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# Intimate Partner Violence and Preschoolers' Explicit Memory Functioning

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This research examines whether parents' intimate partner physical violence (IPV) relates to their preschoolers' explicit memory functioning, whether children's symptoms of hyperarousal mediate this relation, and whether mothers' positive parenting moderates this relation. Participants were 69 mothers and their 4- or 5-year-old child (34 girls). Mothers completed measures of IPV, children's hyperarousal symptoms, parent–child aggression, and positive parenting. Measures of explicit memory functioning were administered to preschoolers. As expected, IPV correlated negatively with preschoolers' performance on explicit memory tasks, even after controlling for parent–child aggression and demographic variables related to preschoolers' memory functioning. Preschoolers' hyperarousal symptoms did not mediate the relation between IPV and explicit memory functioning, but mothers' positive parenting moderated this relation. Specifically, the negative relation between IPV and preschoolers' performance on 2 of the 3 explicit memory tasks was weaker when mothers engaged in higher levels of positive parenting. These findings extend research on IPV and children's adjustment difficulties to explicit memory functioning in preschoolers and suggest that mothers can ameliorate the influence of IPV on preschoolers' memory functioning via their parenting.

*Keywords:* intimate partner violence, preschoolers, explicit memory

Each year in the United States, approximately 15.5 million children living in dual-parent households are exposed to intimate partner physical violence (IPV), with 7 million of those exposed to very severe acts of violence (McDonald, Jouriles, Ramisetty-Mikler, Caetano, & Green, 2006).[1] Although children of all ages are at risk for exposure to IPV, preschool-age children appear to be especially vulnerable. For example, in a five-city study on households involved in substantiated incidents of IPV, preschool-age children (≤5 years) were more likely than older children to have been present in the household at the time of the incident (Fantuzzo, Boruch, Beriama, Atkins, & Marcus, 1997). Similarly, exposure to IPV seems to increase emotional and behavioral problems among children of all ages (Jouriles, Norwood, McDonald, & Peters, 2001; Margolin & Gordis, 2000), but exposure to IPV during the preschool years is thought to place children at especially high risk for developing emotional and behavioral problems (McDonald, Jouriles, Briggs-Gowan, Rosenfield, & Carter, 2007; Yates, Dodds, Sroufe, & Egeland, 2003).

Exposure to IPV is also associated with children's performance on an assortment of cognitive tasks (e.g., Huth-Bocks, Levendosky, & Semel, 2001; Koenen, Moffitt, Caspi, Taylor, & Purcell, 2003). However, research on IPV and preschoolers' cognitive functioning is sparse, and virtually nothing is known about IPV and preschoolers' memory functioning. Explicit memory, a specific dimension of memory functioning, involves capturing, processing, and storing new information (Schacter, 1987). When a preschooler encounters new information, it must be held in a temporary memory system while being encoded, and then it is placed into a long-term memory store from which it must be retrieved. Explicit memory is central to many activities of daily life, such as problem solving, reasoning, comprehending instructions, and decision making (e.g., Cantor &

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[1] In the literature on children and IPV, the terms *exposed* and *exposure* to violence refer to a range of experiences. In this article, these terms refer to children living in a family in which the mother reported that IPV occurred. The children may or may not have witnessed the violence.

Engle, 1993; Conway & Engle, 1994; Daneman & Carpenter, 1980; Engle, Cantor, & Carullo, 1992). It has been linked to academic success in a variety of school-age populations (e.g., Catroppa & Anderson, 2007; Riding, Grimley, Dahraei, & Banner, 2003) and may be critical to the achievement of important developmental milestones, including the formation of effective interpersonal relationships. Research with adult samples indicates a negative relation between explicit memory functioning and all-cause mortality (Shipley, Der, & Taylor, 2006).

Theoretically, explicit memory functioning might be particularly sensitive to symptoms of hyperarousal (e.g., difficulty concentrating or paying attention, feeling jumpy or nervous), and it seems plausible that hyperarousal may mediate the relation between IPV and preschoolers' performance on tasks requiring explicit memory. Specifically, some children appear to develop symptoms of hyperarousal from exposure to IPV (Graham-Bermann & Levendosky, 1998), and these symptoms, by their very nature, could interfere or compete with cognitive tasks involving explicit memory (Thrasher, Dalgleish, & Yule, 1994). Consistent with this notion, youth who exhibit symptoms of posttraumatic stress disorder (PTSD), a psychological disorder in which hyperarousal is a significant component, score lower on standard tests of verbal IQ and verbal memory compared with youth exposed to significant stressors but not warranting a diagnosis of PTSD (Saigh, Yasik, Oberfield, Halamandaris, & Bremner, 2006; Yasik, Saigh, Oberfield, & Halamandaris, 2006). In addition, youths between 11 and 14 years old with significant trauma symptoms perform more poorly than do controls on tests of prospective memory, immediate and delayed recall, and other cognitive tasks (Beers & De Bellis, 2002; Moradi, Doost, Taghavi, Yule, & Dalgleish, 1999).

