

# Traumatic Events and Maternal Education as Predictors of Verbal Ability for Preschool Children Exposed to Intimate Partner Violence (IPV)

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Published online: 9 December 2009  
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**Abstract** Despite research on the effects of intimate partner violence (IPV) on children, little is known about its impact on cognitive development. In this study, 87 preschool-aged children and their mothers exposed to IPV within the last two years participated in interviews to ascertain verbal ability, history of violence, and exposure to trauma. When compared to a national sample of 1,700 same-age children not evaluated for exposure to traumatic events, children exposed to IPV scored significantly lower on verbal ability, as assessed with standardized measures. In order to understand variation in verbal ability, multiple regression models were tested. Both prior exposure to traumatic events and the level of mother's education were significant predictors of verbal ability. However, level of education mediated the relationship between traumatic events and the child's verbal ability.

**Keywords** Preschool children · Verbal ability · Intimate partner violence · Trauma

Trauma encompasses a wide array of life events, ranging from community violence to natural disasters to warfare. While these events might seem too extreme to affect a

substantial portion of the population, studies indicate that 40% of children between the ages of 10 and 16 have already experienced a potentially traumatic event (Boney-McCoy and Finkelhor 1995). Costello et al. (2002) found that 25% of children experience a high magnitude trauma in their lives, with 33% of these children experiencing low magnitude traumas within the past 3 months. Other studies, specific to family violence, note 25% of children will experience some type of family related trauma—whether it be child physical abuse, sexual abuse, or witnessing intimate partner violence (IPV) (Ammar 2006; Chen et al. 2004; Nelson et al. 2002; Xu et al. 2001). These staggering prevalence rates have led researchers to explore the consequences of traumatic exposure. And indeed, it is associated with a plethora of negative effects for children's social, emotional, behavioral, physical, and academic development (Bedi and Goddard 2007; Chemtob et al. 2008; Graham-Bermann and Seng, 2005; Katz et al. 2007; Levendosky et al. 2002; Malik 2008; Stover and Berkowitz 2005).

One area that has received little attention to date is the relationship between exposure to trauma and cognitive development. Cognitive development is especially important for younger children as they prepare to enter the educational system. Children in at-risk populations often have poorer academic performance than their peers; a factor which recent research has shown affects their long-term academic success (Howse et al. 2003; Zolotor et al. 1999).

## Factors Influencing Cognitive Development

Research consistently shows that academic achievement is linked to intelligence (Butler et al. 1985; Jensen 1998; Johnson et al. 2007). While some researchers have

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This research was funded by the Blue Cross Blue Shield Foundation of Michigan. The views expressed in this manuscript do not necessarily reflect those of the granting agency.

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described the link between the intelligence quotient (IQ) and academic achievement as concrete and unidirectional, others indicate that it might be more reciprocal in nature—with education resulting in IQ increases (van Tuijl and Leseman 2007). While IQ is evaluated in two sub-categories, verbal and performance IQ, past studies indicate that verbal ability has a particularly strong impact on academic performance (Petrides et al. 2005). However, much of the research on verbal ability and academic performance has focused on adolescent populations. The current research project seeks to extend this area of inquiry by considering predictors of preschool children's verbal ability in at-risk families, in this case, families experiencing intimate partner violence.

There is evidence that measures of intelligence might be more fluid in early childhood because children tend to score differently depending on their exposure to education (van Tuijl and Leseman 2007). For example, Huttenlocher et al. (1998) found preschoolers' had IQ growth over the course of the school-year and then a decline over the summer. Additionally, preschool-aged children in most families go through a spurt of language and cognitive development, and generally test better with each passing year (Piaget 1952; Wechsler 2002). Given that preschoolers' intelligence is sensitive to education and age, it is not unreasonable to assume that it would be impacted by other environmental and social factors, such as exposure to traumatic events, although this has not been thoroughly examined to date.

