Blakely, & Engleman, 1996; Margolin & Gordis, 2000; Wolak & Finkelhor, 1998). Investigators are now being called upon to uncover factors that are related to the adjustment of children in violent families (Hughes & Luke, 2000; Levendosky, Huth-Bocks, Shapiro, & Semel, 2003). Gender has recently been advanced as an important factor because differences have been noted across boys' and girls' development. In general, boys tend to show more externalizing behavior than do girls in families of IPV while girls show more internalizing behavior (Moylan et al., 2009; Yates et al., 2003). Even when, or perhaps especially when, boys and girls experience comparable forms of adjustment, there seems to be potential for factors to vary subtly along gender lines (J.G. Cummings, Pepler, & Moore, 1999).

Mothering has been identified as one of the most important predictors in the development of children from violent families (Mullender et al., 2002). The mother–child relationship may be negatively affected in the presence of IPV, with the result of increased cognitive, psychological, and emotional difficulties in young children (Graham-Bermann, DeVoe, Mattis, Lynch, & Thomas, 2006; Levendosky et al., 2003; Mullender et al., 2002; Osofsky, 1999). Sons tend to experience less secure attachment to their abused mothers at 12 months of age than do daughters (Huth-Bocks, Levendosky, Theran, & Bogat, 2004). Because security of attachment may be critical in the successful development of children (Ainsworth, 1985), this trend poses concern. Despite these findings, very little is understood of relations between gender, mother–infant interaction, and infant development in families of IPV.

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IPV AND THE INFANT'S DEVELOPMENT OF COMPETENCIES

While extensive literature has documented the emotional and behavioral adjustment of young children exposed to violence (Bogat et al., 2006; Hughes & Barad, 1983; Huth-Bocks et al., 2004; Levendosky, Leahy, Bogat, Davidson, & von Eye, 2006), a serious need remains for the study of children's cognitive and social functioning. Cognitive processes such as verbal attention and working memory play a central role in children's higher order cognitive constructs (e.g., self-schemas), emotional and social development, information processing, and ability to mitigate negative developmental outcomes in the presence of risk factors (Crick & Dodge, 1994; Dodge, Pettit, Bates, & Valente, 1995; Eisenberg, Fabes, & Guthrie, 1997; Weisz, Rudolph, Granger, & Sweeney, 1992; Wilson & Gottman, 1996). Among the handful of studies that exist, we generally have seen poorer cognitive, verbal, motor, and quantitative abilities, emotion expression and regulation, and social functioning in young children from violent families (Gleason, 1995; Graham-Bermann & Levendosky, 1998; Huth-Bocks et al., 2001; Westra & Martin, 1981). Note that while exposure to IPV undoubtedly impacts the cognitive and social functioning of young children, infant development in violent families is complex, confounded by direct child abuse, parental substance abuse and mental health problems, unemployment, homelessness, and social isolation (Rossman, 2000).

In sum, research on the cognitive and social development of violence-exposed infants is lacking. As early development of competencies may be essential to peer acceptance, emotional health, and protection against risk factors (Dodge et al., 1995; Eisenberg et al., 1997; Luthar & Zigler, 1991), further inquiry is both important and necessary.

GENDER AND IPV

The influence of gender on the development of infants exposed to violence remains inconclusive. While some investigators have found more externalizing behavior in boys and more internalizing behavior in girls (Moylan et al., 2009; Yates et al., 2003), others have reported no such differences (Gleason, 1995; Kitzmann, Gaylord, Holt, & Kenny, 2003). Still others have indicated changes in the internalizing and externalizing behavior of boys and girls over time (Hughes & Barad, 1983; Moylan et al., 2009; Yates et al., 2003). With the exception of Gleason (1995), no prior work has examined the relationship between gender and infant cognitive and social functioning in violent families.

The study of gender differences in cognitive abilities evokes great controversy in psychology and related disciplines. Several theories, from biopsychosocial (Peterson, 1980) to evolutionary (Buss, 1995), have been proposed over the years to understand these differences. While intelligence may be conceptualized as a single unitary concept (Spearman, 1927), most contemporary psychologists have adopted a multiple-component understanding (Brody, 1992). Gardner (1983) proposed one of the most influential conceptions of multiple intelligence, consisting of the following seven intelligences: linguistic, logical-mathematical, spatial, musical, body-kinesthetic, interpersonal, and intrapersonal. Among nonviolent families, female infants seem to outperform male infants in areas of language and social development (Hyde & Lynn, 1988). Males, on the other hand, tend to have an advantage over females in visual-spatial and motor development in later, but not early, infancy (Robinson, Abbott, Berninger, & Busse, 1996; Toriola & Igbokwe, 1986). Males also appear to demonstrate an increased proclivity toward developmental and learning disabilities during the preschool and school years (Wagner, Marder, Blackorby, & Cardoso, 2002).