Although exposure to IPV increases the likelihood of child adjustment difficulties, not all children in violent families, even severely violent families, have negative outcomes (Grych, Jouriles, Swank, McDonald, & Norwood, 2000; Jouriles, Murphy, & O'Leary, 1989). This variability suggests the possible presence of factors that buffer some children from the negative effects of IPV. Positive parent–child interaction or, more specifically, mothers' positive parenting may be one such factor (e.g., Davies, Harold, Goeke-Morey, & Cummings, 2002; Katz & Windecker-Nelson, 2006; Skopp, McDonald, Jouriles, & Rosenfield, 2007). Certain types of positive mother–child interactions that provide cognitive stimulation for children may offset the potential negative influences of IPV on explicit memory functioning. In addition, mothers' positive parenting may calm children who have been exposed to IPV, countering the negative effects of hyperarousal.

In the present research, we examine the relation between parents' IPV and preschoolers' performance on tasks involving explicit memory and analyze factors influencing that relation. We hypothesize that IPV relates negatively to preschoolers' performance on explicit memory tasks and that symptoms of hyperarousal mediate the relation. We also hypothesize that mothers' positive parenting will moderate the relation between IPV and children's performance on explicit memory tasks, with the relation weaker in families with higher levels of mothers' positive parenting. Because IPV correlates positively with parental physical aggression toward children (Jouriles & Norwood, 1995; Margolin & Gordis, 2003) and because physically abused children perform more poorly than nonabused children on standardized measures of intellectual performance (Barnett, Vondra, & Shonk, 1996; Kinard, 2001; Pears & Fisher, 2005), parental physical aggression toward children was controlled for in tests of the hypotheses. The potential influence of demographic variables, such as child sex, was also considered in tests of the hypotheses.

## Method

### *Participants*

Families were recruited from fliers distributed in preschools, libraries, social service agencies, and domestic violence shelters in a large metropolitan area. The fliers invited mothers of children 4 or 5 years of age to participate in the Preschool Family Project, which would involve the mother completing a "set of questionnaires about your child, yourself, your family, and your relationships" and the child completing tasks involving books, blocks, and drawings. The flier indicated that participation would take approximately 2 hr, mothers would be compensated $40 for participating, and children would receive a small toy. Mothers who telephoned in response to the fliers were given information about the study (e.g., mothers would be interviewed about family interactions, children would complete academic-type tests conducted in a way that most children would find fun) and were offered an opportunity to ask questions about the study. Interested mothers then participated in a brief screening interview (about 5 min) to determine eligibility. Eligible families were those in which the mother indicated that (a) she had been in a married or cohabiting relationship with a male partner for at least 5 of the past 6 months, (b) her child had never received a diagnosis of mental retardation or developmental delay nor suffered a serious head injury, (c) she and her child both spoke English sufficiently well to participate in an interview conducted in English, and (d) the annual family income was $60,000 or less.

Participants included 69 children (34 girls and 35 boys) and their mothers. The mean age of the children was 60.0 months ($SD$ = 7.48), mean annual family income was $25,417 ($SD$ = $15,135), and 79% of mothers had 12 or more years of education. In 71% of the families, the mother's partner was living in the household at the time of the study. The sample was 44% African American, 33% Hispanic, 12% European American, 4% Asian American or Pacific Islander, 3% Native American, and 4% multiethnic or other. The final sample of 69 families became aware of the study (i.e., received or viewed a flier) through preschools (28), domestic violence shelters (19), social service agencies (18), and libraries (4).