The relationship between measures of intelligence and socioeconomic status (SES) has been clearly established, but the reasons given for differences across SES and culture have varied (Brooks-Gunn et al. 2003; Fagan and Holland 2002; Strenze 2007). For example, Fagan and Holland (2002) found differences in vocabulary scores between African-American and Caucasian children, even after controlling for a number of demographic variables. However, when the vocabulary task was changed to incorporate the learning of 40 novel words and then a consequent vocabulary test, differences between ethnicities vanished. One reason offered by several researchers is that African-American children are more likely to experience long-term poverty, while Caucasian children are much more likely to experience short-term poverty, leading to differences in intelligence testing, even after considering current SES (Cellini et al. 2008; Duncan and Rodgers 1988; Stevens 1999). Long-term poverty is defined as family income falling below the poverty line (on average) for several years, whereas short-term poverty indicates annual family income below the poverty line in a given year, but not in subsequent years (Korenman et al. 1994).

The risk of long-term poverty is also especially high for single mothers, particularly those who have recently left a partner—a pertinent demographic fact for many families

with IPV (Bane and Ellwood 1986; Blank 1997; McKernan and Ratcliffe 2002, 2005). Since the gap in intelligence testing scores is evident as early as age three (Montie and Fagan 1988; Peoples et al. 1995), it is especially important to give increased attention to preschool-aged children. Thus, preschoolers who are exposed to traumatic events might be uniquely at-risk for learning difficulties due to socioeconomic and ethnicity-related variables, both of which will be evaluated in the current study.

In addition to the effects of ethnicity on measures of intelligence, research also finds gender differences in IQ scores. Such differences between girls and boys are present on many of the IQ subscales, but the direction of the discrepancies is inconsistent. It appears that females tend to do better on the digit span sections (Hattori 2000; Lynn and Irwing 2008; Miller and Vernon 1996), while males tend to have a slight advantage on mental arithmetic (Lynn and Irwing 2008). Gender differences in vocabulary appear to vary depending on the study and age-group (Kaiser and Reynolds 1985; Westerlund and Lagerberg 2008). Surprisingly, relatively few studies have addressed preschool gender differences in intelligence testing. One potential reason for this may be that many of the intelligence subscales, though not all, fluctuate across the lifespan and stabilize with the progression to adulthood (Lynn and Irwing 2008).

The role of mother's education and its influence on the cognitive development of the child can be considered in light of exposure to IPV. Studies show that when IPV occurs it happens very early in the life of the child, in some studies as young as age 2 (Jarvis et al. 2005) and in other studies as young as the first year of life (Kilpatrick and Williams 1998). In another study, mothers of 6–12 year old children report their exposure to intimate partner violence had occurred for an average of 10 years, or the entire life of the child (Graham-Bermann et al. 2007). Typically, along with physical assaults are efforts to restrict the woman's access to resources outside of the home (e.g., to work, to education, and to social support) (Lynch and Graham-Bermann 2004). Thus, IPV may influence the opportunities that a mother may have or may have had for furthering her education (Riger et al. 2000). The optimal development of her child's cognitive abilities may also be diminished.

Beyond demographic variables, the mental health of both the parent and child has been associated with IQ scores. Post-Traumatic Stress Disorder (PTSD) is related to IQ, though the direction of this association has not been fully developed. The consideration of traumatic stress events and symptoms is especially important in families experiencing IPV, since many of the children show clear signs of traumatic stress (Bogat et al. 2006; Graham-Berman et al. 2006; Graham-Bermann and Levendosky 1998; Kitzmann et al. 2003). Most studies in this area find a

significant negative correlation between traumatic stress and IQ. Still, they are cross-sectional, making the direction of the relationship controversial (Gil et al. 1990). Recent research reveals that the duration and severity of the trauma are particularly important to developmental outcomes, with increased severity and frequency resulting in greater cognitive impairment (Emdad et al. 2005).

