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thesis entitled

THE IMPACT OF EXPOSURE TO DOMESTIC VIOLENCE
ON INFANT RESPONSE TO ADULT VERBAL CONFLICT

presented by

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has been accepted towards fulfillment
of the requirements for

M.A. degree in Psychology

Major professor

Date 12/10/02

THE IMPACT OF EXPOSURE TO DOMESTIC VIOLENCE ON INFANT RESPONSE TO ADULT VERBAL CONFLICT

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A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

MASTER OF ARTS

Department of Psychology

2002

ABSTRACT

THE IMPACT OF EXPOSURE TO DOMECTIC VIOLENCE ON INFANT RESPONSE TO ADULT VERBAL CONFLICT

By

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The current study examined whether infants whose mothers had been victims of domestic violence during the infant's lifetime would be more likely to experience distress in response to a simulated verbal conflict and whether the amount of distress expressed would be influenced by infant temperament. Ninety one-year-old infants were videotaped during and for five minutes after a simulated verbal conflict in which an experimenter pretended to have a telephone argument. Exposure to domestic violence was related to infant distress following an episode of simulated adult verbal conflict. Two aspects of temperament, intensity and mood, predicted greater distress among infants not exposed to domestic violence, but not among infants exposed to domestic violence. These findings suggest that while typically only more temperamentally reactive infants would display distress in response to verbal conflict, all infants exposed to domestic violence, regardless of temperament, may be likely to experience distress when verbal conflicts occurs.

ACKNOWLEDGEMENTS

I would like to thank my advisor and mentor, G. Anne, Bogat, for her guidance, support, and encouragement. I would also like to thank my other committee members: Alytia Levendosky, for her unflagging optimism and insightful recommendations, and Alexander von Eye, for his generous assistance with the analyses and enthusiastic support.

In addition, I am grateful to my colleagues on the Mother-Infant Study, Sally Theran, Robin Weatherill, Kerry Kelly, and Shallimar Jones, whose emotional and practical support helped me at every stage in the process. Finally, I would like to thank the dedicated research assistants whose commitment to the project made it possible to conduct the interviews upon which this study is based and who continue to make the Mother-Infant Study possible by maintaining positive relationships with study participants.

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Introduction

The association between exposure to domestic violence and behavioral and psychological problems, particularly the expression of trauma symptoms, is well-documented in preschool and school age children. Clinical evidence suggests that these negative effects are also present in infants, but empirical work has not yet been conducted. However, given that infants possess the necessary abilities to experience, respond to, learn from, and display a response to interpersonal interactions, it is reasonable to expect that exposure to domestic violence may also have a negative impact on infants. The limited information available suggests that infants will not only experience distress in response to an episode of domestic violence, but will also be more likely to respond with distress to similar future events. However, it is also likely that there will be significant individual differences in the degree to which the distress response is facilitated. This may be due in part to temperamental differences that function as risk factors. Infants who are temperamentally more sensitive may be at an additional risk, because they are generally more likely to experience environmental stimuli as stressful. The present study examined whether infants exposed to domestic violence would indeed be more likely to display distress in response to a related event, adult verbal conflict, and whether temperament would influence the degree to which this distress response occurred.

Risks Associated with Exposure to Domestic Violence in Childhood and Infancy

Children exposed to domestic violence display elevated levels of behavioral problems as well as internalizing problems such as depression and anxiety. In a study of 198 children varying in age from 4-16 years old, Wolfe, Jaffe, Wilson, and Zak (1985)

found a significant prevalence of behavior problems and diminished social competence among those children whose mothers reported that the children had witnessed family violence. Similarly, O'Keefe (1994) found that 21% of children aged 7-13 years from homes in which domestic violence occurred displayed externalizing problems so severe that they fell within the 98th percentile on Achenbach's Child Behavior Checklist (CBCL) and that 31% of children displayed internalizing problems severe enough to be in the 98th percentile on the CBCL. Fantuzzo, DePaola, Lambert, Martino, Anderson, and Sutton (1991) found that among young children ranging in age from 3.6 to 6.4 years, exposure to domestic violence was associated with clinical levels of conduct problems, with exposed children living in shelters faring even worse. Wildin, Williamson, and Wilson (1991) found a higher prevalence of developmental and academic problems among children varying in age from 9 months to 13 years-5 months who had been exposed to domestic violence. Among the pre-school-aged children in the sample, 39% showed developmental delays and risk for future school problems. Among school-aged children, 46% had one or more academic problems. Though domestic violence commonly co-occurs with other risk factors [e.g., single parent status, lower family income, less maternal education and smaller family size, frequent family moves, parental divorce, maternal and paternal drinking, incarceration of father (Spaccarelli, Sandler, & Roosa, 1994) and child abuse (O'Keefe, 1994)], exposure to domestic violence has been shown to account for behavioral and psycholgical problems in children over and above the effects of these co-occuring risk factors (Hughes, 1988; Spaccarelli et al., 1994).

Domestic violence may also lead to the development of trauma symptoms in young children. In a study of 84 school-aged children (9-15 years of age) residing in a shelter for battered women, Lehmann (1997) found that 56% of children met criteria for post-traumatic stress disorder (PTSD) [as defined by DSM-III R (1987)] and the group of children exhibiting PTSD contained more younger children than the non-PTSD group. Conclusions drawn from this study are limited by the fact that data were collected from children residing in a shelter, who have recently experienced the emotional upheaval associated with leaving their homes. However, Graham-Bermann and Levendosky (1998) also found elevated rates of traumatic symptoms among a community sample of 64 children 7-12 years of age who had been eyewitnesses to or overheard domestic violence. While only 18% of children in this study met full criteria for PTSD as defined by DSM-IV (1994), a high percentage of children in the sample suffered from traumatic symptoms such as intrusive reexperiencing (52%), traumatic avoidance (19%), and traumatic arousal symptoms (42%).

Recent research has documented the presence of trauma symptoms in even younger children exposed to domestic violence. Levendosky, Huth-Bocks, Semel, and Shapiro (2002) examined whether trauma symptoms were present in pre-school aged children whose mothers reported that the children had been eyewitnesses to domestic violence or had lived in the home during a violent relationship. According to maternal report using the PTSD scale from the CBCL, of the 62 children included in the study, 92% had at least one reexperiencing symptom, 47% had at least three avoidance symptoms, and 91% had at least two symptoms of hyperarousal, with 24% of the children meeting diagnostic criteria for PTSD according to the DSM-IV (1994).