### Measures

*Intimate partner physical violence.* Mothers completed the 26-item Physical Aggression subscale of the Revised Conflict Tactics Scales (Straus, Hamby, Boney-McCoy, & Sugarman, 1996), reporting on their own aggression toward their partner as well as their partner's aggression toward them during the previous 6 months. Sample items included "How often did a partner throw something at you that could hurt?" and "How often did you slap a partner?" Frequency was indicated on a 10-point scale with higher scores reflecting greater frequency (0 = *never*, 1 = *once*, 2 = *2–3 times*, 3 = *4–5 times*, 4 = *once a month*, 5 = *2–3 times a month*, 6 = *1–2 times a week*, 7 = *3–4 times a week*, 8 = *5–6 times a week*, 9 = *every day*). Coefficient alpha is .94 in the present sample.

*Parent–child aggression.* Mothers completed the six-item corporal punishment scale of the Alabama Parenting Questionnaire (Shelton, Frick, & Wootton, 1996), indicating their own and their partner's parent–child aggression. Sample questions included "How often do you slap __ when he/she does something wrong?" and "How often does your partner hit__with a belt, switch, or other object when he/she has done something wrong?" Mothers responded to these items on a 5-point scale (0 = *never*, 1 = *almost never*, 2 = *sometimes*, 3 = *often*, 4 = *always*). Coefficient alpha is .60 in the present sample.

*Hyperarousal symptoms.* Mothers completed a nine-item scale assessing *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994) posttraumatic stress disorder (PTSD) symptoms of hyperarousal in children. Sample items included "Does __ feel jumpy or nervous nowadays for no reason he/she can think of?" "Is it easy for __ to pay attention to things that he/she has to do at home or school?" "Once __ is in bed, is it easy for him/her to go to sleep at night?" and "Is it easy for __ to finish things he/she starts (like games or TV shows)?" Mothers indicated the degree to which these symptoms occurred during the previous 6 months on a 3-point scale (0 = *never*, 1 = *sometimes*, 2 = *always*). Coefficient alpha is .63 in the present sample. The hyperarousal symptoms were conceptualized as a component of PTSD. To evaluate this notion, we correlated the Hyperarousal Symptoms Scale with a five-item, mother-report scale of the child's persistent reexperiencing of incidents of interparent conflict (another component of PTSD among children from violent families). Sample items included "Does__ever have bad dreams or nightmares about arguments or fights between you and your partner?" and "Do you think there is anything about arguments/fights between you and your partner that__ just keeps thinking about?" The correlation between these two scales was .59.

*Mothers' positive parenting.* Mothers completed the nine-item Positive Parenting scale of the Parent Perception Inventory (PPI; Hazzard, Christensen, & Margolin, 1983). Sample items included "How often do you play with__, spend time with him/her, or do things together, which your child likes?" and "How often do you talk to__, just listen, or have good conversations with him/her?" Mothers responded on a 5-point scale (1 = *never*, 2 = *a little*, 3 = *sometimes*, 4 = *pretty much*, 5 = *a lot*). Coefficient alpha is .90 in the present sample.

*Explicit memory.* The Visual Reception scale and the Receptive Language scale from the Mullen Scales for Early Learning (Mullen, 1995) were administered to children. These scales included tasks to evaluate explicit memory functioning. An example of a task from the Visual Reception scale involves having the preschooler briefly examine a symbol, removing it from view, and then having the preschooler identify that same symbol in a changed orientation when it is presented with other symbols. An example of a task from the Receptive Language scale involves presenting the preschoolers with three commands and then having them follow these commands in sequence. Test–retest reliability (1–2 weeks) for the two scales ranges from .75 to .82 (Mullen, 1995). *T* scores, adjusted for child age, were used in analyses.

The Memory for Faces subtest from the NEPSY (Korkman, Kirk, & Kemp, 1998) was also used to assess explicit memory functioning. This subtest involves presenting pictures of the faces of 16 children for 5 s each, followed by a three-alternative forced-choice recognition test for each face. The Memory for Faces subtest has an average test–retest reliability (2–10 weeks) of .79 (Korkman et al., 1998). Normed scores, adjusted for child age, are not available for 4-year-olds for this particular subtest. Thus, age-corrected scores were created for the sample and used in the analyses. Specifically, raw scores were regressed on child age, and the average change in raw score per month of age was computed. For each child, this change in raw score per unit change in age was multiplied by the difference between the child's age and the sample mean age. This difference score was then added to (or subtracted from) the child's actual score to obtain an age-corrected score.[2] In the present sample, the age-corrected scores correlated with scores on the Visual Reception scale, $r = .34$, $p < .01$, and the Receptive Language scale, $r = .42$, $p < .001$.