While patterns of dysregulation vary, studies of the psychophysiology of children exposed to IPV and other traumatic events suggest that they respond to traumatic events with higher levels of cortisol stress hormones than do children not exposed to traumatic events (De Billis 2001; Saltzman et al. 2005). Depending on the extent and duration of exposure, their neuroendocrine systems may become either permanently or transiently dysregulated, leaving these children with greater physiological arousal, reactivity, and hypervigilance, symptoms of PTSD (Perry and Pate 1994). Children who are highly aroused may be distracted, fearful, and/or less relaxed around other people than children without these symptoms, thus possibly compromising their ability to perform on cognitive tasks. Such factors are important to consider in young children because family and community traumas can be severe and of great duration, yet children do not typically have the ability to remove themselves from their environment.

Since preschool children's IQ is in flux, it is possible that trauma could impact their general IQ more than it might in adult populations. Children who show PTSD symptoms following exposure to trauma have more negative IQ outcomes. More specifically, PTSD symptoms are negatively associated with full scale and verbal IQ as well as the majority of the Verbal IQ subscales in a number of studies (Saigh et al. 2006; Saltzman et al. 2006). Children who suffer from child abuse/neglect also have significantly lower IQ and poorer reading ability than non-abused/neglected peers of similar socioeconomic status (Perez and Widom 1994). One compelling twin study indicated that children who had been exposed to high levels of IPV fell eight points short of their non-exposed counterparts. This study found that the difference in IQs between the groups exceeded what would be expected given genetic differences in intelligence (Koenen et al. 2006). The current study will extend existing research by including variables that might act as explanatory mechanisms for the relationship between preschoolers' decreased intellectual functioning and exposure to traumatic events, such as IPV.

Although some studies have evaluated the relationship between exposure to IPV and children's verbal ability, none have included a more comprehensive measure of children's exposure to traumatic events. Ybarra et al. (2007) found that seldom is community violence controlled for in studies of the effects of IPV exposure on children. Because children who are exposed to IPV might be in similarly violent

communities, this is important to take into account. Similarly, other types of traumas may have additive effects on children's functioning, with conjoined trauma exposure resulting in more detrimental outcomes (Chemtob et al. 2008). For this reason, the current study will include a comprehensive measure of children's exposure to a variety of traumatic experiences.

Recent research has also evaluated how the mother's exposure to trauma relates to long-term child adjustment. Studies in which both the mother and child experience the same traumatic event show a strong association in the development of consequent child trauma symptoms and problems in adjustment (Graham-Bermann et al. 2009; Ostrowski et al. 2007). The current study seeks to expand on existing research by considering how maternal traumatic stress relates to a number of more general child adjustment factors, including child verbal ability.

Finally, several studies have linked maternal education to children's cognitive capabilities, finding that increased maternal education is linked to the creation of a more cognitively-stimulating environment for children (McGroder 2000). Other research has supported the link between parent education and child achievement (Davis-Kean 2005; Klebanov et al. 1994; Smith et al. 1997). A low level of maternal education is a risk factor for IPV in other studies, with mothers not completing high school experiencing higher levels of IPV (Breiding et al. 2005). Not only does this place children at greater risk for exposure to family violence, but also low levels of maternal education are also associated with poorer maternal resiliency to trauma (Brewin et al. 2000).

## Hypotheses

Following the literature on children living in high risk environments, it is expected that the verbal ability of children exposed to potentially traumatic events, such as IPV, will be lower than same-age children in a normative national sample. Given that high risk, preschool-age children exposed to traumatic events may experience difficulty participating in the tests in general, it is predicted that the child's verbal ability will be positively and significantly related to the child's level of comfort with the test and understanding of the requirements of the verbal ability test. Because studies have shown that child age and mother's education are related to verbal ability, it is hypothesized that greater child age and mother's education will be associated with greater verbal ability in the children in this study. Additionally, research shows that deleterious circumstances can have a diminishing effect on cognitive ability; therefore, we expect that greater exposure to traumatic events will be associated with lower verbal ability

in the child. Protective factors in the home have also been hypothesized to impact verbal ability, one such variable is the mother's level of education. We predict that mother's level of education will mediate the relationship between exposure to potentially traumatic events and verbal ability in the child.