Despite the fact that the negative impact of domestic violence has been clearly demonstrated in pre-school and school age children, the potential effects of domestic violence in infancy have received little attention in the literature. However, anecdotal reports suggest that such effects may be present. Layzer, Goodson, and deLange (1985) report that, among infants in the six shelters in which they conducted research, over half of the infants demonstrated problems such as poor health, sleep disturbance, and lack of responsiveness to adults. Other researchers also describe infants who witness domestic violence as having poor health and poor sleeping habits (Alessi & Hearn, 1984). Clinicians working with children exposed to domestic violence have suggested that the impact of violence witnessed in infancy may be expressed later in life (McIntosh, 2002).

These anecdotal reports of the negative impact on infants exposed to domestic violence are supported by the limited available empirical research on the impact of trauma in infancy. In a study of severely traumatized children under 48 months of age (ranging from 3-48 months), Scheeringa and Zeanah (1995) examined the effects of a variety of types of trauma in infancy using an alternative criteria for PTSD developed by the authors and published as the criteria for Traumatic Stress Disorder in the Diagnostic Classification: 0-3 (1994). The authors found that threat to a caregiver was most likely to produce symptoms such as hyperarousal, fear, and aggression and that threat to caregiver was the trauma involved most often when children in the study were diagnosed with PTSD. The severity of symptoms was generally higher for infants exposed to threat to a caregiver. The authors suggest that threat to a caregiver may be an especially potent producer of anxiety in infants because of their extreme dependence on

caregivers. Unfortunately, this study had a small sample of infants who had been exposed to a wide variety of traumas, making it difficult to draw conclusions about a single type of trauma, such as exposure to domestic violence. However, this study does suggest that threat to caregiver may be among the most psychologically damaging of traumas.

Theoretical Models of Risk Transmission to Infants

Though strong evidence exists that children are at increased risk for negative social and emotional consequences if exposed to domestic violence, and there is a fairly good indication that these risks may exist in infancy, the mechanisms by which these risks are transmitted is not clear. Three theories may account for why exposure to domestic violence results in these negative consequences: Bandura's concept of learning via "modeling", Cummings' "emotional security hypothesis", and Perry, Pollard, Blakley, Baker and Vigilante's "sensitization and trait formation" hypothesis.

Albert Bandura demonstrated that exposure to a model of aggressive behavior can lead a child to behave aggressively. The child can both mimic the aggressive behavior of the model as well as engage in new aggressive behaviors (Bandura, Ross, & Ross, 1961). He theorized that children learn behavior by observing and then imitating the behavior of the adults they observe. The idea that domestic violence serves as a model for children may be useful to explain the behavior problems seen in children from homes where domestic violence occurs (Fantuzzo et al., 1991; O'Keefe, 1994; Wolfe et al., 1985) as well as the strong relationships between experiencing domestic violence in childhood and receiving or perpetrating domestic violence in adulthood (Stith et al., 2000). Applying Bandura's model to children who witness domestic

violence suggests that these children should model the aggressive behavior they see at home and be at an increased risk to model these behaviors in their own adult romantic relationships.

The internalizing symptoms and traumatization seen in children and infants exposed to domestic violence may not be adequately explained by modeling alone. Davies' and Cummings' (1994) "emotional security hypothesis" may serve to enhance our understanding of how these symptoms develop. They assert that conflicts involving intense marital difficulties or direct threat to the child are more distressing to children than are other types of marital conflict. Among the most distressing conflicts are those that involve physical aggression (Cummings, Vogel, Cummings, & El-Sheikh, 1989; Cummings, Zahn-Waxler, & Radke-Yarrow, 1981). Conflicts that are well-resolved lead to less negative impact on children (Cummings, Ballard, El-Sheikh, & Lake, 1991; Cummings, Simpson, & Wilson, 1993; El-Sheikh, Cummings, & Reiter, 1996) and more positive predictions about the future (El-Sheikh & Cummings, 1995), contributing to emotional security. However, marital conflicts that result in physical violence are by definition not well-resolved, and would therefore be expected to contribute to high levels of emotional insecurity. Emotional insecurity is believed to arise from a history of witnessing these more destructive types of marital conflict. Repeated exposure to destructive conflict causes emotional insecurity, which reduces children's capacity for regulating emotions and behavior. Consistent with this hypothesis, children exposed to repeated episodes of domestic violence tend to display the most severe problems (Wolfe et al., 1985).

Finally, Perry, Pollard, Blakley, Baker, and Vigilante (1995) hypothesize that trauma affects an infant's developing brain differently than it would affect a mature adult brain. Perry et al. point to two major principles of neurodevelopment: (1) use-dependent development and organization of the brain and (2) critical or sensitive periods in brain development during which the course of development may be dramatically altered. Because of these characteristic features of child and infant brains, psychological trauma in infancy can permanently alter the way in which a person processes information. Normal neural development can be altered by lack of sufficient sensory experiences or by abnormal patterns of neuronal activation due to extremes of experience, as would be the case with children exposed to high levels of domestic violence. This is accomplished by way of sensitization of specific responses.

Exposure to trauma, such as domestic violence, stimulates the adaptive "fight or flight" response. Abnormally frequent or severe stimulation of this response can lead to sensitivity, in that the fear response will be easier to elicit in the future. Because infants and young children are developing patterns of neuronal activity that will determine how they process and respond to future stimulation, this sensitization leads to trait formation. Infants exposed to domestic violence have fear responses activated more often and more intensely by their environment than normal. While in adults, exposure to trauma can lead to problems such as PTSD, in the immature brain of an infant, fear states organize neural systems resulting in more stable traits.

Thus, infants exposed to traumatic events should display exaggerated reactivity to stimuli associated with the traumatic event. In a study that seems to support this assertion, Reider and Cicchetti (1989) found that, while all children were likely to

display avoidance of aggressive stimuli, children with a history of maltreatment were more likely to shift their attention to aggressive stimuli from an ongoing task. Maltreated children also showed less embellishment and distortion of aggressive stimuli, assimilating aggressive stimuli more accurately. The authors suggest that this heightened attention to and ready assimilation of aggressive stimuli may have originally constituted an adaptive response to maltreatment. A similar process might occur for infants exposed to domestic violence. While these infants may not be directly abused, they may become attuned to aggressive stimuli in their early environments because these aggressive stimuli are associated with threat to their caregiver. Verbal conflict in particular seems likely to carry such an association for infants living in homes where domestic violence abuse occurs.

Research with children supports the notion that exposure to parental conflict may facilitate a distress response. Observing the responses of children ages 2-5 to simulated adult verbal conflict, Cummings, Pellegrini, Notarius, and Cummings (1989) found that children of parents with a history of exposure to physical hostility displayed heightened involvement and reactivity in responding to anger. Similarly, El-Sheikh (1994) found that children from high-conflict homes (those in which mothers reported either physical violence or verbal aggression above the sample mean) exhibited more distress in response to simulated adult verbal conflict than children from low-conflict homes. It is likely that a similar sensitization to verbal conflict and facilitation of the distress response may occur in infants exposed to domestic violence.