MOTHERING AND IPV

Attachment has been recognized as central in early development and the organization, process, and structure of the brain (Shore, 1997; Van der Hart, Steele, Boon, & Brown, 2001). A healthy secure attachment may result from parental consistency and sensitivity on the part of the mother (deWolff & van IJzendoorn, 1997). In contrast, lack of a secure attachment or an insecure attachment may be a consequence of inconsistent or unavailable maternal care. Studies have indicated that insecurely attached children are more vulnerable to aggression, negative affect, and poor competencies in early childhood (Ainsworth & Bell, 1974; Booth, Rose-Krasnor, & Rubin, 1991). Note that while insecure attachment is often discussed as a function of mothers' insensitivity to her child (Ainsworth, 1979), the mother–infant relationship is an interactive system that is influenced by the child's ability to send clear cues about his or her wants and needs and the mother's ability to respond with sensitivity, a system known as *contingent responsiveness* (Barnard, 1997; Sumner & Spietz, 1994).

Battered women have been observed to be less sensitive and responsive during interactions with their infants, often due to psychological difficulties experienced in response to victimization (Hay, Pawlby, Angold, Harold, & Sharp, 2003; Lyons-Ruth, Wolfe, Lyubchik, & Steingard, 2002; Pianta & Egeland, 1990). Specific challenges in mothering have been noted in the presence of maternal posttraumatic stress following IPV, including abuse potential, punitiveness, psychological aggression, and physical discipline (Cohen, Hien, & Batchelder, 2008). Schechter et al. (2008) also reported noncontingent responsiveness among mothers affected by interpersonal violent trauma, along with maternal withdrawal. Children of battered women consequently may be more vulnerable to insecure attachment patterns (Crittenden, 1992), and later internalizing and externalizing behavior and cognitive and social problems (Hazen, Connelly, Kelleher, Barth, & Landsverk, 2006; Rossman, 1998). What is hopeful, however, is that some mothers who experience interpartner conflict are equally as warm to their children as mothers who do not experience conflict (Whiteside-Mansell, Bradley, McKelvey, & Fussell, 2009), and may even compensate for IPV by being very attentive and sensitive during mother–child interactions (Letourneau, Fedick, & Willms, 2007; Levendosky et al., 2003).

Kelly (1994) highlighted that battered women's bearing and caring for children may be so deeply connected to IPV (e.g., when continual pregnancies through rape are used as a form of control) that keeping the two apart is not only arduous but emotionally painful. Research has begun to show that abuse may influence mothers' mental representations of sons and daughters, and subsequent reports on their child's functioning (Levendosky, Lynch, & Graham-Bermann, 2000). Indeed, the qualitative accounts of battered women have suggested that some mothers project their own experience of abuse onto their young children. In this process, boys are often assigned negative aggressive characteristics, much like the abusive partner, while girls usually undertake characteristics of a helpless victim, similar to the mother (Huth-Bocks et al., 2004). The result may be less quality interactions between mothers and sons, and insecure attachment patterns and poor competencies in sons (Ainsworth & Bell, 1974; Booth et al., 1991; Levendosky et al., 2000). Contrary to this, Schechter et al. (2008) demonstrated that maternal mental representations among abused mothers affected by posttraumatic stress and subsequent interactive behavior are unrelated to child gender. Still, in studies of direct child abuse, some daughters were found to identify with their abusive father, expressing sympathy and forgiveness for his actions as he came to symbolize power and independence, while the mother represented helplessness and ineffectuality (Jacobs, 1990). On a similar note, while abused sons may identify with their aggressive father, several do not (Sgroi, 1989). Sons who are abused could be at risk for conflict regarding an aggressive male identity, and may unconsciously disengage from an aggressive masculine identification, identifying as passive nonmasculine.

In addition to maternal projections, abused mothers' often-held gender-role stereotypes and gender-role socialization of their child has been linked to variation in boys' and girls' development (Birns, Cascardi, & Meyer, 1994; Burge, 1981; Zahn-Waxler, 1993). Taken together, gender seems to be an important moderator—defined by Baron and Kenny (1986) as "a qualitative (e.g., sex, race, class) or quantitative (e.g., level of reward) variable that affects the direction and/or strength of the relation between an independent or predictor variable and a dependent or criterion variable" (p. 1174)—of the association between mothering and child development. No studies to our knowledge have examined such a potential interaction in infants and young children.

Through a gendered lens, we explored the role of mothering in the cognitive and social development of violence-exposed infants. The research question asked: What are the relationships among gender, mother–infant interaction and infant development in families of IPV? Our specific a priori hypotheses were as follows:

- **H1:** Mother–infant interaction and development will be poorer in male than in female infants.
- **H2:** Gender will moderate the relationship between mother–infant interaction and infant development.
- **H3:** Negative effects will be more pronounced in younger male infants.

METHOD

This study is a secondary analysis of a larger, ongoing cross-sectional investigation of mothering and IPV. Our secondary analysis was approved by the Research Ethics Board at the University of New Brunswick. In the primary investigation, participants were provided with a letter of information and an in-depth verbal explanation of the research prior to data collection. Consistent with the Tri-Council Policy Statement, the letter of information identified the researchers involved and explained the purpose of the study, research procedures, benefits of the study, potential risks to participants, the voluntary nature of the study, and confidentiality. Participants were informed that the data might be used to answer other research questions.