## Method

### Participants

The sample consists of 87 mothers and their preschool-age children from two counties in southeast Michigan who were exposed to IPV in the past two years. Children ranged in age from 4 to 6 years ( $M=4.94$ ,  $SD=.84$ ) and mothers ranged in age from 21 to 56 ( $M=32.36$ ,  $SD=7.5$ ). Forty five percent of the children in this sample were girls. The major ethnic group for children was African-American (34.9%), with 19.8% biracial and 38.4% European American. For mothers, 36.5% were African-American, 48.2% European American, and 5.9% biracial. Most of the mothers had completed high school (84.9%), with 12.6% graduating college. Many of the women were single (39.1%) but 26.4% were either married or living with a partner. Twelve percent were separated and 22.4% were divorced at the time of the study. More than half (52.9%) had lived in a shelter for abused women in the past and 8% were currently living with a violent partner.

### Measures

**Demographics** A demographics questionnaire was administered to each mother to ascertain basic background information, such as age, income, ethnicity, education, and relationship status.

**Verbal Ability** The verbal ability of preschool children in this study was assessed using the vocabulary subscale of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI-III; Wechsler 2002). The WPPSI-III provides subtest and composite scores that represent intellectual functioning in verbal and performance cognitive domains, as well as a full intelligence quotient (IQ) that represents a child's general intellectual ability. Quotient and composite scores have a mean of 100 and a standard deviation of 15; while subtest scaled scores have a mean of 10 and a standard deviation of 3. The WPPSI-III is appropriate for children aged 2 years, 6 months through 7 years, 3 months (Wechsler 2002).

Preschool children are often a challenging population to interview due to their youth, making it difficult to complete the entire WPPSI battery. Therefore, several studies have

explored the predictive value of individual subscales. The vocabulary subscale has shown high correlations to both the Verbal IQ and the WPPSI-III Full Scale IQ (Wechsler 2002). Recent research has successfully used vocabulary as a proxy for general verbal ability (Fagan and Holland 2002). This supports the possibility of using the Vocabulary subscale of the WPPSI-III as a proximal indicator of verbal ability and degree of language development (Wechsler 2002).

The vocabulary subscale consists of 25 questions—five where the preschooler must accurately identify pictures, and 20 where they must provide definitions for words of increasing difficulty given by the interviewer. This subscale is designed to measure not only children's knowledge but also their learning ability, long-term memory, and degree of language development (Wechsler 2002). The reliability of the vocabulary subscale fluctuates between .86 and .89 depending on the child's age. The vocabulary subscale has a test-retest reliability of .87. The WPPSI-III has shown high reliability in a variety of populations, including children with developmental delays, confirming its ability to reliably assess both typically and atypically developing children (Wechsler 2002). Overall, the vocabulary subscale shows a strong correlation (.75) with the Verbal IQ composite scale. For the present study, reliability was ( $\alpha$ ) .85.

In order to assess the degree to which these at-risk children understood the requirements of the verbal ability test (to name the item in pictures and to tell what different words mean) and the degree to which they felt comfortable with the child interviewer and in answering the test items, two questions were created for the clinician who interviewed the child participant. The first question asked, "How much do you think this child understood the questions?" Clinical interviewers were briefed on possible behavioral ways in which a child could signal not understanding the requirements of the test (e.g., not being able to give any response to the questions, giving the same response to different questions, not seeming to comprehend what was being asked). Second, the interviewer was asked to rate, "How comfortable (not upset) was this child with this task?" Clinical interviewers were briefed on identifying behavioral indications of discomfort with the task, including a child's not giving assent to participate in the task, becoming agitated when asked questions, excessive fidgeting during the task, seeming to be upset in some other way. The rating scales ranged from 1 (not at all), to 2 (only a little), to three (about half), four (most of the time) to five (all of the time).