Also consistent with the sensitization hypothesis, when comparing abused and/or neglected infants and matched controls, Gaensbauer and Hiatt (1984) found that

abused/neglected infants consistently displayed more anger throughout the testing; however, this difference did not reach statistical significance, presumably because the power of the study was limited because of the small sample size (n=18). The abused/neglected infants appeared to display anger particularly at times of mild stimulation (e.g., during feeding, when presented with a new toy, while being held) that were typically pleasurable or at least did not elicit negative reactions from the control group. The authors suggest that this differential response to mild stimulation may have been because abused infants' "threshold for being disrupted by stimulation had been lowered considerably"(pp. 226-227). This heightened tendency to respond negatively to stimuli would be expected in infants exposed to domestic violence.

These three theories converge on the notion that the long-term impact of exposure to domestic violence will be determined by the degree to which the infant or child's pattern of responding to stimuli is altered by domestic violence. Bandura (1961) highlights how a child may learn to recreate the behaviors he observes. Davies and Cummings (1994) focus on how a child's emotional security may be damaged, leading to an inability to regulate emotion. Perry et al. (1995) describe how an infant may develop a sensitization to stimuli as a result of exposure to domestic violence. All three theories suggest that an infant's past experience of trauma, among other factors, may contribute to different patterns of responding to future events.

Infants' Responses to Domestic Violence

The extent to which infants' responses are altered as a result of exposure to domestic violence will be determined by the degree to which an infant is able to perceive, respond to, and remember these episodes. Heightened distress will most likely

be observable when the infant is presented with a stimulus associated with domestic violence to which the infant has developed a negative association.

It is clear that infants perceive and respond to stimuli. Most infants can distinguish voices early in the first year of life and have developed 20/20 vision by 12 months (Drell, Siegel, & Gaensbauer, 1993). Infants appear to be particularly skilled at perception of emotions in others. Termine and Izard (1988) found that nine-month-old infants showed more joy when their mothers were instructed to display joy and more sadness and anger when their mothers were instructed to display sadness. They also found that the infant looked less at their mothers while the mothers displayed sadness. This suggests that infants may use gaze aversion to reduce exposure to negative-emotion information and to self-regulate emotional arousal. Displays of sadness also resulted in decreased play behavior while displays of joy resulted in increased play behavior, suggesting that the infants' displays of sadness were not simply mimicry, but an actual expression of emotions.

Infant display of emotions in response to stimuli has been well-documented from very early infancy and appears to become somewhat stable by the end of the first year. Izard, Hembree, Dougherty, and Spizzirri (1983) studied infant response to inoculation from age 2-19 months. They found that infants as young as two months of age displayed an emotional response to pain. This response changed over time such that infants became more likely to display anger and less likely to display physical distress over time, with emotional expression becoming fairly stable by the end of the first year. Hyson and Izard (1985) examined emotional responses to separation at 13 months and again at 18 months. They found that individual differences in emotional expressions in

response to a separation seemed to be stable across time and suggest that these individual differences are due in part to the infants' temperamental reactivity. However, they also found a general trend toward more complex display of emotions, with older infants more likely to display facial expressions that indicate two emotions simultaneously.

In order to develop a negative response to stimuli associated with domestic violence (e.g., verbal conflict), infants must also learn to associate the emotions they experience in the presence of these stimuli with analogous or comparable indicators in their environments. The ability to recognize and respond differentially to specific stimuli appears to exist even prior to birth. For example, infants whose mothers had read aloud "The Cat in the Hat" twice a day for a month and a half before their due dates were found to show changes in their rate of sucking in response to this particular passage three days after birth (DeCasper & Spence, 1986). Similarly, infants have been shown to learn fearful responses. McGraw (1941) found that infants over 300 days of age showed a learned fear response to the experimenter after being subjected to a series of pin pricks. Similarly, Levy (1960) found that 25% of infants age 12 months or older displayed anticipatory crying prior to inoculation. Given the prevalence of conditioned responses, including fear, in infants, it is possible that infants will be likely to develop associations between the distress they experience in response to episodes of domestic violence and the visual and auditory stimuli associated with it.

Measurement of Infant Responses

While it does appear that infants possess the prerequisite capabilities to experience a negative impact of exposure to domestic violence, measurement of these

effects is limited by infants' abilities to communicate them. Infant emotions must be inferred from the infant's behavior, facial expressions, vocalizations, or actions. Some researchers assert that infants display facial expressions consistent with their emotional states (Izard, 1994). These facial expressions can be identified not only by trained professionals, but also by untrained observers. For example, Izard et al. (1980) demonstrated that even untrained college students could identify emotions associated with infant facial expressions. Subjects were able to reach agreement as follows: joy (81%), sadness (72%), surprise (69%), interest (67%), fear (52%), contempt (44%), anger (41%), and disgust (37%). Similarly, in a study of abused and/or neglected infants ranging in age from 6 to 27 weeks and a matched control group, Gaensbauer and Hiatt (1984) found that facial patterns for discrete emotions in adults were applicable to even these very young infants. These authors suggest that the emotions of happiness, interest, anger, sadness, disgust, and surprise are organized, in at least a rudimentary form, by 3 or 4 months of age. However, it should be noted that there is controversy about the universality of emotional expression in infancy and about whether facial expression actually denotes underlying emotions (Russell, 1995).

Vocalization may also provide valuable information about an infant's emotional state. Examining brain electrical activity in 10-month-old infants, Fox and Davidson (1988) found that facial expressions of emotions produced different patterns of electrical activity depending on whether they were accompanied by vocalizations, suggesting that facial expressions accompanied by vocalization may represent qualitatively different neurological states. While their study was limited by the use of an

EEG (electroencephalogram), which provides poor spatial resolution, it does highlight that it may be important to consider both facial and vocal indicators of infant emotion.

Finally, infants may communicate distress via their posture. Camras et al. (2002) found that judgments of surprise in infants were related to changes in posture (infants' reduced physical movement) that accompanied changes in facial expression. Even when infants do not display emotion via facial expression, they may display emotion through body posture. For example, infants exposed to presumably surprise inducing events (such as the disappearance of an object) did not typically produce facial expressions of surprise, but they did display postural indications of surprise (Hiatt, Campos, & Emde, 1979).