*Demographic information.* Mothers provided the following demographic information: child sex (1 = *male*, 2 = *female*), family income (thousands/year), mother's education (1 = *less than 8th grade*, 2 = *9th–11th grade*, 3 = *high school or GED*, 4 = *vocational or trade school*, 5 = *some college*, 6 = *bachelor's degree*, 7 = *master's degree*, 8 = *MD, PhD, or JD*), whether mothers had a partner living in the household at the time in which the study was conducted (0 = *no*, 1 = *yes*), shelter status (0 = *not living in a shelter*, 1 = *currently living in a shelter*), and mother's ethnicity (1 = *White/Caucasian*, 2 = *Black/African American*, 3 = *Hispanic/Latino*, 4 = *Asian/Pacific Islander*, 5 = *Native American*, 6 = *other*). For analyses, the six ethnic codes were combined into three groups on the basis of the distribution of ethnic groups in our sample. The three groups were African American (44%), Hispanic (33%), and other

[2] The results presented are for the age-corrected scores, but an identical pattern of results emerged for the raw scores with the Memory for Faces subtest.

(23%). Two dummy variables were coded (African American = 1, other = 0, and Hispanic = 1, other = 0) and used to assess the relation of ethnicity to the memory measures.

### *Procedures*

All procedures and measures were approved by the institutional review board of the university at which the research was conducted. Prior to collecting any data, a research assistant reviewed the parental consent form with the mother to ensure she understood the study procedures and her rights as a participant. Mothers were informed that there were several circumstances in which information collected as part of the study would have to be released without their consent. These instances included (a) the mother posed a serious danger to herself or others, (b) there was evidence to suggest child abuse or neglect, (c) a valid medical emergency arose, or (d) the records were subpoenaed by a court of law.

Mothers and children were assessed in separate rooms by different research assistants. All instructions and measures were read aloud to mothers, which allowed research assistants to clarify misunderstandings mothers may have had about particular questions and to reduce hurried or careless responding. Many measures included items about serious and disturbing life problems, and research assistants were trained to respond empathically to the mothers without communicating judgment or opinion about responses. Empathic but nonleading responses from the research assistants also fostered rapport that enabled opportunities for follow-up questions if necessary (e.g., in the case of a report of severe parent–child aggression). During the course of the present study, the need did not arise for research staff to make a report to authorities about child abuse or neglect.

Research assistants played games with the children prior to administering the assessment materials. Children were given snacks and allowed to take breaks as needed to minimize fatigue and maintain interest and engagement in the assessment procedures. Although data were collected from all 69 child participants, explicit memory data from 4 children were incomplete: 67 completed the Visual Reception scale, 65 completed the Receptive Language scale, and all 69 completed the Memory for Faces subtest. In addition, 1 mother did not complete the PPI. Each analysis was computed with all of the data available for that particular analysis.

## Results

In 37 of the 69 families (54%), the mother reported at least one incident of IPV in the previous 6 months. In 17 of those 37 families, both the mother and the father committed acts of IPV; in 13 families, only the father did so; and in 7 families, only the mother did so. Also, in those 37 families in which IPV was reported, the average number of violent acts was 17 (range = 1–94 acts), and 17 of the 37 families (46%) indicated that at least one of the acts of violence was severe (e.g., punched or hit with something that could hurt; burned or scalded; beaten up). Eighteen percent of the children (12/67) received a *T* score at least 1.5 standard deviations below the mean on the Visual Reception scale (35 or less), and 35% (23/65) received such a score on the Receptive Language scale. "Scores that are 1.5 standard deviations below the mean . . . indicate that the child is at risk for delay and should receive consideration for early intervention services" (Mullen, 1995, p. 34).

### *Relation Between IPV and Children's Explicit Memory Functioning*

Means, standard deviations, and correlations among the study variables are presented in Table 1. IPV was negatively correlated with scores on all three measures of explicit memory functioning (Visual Reception scale, Receptive Language scale, and Memory for Faces subtest), whereas parent–child aggression was negatively associated only with scores on the Visual Reception scale.