**Severity of IPV** Family violence was assessed with the Revised Conflict Tactics Scales (CTS2; Straus 1979; Straus et al. 1996). The CTS2 is a 39-item instrument measuring the severity of psychological, physical, and sexual violence

in a dating, cohabitating, or marital relationship as well as the extent to which negotiation has been used to deal with conflict in the past year. Each of the items is designed to be answered by the participant about both the participant and their partner, for a total of 78 questions; only the 39 partner items were included in this study. Mothers were asked to estimate the frequency with which their partner had used different violence tactics toward them within the past year on a seven-point Likert scale (from never occurred to occurred more than 20 times). The measure is composed of five subscales: Physical Assault (e.g., “My partner twisted my arm or hair”), Psychological Aggression (e.g., “My partner insulted or swore at me”), Negotiation (e.g., “My partner explained his or her side of a disagreement to me”), Injury (e.g., “You had a broken bone from a fight with your partner”), and Sexual Coercion (e.g., “My partner used threats to make me have sex”). The CTS2 has good internal consistency and reliability, with alpha coefficients ranging from .79 to .95, as well as adequate construct and discriminant validity (Straus et al. 1996). In the present study, reliability for the CTS Total Scale was .89 with lower statistics for the subscales of Negotiation ( $\alpha=.47$ ), Aggression ( $\alpha=.79$ ), Physical Assault ( $\alpha=.85$ ), Sexual Coercion ( $\alpha=.83$ ), and Injury ( $\alpha=.55$ ).

*Number of Potentially Traumatic Events* Was assessed by asking the mother to indicate whether the child was ever exposed to 11 categories of traumatic events derived from the Posttraumatic Stress Diagnostic Scale (PTSD; Foa 1995) used to assess trauma in families. Categories include being physically assaulted by someone in the family, assaulted by someone outside of the family, being sexually assaulted, witnessing violence, and exposure to natural disasters, such as an accident or fire. Given the IPV sample, possible scores range from 1 to 11.

## Procedures

Following IRB approval, sheltered and non-sheltered women in the community were recruited through newspaper advertisements, flyers distributed to low income housing units, cooperating stores, churches, domestic violence shelters, and local mental health agencies, as well as the Department of Social Services offices for the State of Michigan. A telephone screen was used to determine that the mothers in this study were exposed to IPV within the past two years. One of the strengths of this study is including women currently residing in the community rather than the exclusive selection of those living in shelters. All clinical interviewers were trained in research ethics and clinical interviewing with at-risk families. Child interviewers received training and ongoing supervision by a

licensed clinical psychologist in the administration and scoring of the Verbal IQ subtest and in evaluating the child’s comfort and comprehension of the task. Mothers were paid \$25 for each interview and their child received a gift worth approximately \$4 for their time. Every precaution was taken to assure the comfort and safety of those who participated in this study.

## Results

Results of the mothers’ self-report of exposure to IPV within the past year indicate that they experienced a mean of 9.20 ( $SD=6.03$ ) negotiation tactics, a mean of 13.24 ( $SD=5.33$ ) psychological aggression tactics, a mean of 7.42 ( $SD=3.57$ ) physical assaults, a mean of 8.39 ( $SD=3.54$ ) episodes of sexual coercion and a mean of 6.43 ( $SD=2.20$ ) injuries in the past year. The majority of women reported psychological aggression (96%), negotiation (92%), physical assault (77%), injury (73%), and sexual assault (53%). More specifically, psychological aggression and negotiations were the most common tactics with physical assaults and injuries occurring more than bimonthly.

Children’s verbal ability scores ranged from 3 to 38 ( $M=17.08$ ,  $SD=7.09$ ). Paired samples *t*-tests were used to determine whether the children’s verbal ability matched that of same-age children from a normative national sample (Wechsler 2002). Children exposed to IPV were significantly lower in verbal ability ( $t=-2.69$ ,  $df=84$ ,  $p=.009$ ; see Table 1).