Given that infants possess the abilities to perceive, respond emotionally to, and develop a learned fear response to threatening stimuli, it appears likely that infants are experiencing negative effects as a result of exposure to domestic violence. No empirical studies, however, have examined this issue. Unlike older children, infants are not able to describe their experiences of domestic violence, nor are they able to describe the types of internalizing and externalizing symptoms typically seen in older children exposed to domestic violence. However, infants do display facial expressions, vocalizations, and body postures that can be studied as indicators of the degree to which an infant is distressed.

Temperament

As suggested by Hyson and Izard (1985), an infant's response to environmental stimuli, including episodes of domestic violence, are likely to be affected by the infant's temperament. "Difficult" temperamental characteristics, such as high reactivity and a

tendency to respond negatively, appear to function as risk factors for negative outcomes. Thomas and Chess (1984) demonstrated that infants characterized as temperamentally difficult were at increased risk for psychological problems in adulthood. Demonstrating the short-term impact of temperament, Kyrios and Prior (1990) found that children's temperaments measured at 3-4 years were predictive of behavioral adjustment one year later, such that high temperamental reactivity predicted poor behavioral adjustment.

Temperament appears to be present and to affect responses to stressors from the beginning of life. Lewis, Worobey, and Thomas (1989) found that infant reactivity shortly after birth (response to a stressful stimulus-- a painful heelstick procedure) was consistent with infant reactivity two months after birth. Similarly, Eckerman, Hsu, Molitor, Leung, and Goldstein (1999) compared the reactions of four-month-old full-term and very low birth weight (VLBW) (adjusted age) infants (who typically differ in reactivity) to a peek-a-boo game in a laboratory setting. They found that VLBW infants were less likely to show positive and more likely to show negative arousal.

Rothbart (1981) was among the earliest researchers to quantify temperament in the first year of life. She defined infant temperament as individual differences on two dimensions—reactivity and self-regulation. Evidence for the existence of the two dimensions of temperament defined by Rothbart exists in the work of Braungart-Rieker and Stifter (1996). They found that infant behavioral responses to frustrating situations loaded onto two factors, reactivity and regulation, and that the relationship between these two factors changed over time. Infants who were highly negatively reactive at five months tended to display lower levels of regulation at ten months, whereas infants who

were less negatively reactive at five months tended to display more regulatory behaviors at ten months. Also, reactivity and regulation were negatively correlated at five months, but unrelated at ten months. The authors hypothesize that regulation in younger infants may involve automatic responses that are dependent on distress levels, but, that by ten months, infants may have more control over their behavior and hence their regulatory responses. The authors postulate that this developing independence of reactivity and regulation may be due to environmental factors such as parent responses to reactive behavior. For example, a parent of a reactive infant may choose not to expose that infant to stressful stimuli, reducing the infant's need to develop self-regulatory behaviors.

However, for a temperamental vulnerability to lead to a negative outcome, this vulnerability must interact with an environmental stressor. Strelau (1995) explains that temperament serves as a risk factor "only if the difficult temperament is in interaction with an inappropriate environment... which is experienced by the child as a chronic or excessive state of stress" (p. 67). Indeed, temperamental characteristics shown to be associated with negative outcomes in Western cultures have been associated with positive outcomes in other cultures (deVries, 1987). Thus, infants or children who are temperamentally more reactive will only be at increased risk if they encounter an environment that makes this temperamental reactivity undesirable. If infants or children are relatively buffered from stress, reactive temperament will not function as a risk factor.

Among infants who do not face undue environmental stress, temperamental reactivity may be associated with positive outcomes. Fox (1989) found that infants who

were more emotionally reactive to both positive and negative stimuli at five months were more positively reactive to novel events at fourteen months. They were also still more reactive to a stressor, showing a shorter latency to cry after maternal separation, indicating that the underlying temperamental reactivity still existed. Fox suggests that the reactive infants in this sample appeared to have developed the ability to self-regulate by fourteen months. Infants in the sample who were less reactive showed little overt reaction to novelty at five months and were unsociable with unfamiliar adults or objects at fourteen months. Fox worked with infants specifically selected to be representative of a healthy, low-risk population. Infants in this study were all born full term, with high Apgar scores, they had normal pediatric examinations, and their mothers' pregnancies were uncomplicated by serious illness. One might expect a different pattern of development in high-risk samples. Reactive infants who face a stressful and dangerous environment after birth might not learn to be as outgoing and exploratory as the infants in this study. This might also affect the development of self-regulation that appears to occur later in the first year of life.

Karraker, Lake, and Parry (1994) collected information from mothers about infant responses to a variety of stressful events. They found that infants who were rated temperamentally more "difficult" were more likely to respond to these events with negative emotion. However, infants' behaviors after the negative emotional response (presumably regulatory behaviors) appeared to be independent of temperament, suggesting that these "coping strategies" may be related to infants' learning from successful previous attempts at coping rather than temperamental factors. They also

found that older infants experienced a greater variety of stressful events and were more likely to be distressed by the events they experienced.

Highlighting the importance of the temperament/environment interaction, Kochanska (1995) examined the ways in which a child's temperament as well as attachment security and maternal discipline contributed to internalization in a sample of 103, 26-41-month-old toddlers. She found evidence for multiple pathways to internalization depending on the child's temperament. For example, a more fearful/anxious temperament was associated with better internalization when coupled with gentle maternal discipline. This is presumably because the combination of a fearful/anxious temperament and gentle discipline resulted in an optimal, moderate level of anxiety that facilitated internalization of discipline. For children who were less fearful, it was security of attachment that predicted internalization. Here the impact of parental behavior, an environmental influence, is moderated by temperament.

Despite the fairly good evidence that temperament influences an infant's response to stressors, there is no research on the impact of temperament on infant exposure to domestic violence. However, Easterbrooks, Cummings, and Emde (1994) did find that toddlers with more difficult temperaments tended to be more reactive to non-violent marital disputes. As suggested by Strelau (1995), highly reactive temperament most likely functions as a risk factor for children exposed to high or moderate levels of stress. Inclusion of temperament as a factor, which will interact with an infant's experience of domestic violence, might serve to better predict outcomes.

Rationale

The negative consequences associated with exposure to domestic violence have been well-documented in pre-school and school-age children (Fantuzzo et al., 1991; Wildin et al., 1991; Wolfe et al., 1985). However, the consequences of domestic violence have not been as fully explored for infants, despite evidence that exposure may be traumatic for children (Graham-Bermann & Levendosky, 1998) and anecdotal reports indicating the adverse effects of domestic violence on infants (Alessi & Hearn, 1984; Layzer et al., 1985; McIntosh, 2002). To date, only one study has empirically examined this issue (Scheeringa & Zeanah, 1995). Unfortunately, this study has several methodological limitations, the most serious of these being the inability of the authors to draw conclusions about the specific effects of domestic violence as contrasted with other traumas.