To determine if IPV was related to children's explicit memory functioning over and above the effects of parent–child aggression, we regressed each of the three memory measures on IPV and parent–child aggression in separate multiple regression analyses. To ensure that the relations between the predictors and the dependent variables were not simply a result of their mutual correlations with demo-

Table 1
*Means, Standard Deviations, Range, and Correlations Among Study Variables*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | *M* | *SD* | Range |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Child sex | — | | | | | | | | | | | | 1.51 | 0.50 | 1–2 |
| 2. Family income (in thousands) | −.02 | — | | | | | | | | | | | 25.42 | 15.14 | 0–60 |
| 3. Mothers' education | .01 | .39* | — | | | | | | | | | | 3.87 | 1.51 | 1–8 |
| 4. Shelter status | −.08 | −.07 | .08 | — | | | | | | | | | 1.72 | 0.45 | 0–1 |
| 5. Partner in household | .01 | .19 | .11 | −.54* | — | | | | | | | | .71 | .46 | 0–1 |
| 6. Intimate partner violence | −.06 | −.15 | −.29* | .39* | −.52* | — | | | | | | | 9.36 | 20.52 | 0–94 |
| 7. Parent–child aggression | .21 | −.23 | −.10 | .19 | −.14 | .26* | — | | | | | | 9.09 | 2.78 | 6–16 |
| 8. Hyperarousal symptoms | .18 | −.23 | .01 | .46* | −.44* | .34* | .43* | — | | | | | 3.16 | 2.26 | 0–10 |
| 9. Mothers' positive parenting | −.14 | .34* | .08 | −.12 | .09 | −.23 | −.16 | −.35* | — | | | | 40.32 | 3.09 | 30–45 |
| 10. Visual reception | −.18 | .20 | .12 | −.12 | .06 | −.33* | −.28* | −.24 | .19 | — | | | 44.99 | 10.46 | 20–74 |
| 11. Receptive language | −.12 | .28* | .26* | .01 | −.06 | −.25* | −.20 | −.16 | .15 | .72* | — | | 41.58 | 12.49 | 20–74 |
| 12. Memory for faces | −.06 | .20 | .13 | −.01 | .03 | −.27* | −.22 | −.21 | .37* | .34* | 42* | — | 9.59 | 3.73 | 0–16 |

* $p < .05$.

graphic variables, we also included child sex, family income, mothers' education, shelter status, mother's partner living in the household at the time in which the study was conducted, and mothers' ethnicity as control variables in the analyses. Mother's partner living in the household was the only demographic variable related to any of the measures of memory functioning. Thus, it was retained, the other demographic variables were dropped from the model, and the analyses were recomputed. In each of the regression analyses, all of the predictor variables were entered simultaneously. Thus, the reported regression coefficients reflect the relation of a given variable to the dependent variable over and above all other predictors and control variables in that model.

Results of the analyses are summarized in Table 2. Higher levels of IPV were related to lower scores on the Visual Reception scale, $b = -.20$, $t(63) = -2.68$, $p < .01$, $sr^2 = .09$; the Receptive Language scale, $b = -.23$, $t(61) = -2.54$, $p < .05$, $sr^2 = .09$; and the Memory for Faces subtest, $b = -.06$, $t(65) = -2.17$, $p < .05$, $sr^2 = .06$.[3] Parent–child aggression was not related to any measure of children's explicit memory functioning over and above the effects of IPV and mother's partner living in the household.

Because child sex has been found to moderate relations between IPV and other variables such as parent–child aggression (e.g., Jouriles & LeCompte, 1991; Jouriles & Norwood, 1995), it was considered a possible moderator of the relation between IPV and children's explicit memory functioning. Child sex and a Child Sex × IPV interaction term were added as predictors in each of the three regression models (IPV was centered at its mean for these analyses). In each analysis, neither child sex nor the interaction term was related to explicit memory functioning.

### *Hyperarousal as a Mediator of the Relation Between IPV and Children's Explicit Memory Functioning*

Hyperarousal symptoms were expected to mediate the relation between IPV and children's explicit memory functioning. Path analyses, using multiple regression, were conducted to test the mediation hypotheses (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Specifically, hyperarousal symptoms were regressed on IPV, and memory functioning was regressed on hyperarousal symptoms and IPV. The mediated pathway from IPV to explicit memory functioning through hyperarousal symptoms was evaluated using the $z'$ test, which directly tests the significance of the indirect (mediated) effect. This direct test of a mediated pathway has greater power and more accurate Type I error rates than most other tests of mediation, such as the Baron and Kenny (1986) causal steps approach (MacKinnon et al., 2002). Separate mediation analyses were performed for each of the three measures of children's memory functioning, each testing hyperarousal symptoms as a mediator of the effect of IPV on that particular measure of children's memory functioning and each controlling for parent–child aggression and mother's partner living in the household. The $z'$ tests of the indirect (mediated) effects revealed that hyperarousal symptoms did not mediate the relation between IPV and any of the three measures of children's explicit memory functioning. Additionally, IPV was not found to be related to hyperarousal symptoms, $p > .66$, and hyperarousal symptoms were not related to any of the three measures of memory functioning over and above the effect of IPV.