Ratings of the child’s level of understanding of the test of verbal ability and comfort with the test ranged from 1 to 5 with a mean of 3.53 ( $SD=1.06$ ) for Comprehension and a mean of 3.76 ( $SD=1.18$ ) for Comfort. Significant correlations were found between the mean WPPSI Verbal score and the mean Comprehension rating ( $r=.488$ ,  $p=.001$ ) and between the mean WPPSI Verbal score and the mean Comfort rating ( $r=.399$ ,  $p=.001$ ). The mean Comprehension and Comfort ratings were also significantly intercorrelated ( $r=.380$ ,  $p=.001$ ), indicating that children who were the most comfortable with the task were the ones that best understood the task.

In order to ascertain whether there was a relationship between demographic considerations and verbal ability, tests of association and mean differences were performed. Significant associations were found among child age ( $r=.355$ ,  $p=.001$ ) and mother’s education ( $r=.365$ ,  $p=.001$ ) and verbal ability. Here, greater ability was found for older children and those with more educated mothers. No significant associations were found among verbal ability and child ethnicity, child sex, mother’s age, or income.

We hypothesized that exposure to potentially traumatic events would predict to verbal ability in young children

**Table 1** Verbal ability of national sample of 1,700 children compared to average verbal ability of 87 children exposed to traumatic events

Age range (yr:mo)	National mean	IPV sample mean	IPV sample SD
4:0–4:2	13–14	13.86	6.51
4:3–4:5	13–14	11.83	4.88
4:6–4:8	15–16	16.67	5.54
4:9–4:11	16–17	15.37	4.14
5:0–5:2	18–19	18.09	5.05
5:3–5:5	19–20	16.50	5.99
5:6–5:8	21–23	17.25	7.17
5:9–5:11	21–23	14.33	10.07
6:0–6:3	24–25	19.33	3.54
6:4–6:7	25–26	24.00	7.17
6:8–6:11	25–27	25.5	4.72
TOTAL	19.1–20.4	17.48	6.66

Wechsler 2002, pp. 218–255

exposed to IPV. Regression analyses predicting to verbal ability were undertaken, holding comprehension of the task constant. These results are shown in Table 2. The first model tested the contribution of comprehension to verbal ability and was found to be significant, accounting for 22.9% of the variance. In the second model, exposure to traumatic events was added and significantly predicted 26.4% of the variance. In the third model, we tested whether mother's level of education mediated the relationship between exposure to potentially traumatic events and verbal ability in the child and found that it did. In order to do, so we first regressed mother's education on trauma exposure and found a significant relationship when tested for both girls and boys (girls standardized beta =  $-.301$ ,  $p=.049$ ; boys standardized beta =  $-.374$ ,  $p=.007$ ). The relationship between PTEs and verbal ability became nonsignificant with the addition of mother's education in the third model. The final model accounted for 34% of the variance in verbal ability.

## Discussion

This study extends the limited research on the verbal ability of preschool children exposed to traumatic stressors, including family violence. Further, it successfully identifies variables impacting the verbal ability of this population, providing valuable information on factors that mediate the cognitive functioning of potentially traumatized young children. One of the primary findings of this study centers on the verbal ability of children exposed to IPV as compared to a normative, national sample.

Past research consistently notes that school-age children in high-risk environments often have poorer academic performance than their same-age peers. This lower performance, including in the verbal domain, impacts both short

and long-term functioning (Howse et al. 2003). The current study extends this finding to preschool-aged children. The statistically significant finding of lower scores on the verbal subscale of the WPPSI may be due to the gravity of hardships that children as young as 4 years old experience in a home with violence. This result is in line with a recent study on preschool-age twins exposed to interparental violence that also indicated children who had been exposed to high levels of IPV fell eight points short of their non-exposed counterparts (Koenen et al. 2006). While there was no way to discern whether the comparison group of children in the present study had been exposed to IPV or other traumatic events, researchers estimate the rate of children's exposure to IPV and major traumatic events at 25% across all years of childhood (Costello et al. 2002; Nelson et al. 2002). Thus, it is likely that the majority of the young comparison group children were not exposed to severe traumas. Such findings across studies suggest the necessity of providing clinical services to children at an early age in order to contend with the negative consequences on cognitive functioning associated with exposure to IPV.