Participants

Participants were recruited across three Maritime Provinces (New Brunswick, Prince Edward Island, Nova Scotia) through agencies that target families affected by violence and sources more universally accessible to the general population. Several universal approaches were employed to recruit mother–infant pairs from the community. First, parents were invited to respond via telephone to advertisements placed on public notice boards, in community newsletters, and in the widest circulating newspaper in each of the three Maritime Provinces. Second, public service announcements were broadcasted on radio and television stations. Finally, recruitment posters were strategically placed in locations thought to be most appropriate by the Community Research Team. Service providers were recruited from agencies to assist in recruitment of mother–infant pairs and data collection.

Forty-four mother–infant pairs (28 male infants, 16 female infants) agreed to participate in the study. Mothers' mean age was 28.5 years ($SD = 7.5$), and infants' mean age was 23.2 months ($SD = 11.1$). The majority of the sample was Caucasian (84%), followed by African (9%), Aboriginal (2%), and Other (5%). Most mothers were battered by an ex-boyfriend (49%) or former spouse from whom they had legally separated (23%). Mothers frequently identified their educational attainment as falling under the categories of partial high school (27%), completed high school (14%), partial university (27%), or completed university (20%). Mean household income of the sample was \$24,902 ($SD = \$19{,}362$).

Measures

Childhood exposure. Children's exposure to IPV was determined by mothers' positive response to the following question based on the Center for Disease and Control's (CDC) criteria for IPV (Saltzman, Fanslow, McMahon, & Shelley, 1999): At the time your child was 12 months or less, did you experience physical violence, sexual violence, threat of physical or sexual violence, or psychological/emotional abuse when there has also been prior physical or sexual violence?

The Nursing Child Assessment Teaching Scale (NCATS; Sumner & Spietz, 1994). Mother–infant interaction was examined using the NCATS. This measure is underpinned by research on attachment theory, developmental psychology, psychobiology, and nursing (Byrne & Keefe, 2003; Sumner & Spietz, 1994). The NCATS may be the most widely used instrument among infants from birth to 3 years of age and provides normative data for comparison purposes. It is an observational measure that examines mother–infant pairs across 73 binary items during a novel teaching situation (e.g., pat-a-cake, reading baby books) that is chosen by the caregiver form an age-appropriate list of situations. The observer responds to the 73 binary items with either *yes* or *no*, depending on whether a behavior was observed. Included in the NCATS are the following subscales: *Sensitivity to Cues*, *Response to Distress*, *Social-Emotional Growth Fostering*, *Cognitive Growth Fostering*, *Clarity of Cues*, and *Responsiveness to Caregiver*. In addition to these subscales, there are subsets of *Contingency* items for the caregiver (20 items) and for the infant (12 items). Administration time can span from 1 to 6 min. Scores on the NCATS are predictive of later development, including IQ and socioemotional adjustment (Sumner & Spietz, 1994). Internal-consistency alpha coefficients have ranged from .73 to .86, and test-retest reliability scores have ranged from .55 to .85 in total and subscale scores. Studies have found adequate content, criterion, and construct validity for the NCATS (Barnard et al., 1989; Sumner & Spietz, 1994). Prior to coding videotaped data, research assistants completed 2 days of training with an NCAST (Nursing Child Assessment Satellite Training) trainer and achieved at least 90% agreement with NCAST videos. Interrater reliability also was assessed at regular intervals and maintained at over 90% during the coding. To avoid coder bias, coders did not have any knowledge of the participants or the research question.

Ages and Stages Questionnaire (ASQ; Squires, Bricker, & Twombly, 2004). The ASQ is a short (10–15 min), easy-to-administer, maternal-report instrument that screens children's cognitive and social functioning. The ASQ has achieved widespread acceptance and is used by numerous jurisdictions such as the Province of Nova Scotia in public health. Mothers have reported easy understanding and high satisfaction with the instrument (Squires, Bricker, Heo, & Twombly, 2001). The ASQ is designed for children 4 through 60 months of age and includes a series of similarly constructed questionnaires, each targeting a specific age group. The following areas are assessed using a total of 30 items (six in each area): *Personal-Social*, *Communication*, *Problem-Solving*, *Gross Motor*, and *Fine Motor Skills*. Parents respond to each of the 30 items with either *yes*, *sometimes*, or *not yet*. The total score is then compared to established normative cutoff points. Internal consistency estimates have reported an overall alpha of .82, and test-retest reliability scores have revealed an average of .94 between caregivers' classifications. Concurrent validity was determined by comparing ASQ classifications with other standardized measures such as the Bayley Scales of Infant Development-II (BSID-II; Gollenberg, Lynch, Jackson, McGuinness, & Msall, 2009). Scores on the ASQ Communication and Personal-Social subscales were moderately correlated with the BSID-II Mental Scale, $R = .55$, $p < .001$; $R = 0.45$, $p < .01$, as was the ASQ Gross Motor subscale with the BSID-II Motor Scale, $R = .46$, $p < .01$. The Problem-Solving and Fine Motor domains of the ASQ, however, were not correlated with BSID-II scores. Sensitivity and specificity also was determined. Sensitivity ranged from .75 to .89, and specificity ranged from .82 to .96.