### *Mothers' Positive Parenting as a Moderator of the Relation Between IPV and Children's Explicit Memory Functioning*

Mothers' positive parenting and the interaction between mothers' positive parenting and IPV were added as predictors to the original multiple regression models. Mothers' positive parenting and IPV were centered at their means. The reported regression coefficients reflect the relation of a given variable to the dependent variable over and above all other predictors and control variables in that model.

Results are summarized in Table 3. The Mothers' Positive Parenting × IPV interaction term was related to scores on the Visual Reception scale, $b = .12$, $t(60) = 2.15$, $p < .05$, $sr^2 = .06$, and the Memory for Faces subtest, $b = .04$, $t(62) = 2.27$, $p < .05$, $sr^2 = .06$.[4] To help interpret these interactions, we followed procedures suggested by Aiken and West (1991). Specifically, the relation between IPV and each of these two memory tests was plotted separately for high (1 standard deviation above the mean) and low (1 standard deviation below the mean) levels of mothers' positive parenting. The plots are presented in Figure 1. When mothers' positive parenting was low, higher levels of IPV were related to poorer Visual Reception scale scores, simple slope $= -.22$, $t(60) = -3.02$, $p < .05$, and to poorer Memory for Faces subtest scores, simple slope $= -.05$, $t(62) = -2.10$, $p < .05$. When mothers' positive parenting was high, there was no relation between IPV and Visual Reception scale scores or between IPV and Memory for Faces subtest scores.

## Discussion

This is the first study to our knowledge to evaluate relations between IPV and preschoolers' performance on

[3] Although mother's partner living in the household related to children's memory functioning in regression analyses, it was not related to memory functioning in the bivariate correlations presented in Table 1. To be conservative, we repeated the regression analyses with the two demographic variables that were associated with children's explicit memory functioning in the bivariate correlations (family income, mothers' education) added to the equations. The pattern of results for these new regression analyses was identical to the pattern of results for the analyses reported in the text.

[4] To be conservative, we repeated the regression analyses with the two demographic variables that were associated with children's explicit memory functioning in the bivariate correlations (family income, mothers' education) added to the equations. The pattern of results for these new regression analyses was identical to the pattern of results for the analyses reported in the text.

Table 2
*Results of Univariate Multiple Regression Analyses Predicting Memory Tasks*

| Variable | β | *B* | *SE* | $sr^2$ |
|---|---|---|---|---|
| Visual reception | | | | |
| Intimate partner violence | −.38* | −0.20 | 0.07 | .09 |
| Parent–child aggression | −.22 | −0.82 | 0.45 | .04 |
| Mother's partner living in household | −.18 | −4.03 | 3.14 | .02 |
| Receptive language | | | | |
| Intimate partner violence | −.37* | −0.23 | 0.09 | .09 |
| Parent–child aggression | −.15 | −0.69 | 0.56 | .02 |
| Mother's partner living in household | −.29* | −7.79 | 3.84 | .06 |
| Memory for faces | | | | |
| Intimate partner violence | −.31* | −0.06 | 0.03 | .06 |
| Parent–child aggression | −.16 | −0.21 | 0.16 | .02 |
| Mother's partner living in household | −.15 | −1.25 | 1.12 | .02 |

*Note.* $sr^2$ = semi-partial $r^2$.
* $p < .05$.

tasks involving explicit memory. Methodological strengths of this research include the use of multiple measures of explicit memory functioning, collection of data from children as well as mothers, and consideration of social and demographic variables that might account for results. Investigation of hyperarousal symptoms as a potential mediator of the relations and examination of mothers' positive parenting as a potential moderator of the relations contribute to the development of theory in this area. The frequency of IPV related negatively to preschoolers' explicit memory functioning, even after controlling for parent–child aggression and demographic variables related to preschoolers' memory functioning. Preschoolers' hyperarousal symptoms did not mediate the relation between IPV and explicit memory functioning. However, mothers' positive parenting moderated the relation, with a weaker relation between IPV and preschoolers' explicit memory in families with higher levels of mothers' positive parenting.