This study also provides new information on the underlying elements of the test taking process. This is one of the few times that a research study has analyzed the preschool child's understanding and comfort with a verbal ability assessment task. The finding that a young child's comfort with the interview and understanding of the task instructions influences verbal ability, or vice versa, suggests one possible avenue for exploring potential differences in scores across samples. It is possible that children from high-risk environments, such as homes with violence, may not feel as comfortable with unfamiliar interviewers. Additionally, these children may exhibit greater test anxiety in unique assessment situations.

**Table 2** Regression models showing mediation of PTE’s with mother education predicting to child verbal ability (*n*=87)

Predictor	Adj <i>R</i> <sup>2</sup>	F	B Model 1	β Model 2	β Model 3
1. Comprehension	.229	26.285***	.488***	.488***	.488***
2. Comprehension	.229	16.235***		.495***	.321***
PTE’s	.264			-.207*	-.207*
3. Comprehension	.229	15.568***			.506***
PTE’s	.264				-.138
Mother Education	.340				.294**

\**p*<.05, \*\**p*<.01, \*\*\**p*<.001

Further, it was hypothesized that various demographic factors, such as greater child age, would be associated with increased verbal ability in children participating in this study. This hypothesis was confirmed, indicating that the development of verbal ability in preschoolers is linked to older child age. No significant associations were found among verbal ability and mother’s age or income. Given the large amount of research demonstrating a link between family income and children’s verbal ability, it may seem surprising that no association was found for this sample. However, because women who experience IPV are more likely to have decreased incomes, there may not have been enough income variability in this sample to accurately describe the relationship between verbal ability and income level.

While some demographic characteristics are found to be consistently linked to child verbal ability, studies of other demographic information, such as child sex and ethnicity, have produced more controversial results. No significant associations were found between child verbal ability and either child sex or ethnicity. The non-significance of child ethnicity is particularly important because of the age of this sample. A similar verbal ability across ethnicities indicates that preschool-aged children do not show the intelligence gap evidenced in some older populations. If prior to the transition to school, children of different ethnicities show similar verbal ability, later differences may be due to pitfalls in the educational system. It is important to take into account, however, that this sample of children consisted primarily of Caucasian and African-American preschoolers, so little can be determined about verbal ability across children of Hispanic, Asian, or Native American backgrounds. Further, the small sample size used for testing this in the present study suggests that a lack of statistical power might have impeded the search for significant differences if, in fact, they did exist.

One major hypothesis, that greater exposure to traumatic events would be associated with lower verbal ability in the child, was confirmed. While all of the children in this study had been exposed to IPV, the addition of other traumatic events was a unique element that contributed to some of the variance in verbal performance. As found by other

researchers, significant numbers of children, even young children, are exposed to traumatic events before their teen years (Ammar 2006; Boney-McCoy and Finkelhor 1995; Costello et al. 2002); and family trauma is a common event in the lives of many children (Graham-Bermann et al. 2008; Stover and Berkowitz 2005). Traumatic events are known to be associated with the disruption of cognitive development, as our findings also imply. However, results of this study suggest that exposure to additional traumatic events, over and above exposure to IPV, also adds vulnerability to child verbal ability.