Age and gender. Age was included as a covariate in our study to assess for changes over time in infant development. Gender × Age effects were explored in addition to the effects of age alone. Children were dichotomized into younger ($\leq$12 months; $n = 13$) and older (>13 months; $n = 31$) subgroups using a 1-year age cutoff because research has identified the first 12 months of life to be the most critical period in the development of competencies (Chugani, 1997, 1998). Gender was coded as a dichotomous variable (0 = female, 1 = male). Gender- and sex-based analysis (GSBA) was a key component of the study. The guidelines set forth in the *Guide to Gender and Sex-Based Analysis in Health Research* by the Canadian Institutes of Health Research (2006) were closely adhered to in all phases of research, from planning to interpretation of findings.

Covariates. To control for common confounders, household income and social support were included as covariates in the study (Rossman, 2000). Household income was determined by asking mothers "What is your total household income before taxes?" The Social Provisions Scale (SPS; Cutrona & Russell, 1987), a 10-min self-report instrument, was used to assess mothers' perceptions of social support. The scale contains 24 items, four for each of the following categories: *Guidance*, *Reliable Alliance*, *Reassurance of Worth*, *Attachment*, *Social Integration*, and *Opportunity for Nurturance*.Items are rated on a scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*) to produce a summative Total Global Support score ranging from 24 to 96. Separate scores are derived for each of the six provision subscales, ranging from 4 to 16. Internal consistency alphas ranged from .65 to .76 for the Provisions subscales and .92 for Global Support. To enhance reliability of assessment, only the Global Support score was used in the present study.

Procedure

Mothers who met the CDC criteria for IPV were assessed in person at a location identified as safe. Interviewers started by collecting demographic information including mothers' age, household income, level of education, employment status, marital status, and geographic locale (rural, urban). Mothers completed the age-appropriate ASQ on their child and the SPS on themselves. Interpretation and scoring procedures were carried out by trained research assistants and service providers.

NCATS observations of mother–infant interaction involved a few tasks. First, mothers were directed by observers to select an age-appropriate teaching situation from a Child Activity Card that was not yet mastered by the child. Second, mothers were provided with the materials needed for the activity (e.g., block, squeak toy)

and were instructed to teach the activity to their child without guidance from the observer. If the observer perceived the activity to be incongruent with the child's ability or if the mother began the teaching episode and stopped for any reason, the activity was omitted, and mothers were requested to choose another activity. Finally, mothers were provided as much time as required to finish the activity and were asked to signal to the observer upon completion. Interactions between mothers and infants were videotaped for a maximum of 5 min.

Data Analysis

Descriptive statistics were conducted to examine sample characteristics, and independent *t* tests were used to make comparisons. Because of the numerous subscales included in the NCATS and the ASQ, bivariate correlation tests were used to determine relationships among gender, household income and social support, and each outcome variable (i.e., infant development and mother–infant interaction). Both correlation and regression analysis were employed to assess Age and Gender × Age relations on subscales of infant development. Given that our Gender × Age hypothesis implied directionality, all analysis was conducted using one-tailed testing procedures (Ruxton & Neuhauser, 2010; Stephens, Buskirk, & Martinez del Rio, 2007; Tukey, 1991; Yoccoz, 1991); *p* values were consequently divided by 2. The application of a one-tailed test is justified by the existence of a clear prediction concerning the direction of the difference based on previous studies (E.M. Cummings, 1998; E.M. Cummings, Ballard, & El-Sheikh, 1991; Spaccarelli, Sandler, & Roosa, 1994). A false discovery rate (Benjamini & Hochberg, 1995) was estimated to adjust for multiple comparisons in analysis (critical $p = .028$).

To detect a moderating variable, it is typical to test the effects of the independent variable on the dependent variable through unstandardized regression coefficients and not correlation coefficients (Duncan, 1975). Multivariate (multiple regression) tests and existing theory and research (e.g., Ainsworth & Bell, 1974; Huth-Bocks & Hughes, 2008; Letourneau et al., 2007; Levendosky et al., 2003; Levendosky et al., 2000; Mondschein, Adolph, & Tamis-LeMonda, 2000; Olson, Bates, & Bayles, 1984) were therefore used to guide moderation analysis. As the growing body of literature has suggested that cognitive development is not a unitary process but domain-specific (Brody, 1992; Hirschfeld & Gelman, 1994; Wellman & Gelman, 1992), all infant development subscales were regressed on individual subscales of mother–infant interaction.

Following the recommendations summarized by Frazier, Tix, and Barron (2004), tests for moderation were performed through hierarchical multiple regression (HMR) analysis. A few steps were required. First, the moderator variable, gender, was represented with a code variable including two levels. Second, the predictor variable, mother–infant interaction, was centered or standardized to reduce problems associated with multicollinearity. Third, the product term was created to represent the interaction between the newly coded moderator variable and the centered/standardized predictor variable. Finally, the HMR was structured by entering variables into the regression equation through the following series of specified blocks: covariates, code variables (i.e., gender) and centered/standardized variables (i.e., mother–infant interaction) representing the predictor and the moderator variables, and product terms (i.e., Gender × Mother–Infant Interaction). The single degree of freedom *F* test, representing stepwise change in variance explained as a result of the addition of the product term, was used to determine statistical significance of the moderator effect (West, Aiken, & Krull, 1996). To inspect the form of the moderator effect, tests of simple slopes were graphed and interpreted using procedures outlined by Aiken and West (1991). Tabachnick and Fidell's (1989) minimal sample size criterion for a regression analysis (i.e., five cases/participants per independent variable) was followed in carrying out the HMR.