Infants are keen observers of their environment. Very early in life they possess abilities to observe and learn about their environments (DeCasper & Spence, 1986; Drell et al., 1993; Levy, 1960; McGraw, 1941). Infants attend not only to positive factors in the environment, but also to potential dangers. As infants are almost entirely dependent on their caregivers, a threat to the primary caregiver, typically the mother, presents an especially salient danger, one that may constitute a traumatic experience (Scheeringa & Zeanah, 1995).

As suggested by Perry et al. (1995), traumatic experiences in infancy may make the infant more likely to respond with distress to future events. The distress will be facilitated in these infants such that it will be more easily elicited in the future. Infants will be likely to develop associations between the distress they experience in response

to episodes of domestic violence and the visual and auditory stimuli associated with it. Adult verbal conflict appears to be a particularly likely candidate for the development of a facilitated distress response (J. S. Cummings et al., 1989; El-Sheikh, 1994).

The degree to which infants exposed to domestic violence become sensitized to verbal conflict may be influenced by infant temperament. As suggested by Strelau (1995), temperament functions as a risk factor when combined with an environmental factor that makes a specific temperamental characteristic undesirable. In the case of infants exposed to domestic violence, a highly reactive temperament, one that leads an infant to be predisposed to intense reactions to stimuli, will be particularly problematic when combined with witnessing domestic violence. Infants who live in homes where domestic violence occurs, but who do not directly witness the abuse would be presumed to be experiencing a less stressful environment and, therefore, would be less susceptible to the adverse impact of temperamental reactivity. Infants not exposed to domestic violence would not be expected to suffer an adverse effect of reactive temperament because the necessary interaction between temperament and the adverse environmental factor is not present. Infants who are highly temperamentally reactive and who also have a reduced threshold for the distress will most likely show the strongest negative effects of exposure to domestic violence.

To empirically test whether exposure to domestic violence in infancy produces differences in how infants respond to stimuli related to domestic violence, this study examined the responses of infants to an event that may elicit fear, a simulated verbal conflict. The verbal conflict was a mild one, in which an experimenter simulated a telephone argument. Infant response following the conflict was ascertained by rating

facial, vocal, and postural expressions of distress. The responses of three groups of infants were compared: infants who had witnessed (seen or heard) domestic violence, infants that lived in homes where abuse occurred but did not witness the violence, and infants who did not live in households where domestic violence occurred. Infants were placed into groups according to maternal report. Because previous studies have failed to find significant differences between child witnesses of domestic violence and non-witness children living in homes where domestic violence occurs (Levendosky et al., 2002) and because clinical literature suggests that children may actually witness more violence than mothers are aware of (Jaffe, Wolfe, & Wilson, 1990), it was expected that the witnesses/non-witness distinction might not produce significantly different groups. Therefore, if initial analyses did not reveal significantly different levels of distress between these two groups of infants, it was planned, a priori, that the two groups would be collapsed. Additionally, information from a parent-report temperament questionnaire was used to allow investigation of whether reactive temperament would exacerbate distress among infants who either witnessed or lived in homes with domestic violence.

Hypotheses

Based on the literature review, the following hypotheses were predicted (see Figure 1):

Hypothesis 1: Following exposure to simulated adult verbal conflict, infants who had neither witnessed nor lived in homes with domestic violence were expected to have significantly lower mean ratings on three scales of distress (vocal, facial, and postural expressions) than the other two groups. Infants who had witnessed domestic violence were expected to obtain significantly higher ratings than those who lived in homes with domestic violence but did not witness the abuse.

Hypothesis 2: Should significant differences in distress not emerge between infants who had witnessed domestic violence and infants who had lived in homes with domestic violence, these two groups were to be collapsed into a single group which was expected to receive higher mean distress ratings than infants who had neither witnessed nor lived with domestic violence.

Hypothesis 3: Greater temperamental reactivity was predicted to exacerbate distress in response to simulated adult verbal conflict only among infants who had either witnessed or lived in homes with domestic violence.

Method

Participants

Participants were part of a larger study conducted by Alytia Levendosky, G. Anne Bogat, William Davidson and Alexander von Eye at Michigan State University. Participants included the infants of women recruited during pregnancy to participate in the Mother-Infant Study, a longitudinal study of the effects of domestic violence on mother-infant relationships.

Of the 206 women involved in the original interview during pregnancy, 189 were also interviewed at the time of the infant's first birthday. One-hundred-eighty-one mother infant dyads completed this interview; 3 infants did not attend the interview due to maternal loss of custody and 5 infants did not attend the interview because the mother was interviewed by telephone only. The 90 infants in this study were those that completed the "Angry Phone Call" measure during this interview. Not all 181 infants completed the "Angry Phone Call" because it required that the infant separate from his/her mother and many infants and/or their mothers resisted this separation. As the "Angry Phone Call" was the last measure administered to the infants, it was also not completed if infants were extremely sleepy or fussy. The sample of infants was 24.4% African American, 32.2% Biracial, 1.1% Latino/a and 42.2% Caucasian. The mean age of infants at the time of the interview was 1.08 years (SD = .15). The median monthly family income reported by mothers was $1600.00. Among the mothers of the infants included in the sample, 33.3% indicated that their highest level of education was high school or lower, 31.1% had completed some college, 13.3% had completed trade

school, 6.7% had completed an AA degree, 7.8% had completed a BA/BS degree, 1.1% had completed some graduate school, and 6.7% had completed a graduate degree.

Of the 90 participants included in the present study, 33 (36.7%) were infants whose mothers indicated on either the Conflict Tactics Scale (CTS) or Severity of Violence Against Women Scale (SVAWS) that they had been victims of domestic violence during the previous year. Of these 33 participants, 16 (17.7% of the total) of the mothers indicated that their infant had seen or heard an incident of domestic violence; these infants are referred to as having "witnessed" domestic violence for the purpose of the present study. Infants whose mothers indicated the presence of domestic violence, but did not indicate that the infants saw or heard the abuse are referred to as having "lived with" domestic violence. The combined "witnessed" and "lived with" groups were considered to constitute a larger group "exposed" to domestic violence in infancy (n=33). For a comparison of rates of domestic violence in the larger longitudinal study sample and the sub-sample used for the current study, please see Table 1.