This study extends research on IPV and child adjustment difficulties to the explicit memory functioning of preschoolers. Although it is not clear from the present research what accounts for this relation (the hypothesis that hyperarousal mediated the association was not supported), several plausible explanations can be offered. Biological degradation, in which exposure to continued stressors adversely influences developing brain structures central to effective memory functioning, might account for this relation (e.g., Sapolsky, Uno, Rebert, & Finch, 1990; van der Kolk, 1996). Specifically, young children in families characterized by frequent IPV may experience damage to the hippocampus as a result of chronically elevated blood levels of stress hormones (glucocorticoids), which, in turn, can negatively influence the encoding of information (a process central for explicit memory functioning). Behavioral adaptation (Paige, Reid, Allen, & Newton, 1990) may also help explain links between IPV and explicit memory functioning. Specifically,

Table 3
*Tests of Mothers' Positive Parenting as a Moderator of the Relation Between Intimate Partner Violence (IPV) and Explicit Memory Functioning*

| Variable | β | *B* | *SE* | $sr^2$ |
|---|---|---|---|---|
| Visual reception | | | | |
| IPV | −.20 | −0.10 | 0.08 | .02 |
| Parent–child aggression | −.29* | −1.07 | 0.47 | .07 |
| Mother's partner living in household | −.16 | −3.62 | 3.06 | .02 |
| Mother's positive parenting | .07 | 0.77 | 1.22 | .01 |
| IPV × Mother's Positive Parenting | .30* | 0.12 | 0.06 | −.38* |
| Receptive language | | | | |
| IPV | −.27 | −0.17 | 0.10 | .04 |
| Parent–child aggression | −.18 | −0.84 | 0.61 | .03 |
| Mother's partner living in household | −.28* | −7.57 | 3.90 | .05 |
| Mother's positive parenting | .07 | 0.90 | 1.55 | .00 |
| IPV × Mother's Positive Parenting | .15 | 0.07 | 0.07 | .02 |
| Memory for faces | | | | |
| IPV | −.05 | −0.01 | 0.03 | .01 |
| Parent–child aggression | −.21 | −0.28 | 0.16 | .03 |
| Mother's partner living in household | −.10 | −0.82 | 1.06 | .01 |
| Mother's positive parenting | .27* | 1.01 | 0.43 | .07 |
| IPV × Mother's Positive Parenting | .31* | 0.04 | 0.02 | .06 |

*Note.* $sr^2$ = semi-partial $r^2$.
* $p < .05$.

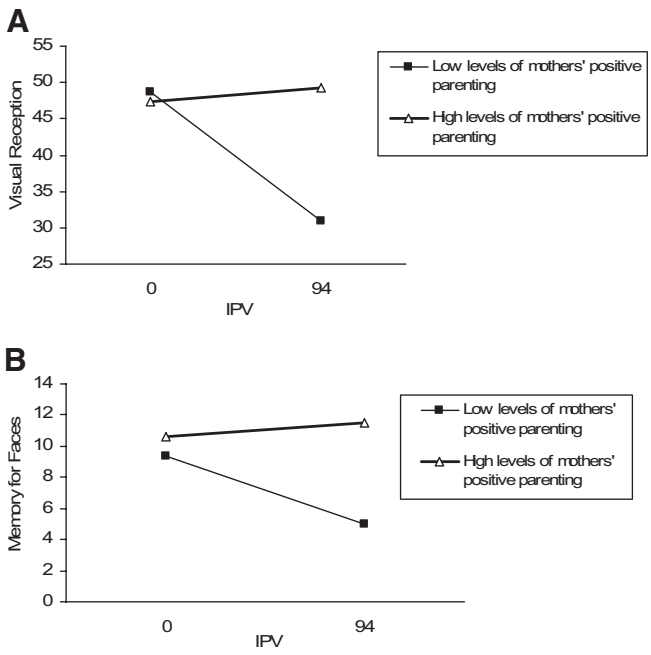


*Figure 1.* The relation between intimate partner physical violence (IPV) and preschoolers' performance on explicit memory tasks at low and high levels of mothers' positive parenting. A: Relation of IPV to visual reception at low and high levels of mothers' positive parenting. B: Relation of IPV to memory for faces at low and high levels of mothers' positive parenting.