RESULTS

No significant relationships were found among household income and social support, and each outcome variable.

Gender Effects

Our first hypothesis that mother–infant interaction and development would be poorer in boys than in girls was partially supported. Independent *t* tests found boys to perform at a lower level than girls on measures of Fine Motor, $t(36) = 2.86$, $p = .002$, Problem-Solving, $t(33) = 2.07$, $p = .020$, and Personal-Social Skills, $t(36) = 2.11$, $p = .014$, and similar to girls on measures of Gross Motor, $t(36) = .44$, $p = .333$, and Communication Skills, $t(36) = .37$, $p = .355$ (see Table 1). Boys and girls showed comparable scores on all subscales of mother–infant interaction.

Moderator Effects

Multivariate (multiple regression) analysis revealed significant relations between maternal Cognitive Growth Fostering and infants' Communication, $R^2 = .220$, $p = .000$, Gross Motor, $R^2 = .182$, $p = .002$, Problem-Solving, $R^2 = .086$, $p = .027$, and Personal-Social Skills, $R^2 = .125$, $p = .010$, and no association among Fine Motor Skills, $R^2 = .001$, $p = .442$. Other subscales of mother–infant interaction showed no relation to infant-development measures. Our second hypothesis was somewhat supported as HMR found gender to moderate the relationship between only maternal Cognitive Growth Fostering and children's Gross Motor Skills, $R^2 = .123$, $p = .022$ (see Table 2). The single degree of freedom *F* test related to the product term, Gender × Cognitive Growth Fostering, was significant, $F(5, 31) = 3.11$, $p = .011$. HMR also showed a significant direct relation between Cognitive Growth Fostering and Gross Motor Skills, $R^2 = .21$, $p = .007$. The full regression model accounted for 33% of the total variance in children's Gross Motor Skills. A plot of simple slopes illustrates the meaning of the moderator effect in Figure 1, revealing a positive relation between

TABLE 1. *Independent T-test Comparisons between Male and Female Infants*

	Female		Male		Total			
	M	SD	M	SD	M	SD	*t*	*p*
Infant Development Measures								
Communication	46.33	13.95	44.35	17.14	45.61	14.95	0.37	355
Gross Motor	54.33	10.15	52.83	10.53	53.16	10.24	0.44	.333
Fine Motor	51.67	7.24	42.61	10.75	45.51	11.83	2.86	002
Problem-Solving	52.00	8.62	45.43	10.10	47.55	10.26	2.07	.020
Personal-Social	53.33	9.39	44.78	13.69	49.08	12.40	2.11	.014
Mother-Infant Interaction Measures								
Sensitivity to Cues	9.73	1.03	9.61	1.12	9.59	1.13	0.35	.366
Response to Distress	9.33	1.40	8.78	1.88	8.91	1.67	0.97	.169
Social-Emotional Growth Fostering	7.73	1.03	7.74	1.14	7.86	1.23	−0.02	.494
Cognitive Growth Fostering	12.72	1.94	13.61	2.43	13.31	2.23	−1.19	.120
Caregiver Total	39.45	3.20	39.74	3.56	39.65	3.45	−0.25	.401
Clarity of Cues	8.53	1.19	8.61	1.12	8.64	1.08	−0.20	.422
Child Total	17.33	3.16	17.52	3.12	17.73	2.99	−.18	.429
Caregiver/Child Total	56.78	4.93	57.26	5.01	57.38	4.85	−0.29	.387
Contingency Caregiver Total	14.53	1.77	15.09	2.33	14.93	2.14	−0.78	.220
Contingency Child Total	7.93	1.98	8.17	2.04	8.27	1.93	−0.36	.361
Contingency Caregiver/Child Total	21.87	3.68	23.17	3.14	22.95	3.46	−1.12	.135

TABLE 2. *Hierarchical Multiple Regression Testing the Moderator Effect of Gender on the Relationship between Maternal Cognitive Growth Fostering and Children's Gross Motor Skills in Families Affected by Intimate Partner Violence*

Predictor	β	*SE* (β)	*b*	*p*
Step 1				
Constant	56.14	3.65		
Age	−3.21	4.82	−.014	.255
Gender by Age	−.01	0.11	−0.03	.448
Step 2				
Constant	60.30	7.60		
Gender	−1.71	5.13	−0.08	.370
Cognitive Growth Fostering	2.23	0.78	0.49	.004
Step 3				
Constant	57.91	7.32		
Gender by Cognitive Growth Fostering	3.13	1.50	1.20	.023

maternal Cognitive Growth Fostering and Gross Motor Skills in boys, $\beta = 3.11$, $t(31) = 3.86$, $p = .000$, and in girls, $\beta = 0.60$, $t(31) = 0.45$, $p = .327$, with a steeper increase in boys. Multicollinearity is to be expected in these data because we included both the main effects of gender and Cognitive Growth Fostering as well as their cross-product. The Variance Inflation Factor (VIF), a reliable multicollinearity diagnosis, clearly indicates the impact of multicollinearity in Cognitive Growth Fostering and Gender × Cognitive Growth Fostering because VIFs reported above the threshold value of 10 (Neter, Wasserman, & Kutner, 1985), but do not detect multicollinearity in other predictors.