Table 1

Prevalence of Domestic Violence (as Measured by the SVAWS) in the Study Sample as compared to the Larger Longitudinal Study Sample

	Study Sample (N=90)		All Longitudinal Study Participants (N=206)	
	Exposed	Non-Exposed	Exposed	Non-Exposed
Number in Group	33	57	59	120
Mean SVAWS Score (SD)	18.36 (19.49)	.33 (.72)	19.35 (22.70)	.44 (1.23)

As shown in Table 2, for two demographic variables (maternal marital status and monthly family income), significant differences emerged between the three current study groups. However, this is not considered to be problematic, as differences in these

variables typically co-occur with domestic violence and the negative impact of domestic violence has been demonstrated over and above the impact of these demographic variables (Spaccarelli et al., 1994).

Table 2

Demographic Differences Among "Witnessed", "Lived With", and "Non-Exposed" to Domestic Violence (DV) Groups

	Witnessed DV (n = 17)	Lived with DV (n = 16)	Non-Exposed to DV (n = 57)
Ethnicity			
African American	3 (17.6%)	6 (37.5%)	13 (22.8%)
Caucasian	6 (35.3%)	4 (25.0%)	28 (49.1%)
Latino/a	0 (0.0%)	0 (0.0%)	1 (1.8%)
Biracial	8 (47.1%)	6 (37.5%)	15 (26.3%)
Maternal Marital Status*			
Single, never married	11 (64.7%)	10 (62.5%)	21 (36.6%)
Married	3 (17.6%)	3 (18.8%)	31 (54.4%)
Separated	1 (5.9%)	2 (12.5%)	0 (0.0%)
Divorced	2 (11.8%)	1 (6.3%)	5 (8.8%)
Maternal Highest Level of Education			
Grades 1-13	6 (35.3%)	4 (25.5%)	20 (35.5%)
Some college	6 (35.3%)	8 (50.5%)	14 (24.6%)
Trade School	3 (17.6%)	2 (12.5%)	7 (12.3%)
AA Degree	0 (0.0%)	1 (6.3%)	5 (8.8%)
BA/BS Degree	1 (5.9%)	1 (6.3%)	5 (8.8%)
Some graduate school	1 (5.9%)	0 (0.0%)	0 (0.0%)
Graduate degree	0 (0.0%)	0 (0.0%)	6 (10.5%)
Median monthly family income*	1000.00 (SD = $678.03)	$1050.00 (SD = $955.61)	$2000.00 (SD=$1775.24)
Mean age of infant	1.09 (SD = .11)	1.06 (SD = .08)	1.09 years (SD = .18)

*Significant differences between groups, $p < .05$

Measures

Demographics

A questionnaire (see Appendix A) was administered to obtain basic demographic information, such as ethnicity of mother and father, infant's age at the time of the interview, family income, mother's employment status, and number of other

children in the family. Information about the ethnicity of the infant's mother and father was collected at the mother's interview during her pregnancy; all other demographic information was collected during the interview that occurred at the child's first birthday.

Measures of Domestic Violence

The Conflict Tactics Scales (CTS) (Straus, 1979). The CTS is the most commonly used violence instrument in the literature. (See Appendix B.) Mothers in this study completed the 14-item verbal and physical aggression scales for each romantic relationship (lasting at least six weeks) during the past year. Examples of items include "threw something at you" and "threatened you with a gun or knife." Respondents rate items on a 7-point Likert scale of frequency over the past year, the first year of the infant's life, ranging from "Never" to "More than 20 times." Mothers were also asked to indicate whether their infants witnessed (i.e., saw or heard) the act of verbal or physical aggression described in each item. Domestic violence was considered present if women indicated that an event had occurred described by items six or higher on the CTS, those describing physical violence or the threat of physical violence. Straus (1979) reports a coefficient alpha of .83 when using this measure for reports of husband to wife violence. Coefficient alphas for this sample were .89 for the current or most recent partner and .81 for the next most recent partner.

Severity of Violence Against Women Scales (SVAWS) (Marshall, 1992). The SVAWS is a 46-item questionnaire assessing violent behavior and threats a woman has experienced from her partner. There are nine categories of abuse and threats: symbolic violence, threats of mild violence, threats of minor violence, threats of moderate violence, threats of serious violence, mild violence, minor violence, moderate violence,

serious violence, and sexual violence. As with the CTS (see above), mothers completed this scale for each romantic relationship (lasting at least six weeks) during the past year. Marshall (1992) reports obtaining coefficient alphas among a community sample that ranged from a low of .86 for symbolic violence to a high of .96 for mild and serious violence. Examples of items include "destroyed something belonging to you," "punched you," and "demanded sex whether you wanted to or not." Respondents rate their experiences of abuse on a 4-point scale ranging from "Never" to "Many Times." For each item, women also indicated whether the infant heard or witnessed the abuse or violence described in the item. (See Appendix C.) Domestic violence was considered to be present if women endorsed items in these categories: threats of serious violence, mild violence, minor violence, moderate violence, serious violence, and sexual violence. The categories are items nine and above on the SVAWS. Coefficient alphas for this sample were .96 for the current or most recent partner and .97 for the next most recent partner.

Classification of Infants as "Witnessed", "Lived With", or "Non-Exposed" to Domestic Violence. For the purpose of this study, infants were considered to have "lived with" domestic violence if their mothers endorsed items six or higher on the CTS (those that describe physical violence) or items nine or higher on the SVAWS (threats of serious violence, mild violence, minor violence, moderate violence, serious violence, and sexual violence). Infants met criteria for having "witnessed" domestic violence if their mothers indicated that the infant had seen or heard any of the incidents described above. The "lived with" and "witnessed" groups combined were considered to constitute a group "exposed" to domestic violence. If none of the items six or higher on

the CTS or nine or higher on the SVAWS were endorsed, infants were considered "non-exposed" to domestic violence.

Angry Phone Call (Levendosky, 1999)

This measure was adapted from Cummings (1987) "Exposure to Inter-Adult Anger." An adult female experimenter simulated an angry phone conversation while the infant played in the same room. The adult experimenter, following a script (see Appendix D), pretended to be angry with a fictional caller for failing to come to a scheduled appointment. The "phone call" lasted approximately 30 seconds. The experimenter then played with the infant for five minutes and then pretended to have a second phone call of approximately 15 seconds in which she apologized for her angry behavior and appeared to reconcile with the fictional caller. The infant's behavior was videotaped during the angry phone call, the five minutes of free play afterward, the reconciliation call, and during five minutes of free play following the second call.