young children in families characterized by frequent IPV may adapt to their environment through changes in their perception and attention abilities. That is, processes involved in explicit memory functioning are altered so that the stream of negative information to which these children are exposed is buffered, attenuated, or forgotten. Third-variable hypotheses might also be advanced to explain links between IPV and preschoolers' explicit memory functioning. For example, frequent and severe IPV is associated with other stressors for children and a wide range of disruptive life events (Wolfe, Jaffe, Wilson, & Zak, 1985). Efforts were made to account for some of these (e.g., parent–child aggression, shelter residence), but unmeasured stressors and life disruptions (e.g., mothers' psychiatric symptoms, interruptions in children's sleep schedules) may also help explain the relation.

Higher levels of mothers' positive parenting were associated with a weakened relation between IPV and preschoolers' explicit memory functioning. This finding suggests that mothers can ameliorate the negative effects of IPV on children's explicit memory functioning and is consistent with the literature that positive mother–child interaction buffers children from the negative influences of marital conflict (e.g., Davies et al., 2002; Katz & Windecker-Nelson, 2006; Skopp et al., 2007). However, because these data are correlational, causation cannot be established (that mothers' positive parenting actually protects children in violent families). Mother–child interaction has been shown to be a fruitful target for intervention for child behavior problems in families characterized by IPV (Graham-Bermann, Lynch, Banyard, DeVoe, & Halabu, 2007; Jouriles, McDonald, et al., 2001; McDonald, Jouriles, & Skopp, 2006), and it seems conceivable that the effects of such interventions may extend to aspects of children's cognitive functioning. In short, this finding holds promise for developing interventions for children exposed to IPV and suggests that it may be beneficial to conduct experimental work examining the effects of positive parenting.

It is noteworthy that a sizable proportion of the children received scores on the Mullen Scales (i.e., the Visual Reception scale and Receptive Language scale) indicative of risk for delay. Given the prevalence of IPV in the sample and the relations between IPV and the Mullen Scales, this finding suggests that problems with explicit memory functioning might be highly prevalent among preschoolers in families characterized by IPV. The implications of this warrant additional investigation. For example, it might be useful to document more precisely the memory problems experienced by children in families seeking services for IPV, delineate the boundaries of the relation between IPV and explicit memory functioning, and examine its implications for child functioning in other domains. It is not clear if the relations documented in this research are specific to preschoolers' explicit memory functioning or if they apply more broadly to preschoolers' cognitive functioning in general. Similarly, it is not clear if our findings signal long-term problems in children's explicit memory functioning that can only be corrected by intervention or if the memory deficits dissipate with the cessation of violence and the passage of time.

Several limitations should be considered when interpreting the present results. One is the cross-sectional design, which precludes inferences about causality and limits conclusions about the durability of the observed memory scores. A second, related limitation is the possibility that stressors other than IPV might play an important role in the observed relations between IPV and preschoolers' explicit memory functioning. Although social and demographic variables that might account for results were considered in the analyses, it is still possible that unmeasured variables influenced the findings. A third limitation is that the measurement of violence focused on the frequency of physical IPV. Contextual factors, such as antecedents and consequences of violent acts, were not considered. Although the frequency of physical IPV proved to be a useful index of violence, a more comprehensive assessment of IPV might yield different results. Another limitation relates to the measurement of preschoolers' hyperarousal symptoms and several of the control variables, such as parent–child aggression. Specifically, although there is some evidence for the validity of these measures in the present study (e.g., the pattern of correlations among IPV, parent–child aggression, and children's hyperarousal symptoms), the measures of hyperarousal and parent–child aggression had low internal consistency coefficients in the present sample. In addition, reporting of parent–child aggression may have been influenced by informing mothers of the need to report suspicions

of child abuse and neglect. In short, better measurement of preschoolers' hyperarousal symptoms and parent–child aggression may enhance future research on this topic.

Early experiences may disrupt the development of important cognitive processes during the preschool years, setting the stage for continued or additional problems later in life. Exposure to IPV may be one such disruptive experience. Given the importance of explicit memory to daily functioning and academic achievement, it is important to better understand its relation to IPV. On a positive note, this research also suggests that mothers may ameliorate the influence of IPV on preschoolers' memory functioning via their parenting, and investigators are encouraged to examine the effects of positive adult–child interactions on a range of child outcomes in high-risk samples, including aspects of memory functioning.

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