Age Effects

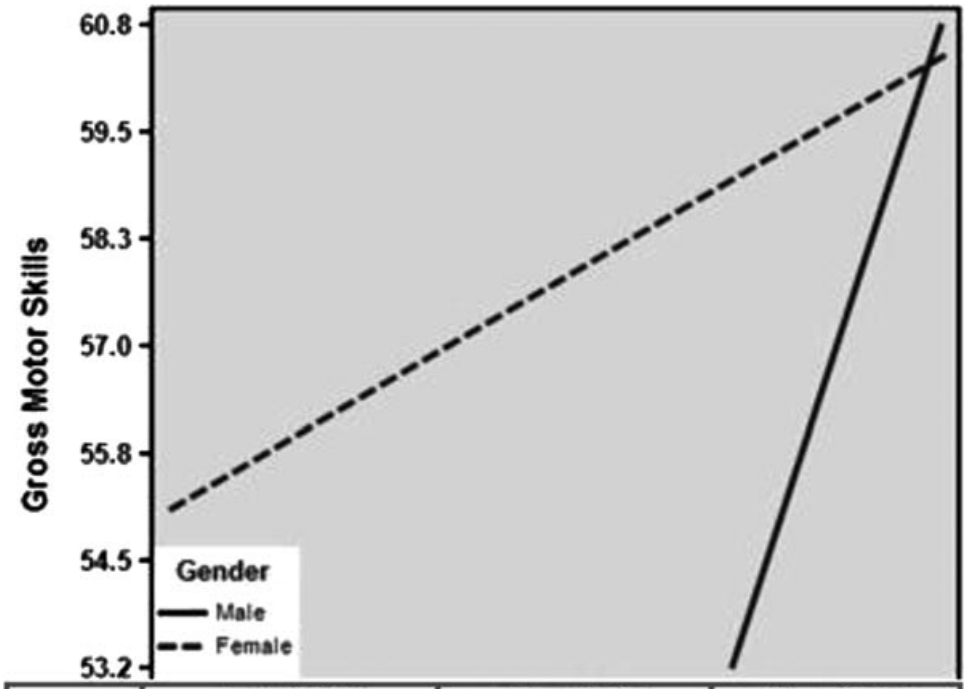
Our third hypothesis was rejected, as independent *t* tests found no significant relation among covariates age and Gender × Age, and infant development. HMR found age and Gender × Age together to account for 3% of the total variance in children's Gross Motor Skills, although neither variable reported to be significant at the corrected alpha level.

DISCUSSION

While male and female infants in violent families showed comparable Gross Motor and Communication Skills, males revealed poorer competencies than did females on the following domains: Fine Motor, Problem-Solving, and Personal-Social Skills. Results showed some support for gender as a moderator of the relationship between mother–infant interaction and infant development in these families, as gender successfully moderated the association among maternal Cognitive Growth Fostering and infant Gross Motor Skills. No other moderator effects were detected. Maternal Cognitive Growth Fostering emerged as a strong predictor of all domains of cognitive and social functioning, except for Fine Motor Skills. Finally, age and Gender & Age effects were not found on any of the infant development subscales.

Comparison With Existing Literature

In the context of prior work, we find some consistency in our results with studies on school-age children that document poorer development in boys than in girls from violent families (Kerig, 1996). Research that has focused on infants and young children,



	Low CGF	Mean CGF	High CGF
Female	46.12	58.21	60.15
Male	34.66	49.23	60.80

FIGURE 1. Plot of significant interaction effect between gender and maternal Cognitive Growth Fostering (CGF) on children's Gross Motor Skills.

however, is very limited. The findings of the current study are inconsistent with those of Gleason (1995), the only other investigator to examine competencies in violence-exposed male and female infants, who reported gender sameness rather than gender difference in results. Notably, Gleason's study varied considerably from the current investigation. In his study, mothers and their children were recruited from shelters only, children ranged from 7 months to 16 years of age, and multiple informants including teachers and mothers were used to assess children's development. While research on nonviolent families has demonstrated a female advantage in social skills during infancy (Hyde & Lynn, 1988) and male vulnerability to cognitive disabilities at preschool and school ages (Wagner et al., 2002), the poorer problem-solving and fine motor skills observed here in male infants is inconsistent with the literature. Deficits in problem-solving and fine motor skills could be specific to boys in violent families, although lack of a nonviolent control group precludes the possibility of making such an assertion.

A few reasons may explain the emergence of gender as a significant predictor in children's fine motor, problem-solving, and personal-social skills. Schechter et al. (2008) noted that mothers' nonbalanced, "distorted" mental representations—potentially corresponding to the "preoccupied" attachment relationship with the aggressor—may lead mothers to develop unrealistic expectations of their child, attribute malevolent intents to their child, or be insensitive to their child. Therefore, it could be that some abused mothers in our sample were distracted by a particular aspect of their male infant that precluded an integrated mental representation. Given the significance of mother–infant interaction to children's competencies (Olson et al., 1984; Reyna & Pickler, 2009), differences in mothering across gender may have contributed to worse development in boys. The relationships of sons to their abusive fathers also are influential in cognitive and social functioning (Aymer, 2010). Sons' internal working model of attachment may be predicated on their relationship to the abusive father, and the conscious or subconscious meaning attached to this relationship. The boys in our sample could have internalized their abusive father as confusion, ambivalence, fear, and/or even anger, negatively affecting psychological growth and development of competencies (Ainsworth & Bell, 1974; Aymer, 2008; Booth et al., 1991). Finally, gender differences in competencies may be attributed, in part, to various biological sources such as behavioral genetics (Plomin, 1990) and sex hormones (Nyborg, 1990).