Finally, several studies have evaluated various protective factors associated with better functioning in children exposed to potentially traumatic events. In this study, the protective benefit of maternal education on child verbal ability was assessed. Consistent with past research, we found that mother’s level of education had a significant impact on child cognitive functioning (Davis-Kean 2005; McGroder 2000). This study more thoroughly examined the impact of maternal education on verbal ability and found that education mediated the relationship between exposure to potentially traumatic events and verbal ability in the child. Additional research is needed to explore how and for whom exposure to violence and trauma are related to educational opportunity for the mother. Given the abundance of research highlighting the negative effects of violence exposure on child functioning, this finding provides unique information on potential protective elements associated with the family. The mediational relationship is particularly important because it underscores the need to provide both maternal and child support, as strengths of the mother clearly impact functioning in the child.

Limitations

Despite the contributions of this study, it is not without some limitations. The sample characteristics create two primary shortcomings. First, while the sample size is similar to other sample sizes in the literature on trauma, a sample of 87 women and children still raises concerns for the external validity of the results. Another limitation to this

particular sample is that the participants were primarily low-income families from the state of Michigan, thus generating additional concern for the generalizability of findings. However, despite the trend towards lower incomes, this sample still showed variation in educational level, with many of the mothers completing some or all of college. Therefore, it is possible that income might be a poor indicator of socioeconomic status in this sample, especially since many of the mothers were recently separated or divorced. It is possible that this sample has greater external validity for members of different SES's than an initial analysis of income levels might indicate. The comparison may also have been exposed to traumatic events and IPV, thus limiting conclusions that can be drawn.

The second limitation is the inconsistency of testing conditions during the interviews, especially the child interviews. While testing conditions were standardized to the best of our abilities, slight differences in testing conditions may have had an impact on individual verbal ability scores. At each testing venue, interviewers did their best to find the most conducive area to conduct the interview. However, the presence of quiet and solitary testing areas varied slightly from site to site. This variation might have caused some children in more distracting environments to show falsely low IQ scores.

Caveats should also be made concerning the measures used in this study. There is low reliability of some CTS subscales. For example, while the Aggression, Physical Assault, and Sexual Coercion subscales had acceptable reliability, the negotiation subscale had a reliability of .47 and the frequency of physical Injury scale reliability was .55. Given the age of the child and the knowledge of the mother, having the mother self-report about the violence in her life as well as the traumatic events in her child's life appeared to be a reasonable strategy. Still, self-report measures are fraught with limitations, including possible bias. It would have been useful to include the abusive partner's responses to the same CTS-R items, as the issue of whether abused mothers are reliable reporters is a source of debate in this area of research (Caetano et al. 2002).

Caution should also be used in interpreting results that rely on the comprehension and comfort variables. Given that there were no standardized measures available to assess the child's comfort with the task and comprehension of the task requirement, they were developed for use with the trauma-exposed children in this study. Beyond attempts made to standardize the scoring of these two constructs, (e.g., the clinical child interviewers received written definitions of the constructs and training in the use of the rating scales' anchors); there was no formal way to assess whether the ratings of a child's comfort with and

comprehension of the testing situation differed from the child's answer to items on the verbal ability measure itself.

### Clinical Implications

While the current study is limited in a number of ways, the results reported here suggest several possible clinical implications. First, they suggest the need for attention to the relationship between trauma and children's verbal ability. Perhaps preschool-age children who have been exposed to trauma and IPV are at greater risk for developing problems with verbal ability than other children. Given their young age, this risk might become especially problematic as children transition into school. Identifying preschool-aged children who have been exposed to trauma, and then working with them on their verbal ability and comprehension, might serve to ease their transition, as well as improve academic performance, both in the short and long term.

Additionally, the current research suggests the unique importance of mother's education on children's verbal ability. Although limited to the present sample, this finding implies that cognitive and educational interventions might be effective if they included elements that address both mothers and children, as some research has shown (Author reference). Providing educational resources to mothers could also be an important way to bolster child cognitive development and potentially help to decrease the impact of traumatic events. Ideally, identifying children exposed to IPV and eliminating the stress of domestic violence in the life of both the mother and the child would be of great benefit, not just to the child's cognitive development, but to the child's social, physical and emotional development as well.

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