The infant's videotaped responses to the conflict for the five minutes during and after the first, "angry" call were reviewed by trained raters and coded for displays of distress, as indicated by facial expression, vocalization, and posture. Raters assigned distress ratings every 15 seconds, resulting in 20 ratings per scale, per episode. (See Appendix E for coding manual.) To measure facial and vocal expressions of distress, Thompson's scales for emotional expression in freely moving infants were applied (Thompson & Lamb, 1984). The scale that measures facial expression of positive or negative emotion consists of 8 points ranging from 1 (bright smile) to 8 (cry-face or angry-face). In the present study, coefficient alpha for this scale was .88. Vocal expressions of distress were measured on a 14-point scale reflecting differences in

intensity, rythmicity, continuity, pitch, and sound quality of infant vocalizations. Coefficient alpha for the vocal scale in this study was .91.

Postural indications of distress, such as freezing, hiding (under or behind furniture in the room), avoidance of the experimenter, cessation of play, and attempting to leave the room, were coded on a 5-point scale developed by the author. This scale ranges from 1 (no postural indicators of distress) to 3 (postural indicators of distress present but not severe—e.g., child briefly stops play immediately after angry phone call) to 5 (postural distress clearly indicated—e.g., child thrashing limbs as in a tantrum). Coefficient alpha for the postural scale was .90. Additionally, the degree to which the experimenter successfully simulated anger was rated on a 3-point scale developed by the author ranging from 1 (very mild or no anger expressed) to 3 (anger clearly and strongly expressed).

Toddler Temperament Scale (TTS) (Fullard, McDevitt, & Carey, 1984)

The TTS is a maternal report measure that was used to assess infant temperament (see Appendix F). This scale is appropriate for infants 12-36 months of age and consists of 97 items. This scale includes 9 subscales: activity, rhythmicity, approach-withdrawal, adaptability, intensity, mood, attention span/persistence, distractibility, and sensory threshold. For the present study, the following scales were used to measure aspects of temperamental reactivity: activity, intensity, mood, distractibility, and sensory threshold. Higher scores on each of these subscales indicate higher levels of each temperament trait. Examples of items include "the child cries after fall or bump," "the child sits still while waiting for food," and "the child is still wary of strangers after 15 minutes." Respondents rate their children's recent and current

behavior, based on the previous four to six weeks, on a 6-point scale ranging from "Almost Never" to "Almost Always." Scores are obtained by assigning a value on each item from 1 (low) to 6 (high) based on mothers' ratings on the six-point scale. Some items are reverse-scored. Subscale scores are obtained by summing these values for all items for the subscale and then dividing by the number of items endorsed on the subscale. Fullard et al. (1984) reported coefficient alphas for the nine subscales ranging from .59 to .86, and test-retest reliability coefficients range from .69 to .89. In the present study, coefficient alphas obtained for each of the five subscales used were .72 for activity level, .54 for intensity, .61 for mood, .59 for distractibility, and .39 for sensory threshold.

Procedures

Data collection for the present study took place as part of a larger longitudinal study of the impact of domestic violence on women and their children. Participants in the larger study were originally recruited by posting fliers and contacting agencies in Mid-Michigan. Women were interviewed initially during pregnancy and were asked for permission to continue to contact them for further interviews. When not currently involved with an interview for the larger study, project staff routinely contact participants every 90 days to ensure that they can be reached for future interviews. For the present study, participants were contacted just before their child's first birthday and asked to come to the project office for an interview that would include gathering information directly from them as well as observation and participation by their infants. Participants were paid $75.00 for the interview. If participants did not have transportation to the office, a cab was provided.

Female research assistants at both the graduate and undergraduate levels were trained as interviewers. Interviewers were blind with regard to the hypotheses of the study, the results of previous interviews and the mothers' abuse statuses, the purpose of specific measures (including the "Angry Phone Call"), and history of domestic violence (questionnaires regarding experience of domestic violence were given at the end of the interview). The group of interviewers was diverse with regard to ethnicity, socio-economic status, and culture. Training took place during the eight months before the interviews.

Interviewers were trained specifically to work with either mothers or infants. Interviewers trained to work with infants underwent extensive training to administer assessments and measures directly to the infants. As part of this training, infant interviewers volunteered at local daycare centers to become familiar working with one year olds and were given extensive readings on infant development and domestic violence. They were also trained specifically to administer the "Angry Phone Call", practicing as a group to express a consistent level of anger.

At the end of training, mother and infant interviewers were merged into one training group. All interviewers observed skilled graduate students perform interviews and completed at least three practice interviews. The interviewers were also observed by graduate students while performing practice interviews and given feedback.

All interviews were conducted at Michigan State University. Infant assessment and observation of the mother-infant dyad took place in a room with a one-way mirror through which mothers and infants could be videotaped without interfering with

assessment or distracting the infant. Mothers were also interviewed separately in private rooms.

A mother interviewer met the mother and infant as they came to the building. This interviewer met with the mother and infant before the interview process began to explain the interview procedure and the fact that all information would be kept confidential as well as to obtain written consent. (See Appendix G for a copy of the consent form.) Confidentiality was maintained throughout the interview by labeling all videotaped information and questionnaires with only the subject number, which had been assigned to the mother at the time of her first interview. The participant list, linking names to subject numbers, is kept separately from the data, in locked research offices. Mothers were also informed that they could refuse to complete any portion of the interview without penalty. Mothers had been informed prior to scheduling the interview that they and their infants would be interviewed separately for a portion of the interview and they were reminded of this at this time as well.

The interviewer then escorted the mother and infant to the observation room. The mother and infant began completing several tasks together in the observation room, and then the mother and one interviewer left to speak privately while the infant remained in the observation room with an infant interviewer and assistant. If at this point the infant's mother or the interviewers felt that the infant was too distressed to be separated from his or her mother, the infant portion of the interview was modified such that the mother was in the room throughout the administration of the infant portion of the interview. In this case, the "Angry Phone Call" did not take place. Once alone with

the infant interviewer, the infant was administered the Bayley Scales of Infant Development and the "Angry Phone Call."

While infants were with the trained infant interviewers, mothers met privately with mother interviewers to complete the remaining portion of the interview. This portion of the interview included a semi-structured interview and several questionnaires, including questionnaires about infant temperament and the mother's experiences of domestic violence.

At the end of the interview the mother and her interviewer returned to the observation room to pick up the infant. Mothers were thanked for their participation and paid $75.00 for the interview and infants received an age-appropriate book, valued at $8.00.