Moreover, the positive relations observed between almost all subscales of competencies (Communication, Gross Motor, Problem-Solving, and Personal-Social Skills) and only the Cognitive Growth Fostering subscale of mothering underline the centrality of maternal cognitive growth fostering. A review of the family violence literature has shown some support for this trend,

although most research has treated competencies in young children as an adjunct to socioemotional and behavioral development (Huth-Bocks & Hughes, 2008; Levendosky et al, 2003). The parent–child literature, on the other hand, has provided direct support for positive associations among maternal cognitive growth fostering behaviors such as verbal and play stimulation, and infant cognitive development (Ainsworth & Bell, 1974; Carew, 1980; Elardo, Bradley, & Caldwell, 1977; Finkelstein & Ramey, 1977). Interestingly, the quality of mothering in our sample was comparable to standardized norms (Sumner & Spietz, 1994) whereas the majority of previous studies have indicated poorer mothering practices in abused women than in nonabused women (Hay et al., 2003; Holden & Ritchie, 1991; Levendosky & Graham-Bermann, 2001; Lyons-Ruth el., 2002; Pianta & Egeland, 1990). In line with the conclusions of more recent investigations, it seems that mothers are trying to protect their children from being brought up in a toxic environment (Letourneau et al., 2007; Levendosky et al., 2003; Whiteside-Mansell et al., 2009).

Although there are four main effects between the subscales of infant development and mothers' Cognitive Growth Fostering, gender moderated only the relationship between maternal Cognitive Growth Fostering and Gross Motor Skills. One reason for this may be that in addition to socialization, motor development usually involves a strong genetic component responsible for gender differences within the first 6 months of life whereas communication, problem-solving, and personal-social skills tend to be influenced less by genetics (Hamill et al., 1979; Mondeschein et al., 2000). Correspondingly, gender differences in the latter three faculties may be more notable in later childhood when socialization is most pronounced (Halpern, 2000).

The moderator effect of gender on the relationship between mother–infant interaction and infant development is consistent with the qualitative accounts of battered women (Levendosky et al., 2000). Studies in the parent–child literature have provided strong support for higher positive relations among maternal Cognitive Growth Fostering and Gross Motor Skills in male than in female infants (Maccoby & Jacklin, 1974; Mondschein et al., 2000; Toriola & Igbokwe, 1986). Maternal gender-role socialization affords a possible avenue to explain this trend. A child's evolving perception of the "appropriate gender role" developed through socialization and imitation of specific reference groups (e.g., parents, peers, and childcare workers) often influences motor performance (Greendorfer, 1980). Research has shown that mothers from nonviolent families underestimate the physical skills of female infants and overestimate the physical skills of male infants (Mondschein et al., 2000). Mothers consequently may communicate and attend to their young children in a way that reinforces such preconceived notions, with the potential for self-fulfilling prophecy. Because gender biases are often stronger in mothers from violent families (Burge, 1981), our moderator effect may, to some degree, be a consequence of mothers' subtle and not-so-subtle forms of gender-role socialization. Biology may offer another explanation for gender differences in motor performance in early childhood. As mentioned earlier, research has indicated a strong male "biological advantage" at 6 months of age (Hamill et al., 1979).

Moreover, the positive relations observed between almost all subscales of competencies (Communication, Gross Motor, Problem-Solving, and Personal-Social Skills) and only the Cognitive Growth Fostering subscale of mothering underline the centrality of maternal cognitive growth fostering. Note that a sizeable amount of work in the area has relegated women to be considered solely in relation to children, with little understanding of their phenomenological experiences as mothers (Lapierre, 2008). Indeed, the qualitative accounts of battered women have suggested a high awareness of and attentiveness to the emotions of their child, with frequent note being made of children's academic and interpersonal difficulties (Levendosky et al., 2000). Past studies have seemed to locate the negative effects of IPV almost entirely on poor mothering practices while ignoring the critical role of fathers, whose violence and fathering practices also may have direct effects on children (Aymer, 2010; Lapierre, 2008). While the mothering of abused women could limit children's development of competencies (Rossman, 1998), we must be careful in drawing arbitrary conclusions from the current study.

Finally, null age and Gender × Age effects in cognitive development are consistent with the conclusions of Gleason (1995), although inconsistent with the majority of family violence literature (Hughes & Barad, 1983; Moylan et al., 2009; Yates et al., 2003). With the exception of Hughes and Barad (1983), however, all previous studies have focused on developmental trends broadly from infancy to adolescence, with no consideration of changes throughout infancy alone. When older infants (>13 months) were excluded from our study, covariates age and Gender × Age showed very strong negative associations to infants' problem-solving and personal-social skills. Given that the first 12 months of life may be most critical to cognitive and social development (Chugani, 1997, 1998), we encourage further investigation into developmental trends in early infancy, with particular attention to the issue of gender.

Strengths and Limitations

A few issues were presented in our data analysis; however, it is likely that we did not capture the complexities in the adjustment of infants from violent families. Children's development may be affected by several factors (Rossman, 2000), although our limited sample size precluded the possibility of considering coexisting factors beyond age, Gender × Age, social support, and household income. The many limitations of cross-sectional designs inherent in our study suggest a need for longitudinal analysis in future work (Bland, 2001). The negative findings in this study considerably outweigh the positive findings, indicating perhaps that the relationships among gender, mother–infant interaction, and infant development are less pronounced than we have presented. As a final note, the current investigation was a secondary analysis, which impeded our ability to address the unequal ratio of male to female infants in the sample.

Some methodological issues also are worth mentioning. We did not include in our study a control group unaffected by IPV; hence, our conclusions regarding mothering and infant development in violent families may be open to scrutiny. Our reliance on maternal report may have biased assessment of infant cognitive and social functioning (Emery & O'Leary, 1982). Confidence in infant-development measures could have been increased by adding ratings from service providers and shelter staff, and conducting systematic home observations. We also relied on a maternal report in measurement of childhood exposure. This measure contained no information regarding the presence of the child during a violent episode, and thus was more an indicator of potential exposure rather than of actual exposure. Maternal measures that provide an indication of whether the child had witnessed or overheard the violence and the frequency, duration, and severity of IPV may be more desirable in future work.

Despite these limitations, the design of the current investigation adds to the childhood exposure literature. In response to several investigators, we employed a gender- and sex-sensitive approach to explore the development of infants in violent families (J.G. Cummings et al., 1999; Kerig, 1999; Wolfe, Crooks, Lee, McIntyre-Smith, & Jaffe, 2003) and examined factors involved in infant development rather than mere negative effects (Hughes & Luke, 2000; Levendosky et al., 2003). Additional contributions were made through our methodological framework. Included in our sample were mothers and their children from shelters and the community from a variety of socioeconomic backgrounds. The often-cited difficulties in shelter and low-income-only samples were therefore mitigated to some degree, allowing for greater generalizability of study findings (Baldry, 2007; Bogat, Levendosky, & von Eye, 2005; Levendosky, Bogat, & von Eye, 2007). As a final note, our developmental measure provided assessment of infant cognitive and social functioning, an often-ignored, but critical, area of adjustment in young children from violent families (Gleason, 1995; Huth-Bocks et al., 2001).

Implications for Future Research and Clinical Practice

The overall poorer fine motor, problem-solving, and personal-social skills of male than of female infants suggest a need for increased research and clinical attention to issues of gender and power in violent families. Indeed, gender-neutral interventions may fall short because they do not address the specific cognitive and social needs of infants (especially boys) affected by IPV. It is therefore imperative that investigators begin to explain gender differences for the delivery of gender and sex-sensitive interventions (E.M. Cummings, Davies, & Simpson, 1994; Kerig, 1999). We encourage further inquiry into the following question through a biological, social, cognitive, and structural lens: Why might there be gender differences in the development of infants exposed to violence?

It seems that the cognitive growth fostering of mothers has a strong positive impact on the competencies of infants. The similarity in mothering scores to standardized norms suggests that some women are coping effectively and constructively with the feelings of powerlessness, helplessness, and hopelessness sometimes accompanied by battering (Walker, 1994). One consideration for intervention is in regards to maternal cognitive growth fostering and the gross motor skills of male and female infants. As battered women may harbor gender-role stereotypic views of child rearing, increased efforts to understand mothers' perceptions of masculinity and femininity are critical, especially as they relate to IPV. General parenting classes that promote the optimal care of infants likely will be inadequate in this process. Instead, interventions may be most useful when they uncover women's gender-role stereotypes and phenomenological experiences of how violence has affected their mothering. Possible approaches include individual or mother–infant psychotherapy. The role of the psychotherapist might be to focus mothers' attention onto the influence of gender and power within their violent families for the purposes of improving maternal care and enhancing social justice.

Most previous investigations on childhood exposure seem to have worked within a "deficit model of mothering." To this end, we present two suggestions for future investigators in moving toward a holistic view of battered women as mothers. One suggestion is to enrich our understanding of the adversities faced by abused women through personal narrative, as it is under these conditions that women carry out their mothering (Lapierre, 2008). Another suggestion is to begin to understand the problem of IPV in terms of men's violence against women rather than as women's "deficiencies" as mothers. The inclusion of men into research and clinical work certainly presents several barriers. In response to this, Aymer (2010) wrote:

> I have had some difficulty engaging fathers, particularly when they felt responsible for their child's problem or if they distrusted the therapeutic process (the latter is especially common among abusive fathers). When it was warranted, I reached out by letter and telephone. I allowed them to talk to me about their experiences and feelings about therapy without defending the significance of the process. (p. 15)

Conclusion

In sum, the findings of this study highlight the centrality of gender and mother–infant interaction to the development of competencies in infants from violent families. Infants' cognitive and social functioning seem to vary considerably across gender. While mother–infant interaction is an influential factor in the adjustment of male and female infants, studies on the mother–infant relationship are very limited. It is critical that we continue to investigate factors involved in the competencies of infants exposed to violence. Such efforts may not only improve the health and healthcare needs of children but also enhance social justice.

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