Videotaped segments of infants responding to simulated, verbal conflict were coded by two coders, the author and another clinical psychology graduate student. Coders were blind to the abuse status of the mother. The two coders achieved inter-rater reliability for the facial (kappa =.94; 96.7% agreement), vocal (kappa = .92; 95.96% agreement), postural (kappa = .88; 95.96% agreement), and experimenter anger (kappa = .99; 100% agreement) scales by double coding 10% of the sample. The first coder then coded all tapes. The second coder checked for integrity of administration by double coding another 20% of the taped segments that were randomly selected from the remaining episodes (kappas for facial, vocal, postural, and experimenter anger scales were .72, .70, .75, and .47, respectively; percent agreements were 85.79%, 83.50%, 89.59%, and 72.22%, respectively). Reliability was computed by comparing whether the 2 ratings for each of the distress scales, facial, vocal, and postural, were the same for

each 15-second interval rated. All but two experimenter anger ratings (97.7%) were judged to be either 2 or 3, indicating that nearly all experimenters were judged to express at least mild anger during the simulated verbal conflict.

Results

Treating level of exposure to domestic violence as a categorical variable (witnessed vs. lived-with vs. non-exposed), a one-way between subjects ANOVA was calculated to determine whether the average distress rating across the five-minute period differed across the three groups. Three separate ANOVAs were run for each of the distress scales: facial, vocal and postural. The ANOVAs revealed a significant difference between groups on the postural scale [$F(2,87) = 3.58$, $MSE = .14$, $p < .05$], but not for the facial expression [$F(2, 87) = 2.29$, $MSE = .23$, *ns*] or vocalization scales [$F(2, 87) = 1.07$, $MSE = 2.03$, *ns*], despite the fact that average ratings on all three scales were significantly correlated with each other (see Table 3 below).

Table 3

Intercorrelations Between Distress Rating Scales

	Facial Scale	Vocal Scale	Postural Scale
Facial Scale	—		
Vocal Scale	r = .73**	—	
Postural Scale	r = .65**	r = .66**	—

** $p < .01$

A Tukey test revealed significant differences on posture-expressed distress between the non-exposed ($M = 1.34$, $SD = .34$) and the lived-with group ($M = 1.62$, $SD = .54$), though not with the witnessed group ($M = 1.39$, $SD = .33$). The lived-with and witnessed group means did not differ significantly from each other, as was expected. Thus, the lived-with and witnessed groups were collapsed for the reminder of the analyses, as was planned a priori. This collapsed group (n = 33) will henceforth be

referred to as the *exposed* group. (For a summary of descriptive data for the exposed group, non-exposed group, and total sample see Table 4 below.)

A one-way between subjects ANOVA was used to determine whether mean ratings of affect in response to conflict differed between the exposed and non-exposed groups. Separate ANOVAs were run for each of the distress scales (facial, vocal, and postural). Again, there was a significant between-group difference on the postural scale [$F(1,89) = 3.99$, $MSE = .15$, $p < .05$], but not on the facial expression [$F(1,89) = 3.08$, $MSE = .23$, *ns*] or vocalization scales [$F(1,81) = .67$, $MSE = 2.04$, *ns*]. Infants in the exposed group had a higher mean level of posture-expressed distress ($M = 1.50$, $SD = .45$) than did infants in the non-exposed group ($M = 1.34$, $SD = .34$).

To determine whether experimenter effects, namely the amount of anger expressed by the experimenter, contributed significantly to the findings, ANOVAs were conducted to determine if experimenter anger was significantly related to distress level or group membership. Experimenter anger did not correlate with level of posture-expressed distress [$r = .11$, ns], nor did experimenter anger ratings differ significantly across the exposed and non-exposed groups [$F(1, 87) = .39$, $MSE = .30$, *ns*].

Linear regressions were calculated (using SYSAT) to determine whether the amount of posture-expressed distress was predicted by temperament (activity, intensity, mood, distractibility, or sensory threshold) for the exposed and non-exposed groups. Two subscales, intensity and mood, yielded significantly different regression lines (see Table 5). Greater temperamental intensity and more negative mood predicted greater distress in the non-exposed group, but not in the exposed group. All other temperament subscales did not generate significantly different regression lines.

Table 4
Descriptive Data for Measures

	Exposed Group			Non-Exposed Group			Total Sample		
	Mean	SD	Range	Mean	SD	Range	Mean	SD	Range
Angry Phone Call									
First quarter									
Average of valid facial codes	4.39	.76	4.00-7.67	4.22	.33	3.80-5.20	4.28	.53	3.80-7.67
Average of valid vocal codes	2.92	2.09	2.00-8.50	2.44	1.15	2.00-7.00	2.60	1.53	2.00-8.50
Average of valid postural codes	2.19	.73	1.00-3.80	1.84	.56	1.00-3.00	1.97	.64	1.00-3.80
Second quarter									
Average of valid facial codes	4.22	.88	3.75-8.00	4.10	.48	3.60-6.60	4.14	.65	3.60-8.00
Average of valid vocal codes	2.55	1.53	1.80-8.00	2.58	1.61	1.00-9.00	2.57	1.57	1.00-9.00
Average of valid postural codes	1.32	.46	1.00-2.40	1.26	.49	1.00-2.80	1.29	.48	1.00-2.80
Third quarter									
Average of valid facial codes	4.04	.25	3.60-5.20	4.09	.63	3.00-8.00	4.07	.53	3.00-8.00
Average of valid vocal codes	2.36	1.02	2.00-6.50	2.54	1.55	1.60-8.80	2.48	1.38	1.60-8.80
Average of valid postural codes	1.25	.48	1.00-2.60	1.14	.34	1.00-2.60	1.18	.40	1.00-2.60
Fourth quarter									
Average of valid facial codes	4.04	.17	4.00-5.00	4.02	.52	2.50-7.33	4.03	.43	2.50-7.33
Average of valid vocal codes	2.59	1.58	1.80-9.00	2.42	1.36	1.50-8.60	2.48	1.44	1.50-9.00
Average of valid postural codes	1.23	.49	1.00-3.00	1.12	.35	1.00-3.00	1.61	.41	1.00-3.00
Experimenter anger	2.59	.50	2-3	2.52	.57	1-3	2.55	.55	1-3
Toddler Temperament Scale									
Activity	4.02	.63	2.63-5.50	3.94	.70	2.40-5.44	3.97	.67	2.40-5.50
Intensity	3.98	.66	2.78-5.56	3.65	.58	2.70-5.30	3.77	.63	2.70-5.56
Mood	3.21	.59	1.75-4.70	3.03	.71	1.90-4.91	3.09	.67	1.75-4.91
Distractibility	4.08	.60	3.00-5.50	4.27	.56	3.27-5.89	4.20	.58	3.00-5.89
Sensory threshold	3.71	.76	1.75-5.00	3.68	.81	1.75-5.71	3.69	.79	1.75-5.71

Table 5

Results of Regressions of Posture-Expressed Distress on Temperament Subscale Scores

	Exposed Group (n= 33)				Non-Exposed Group (n= 57)			
Temperament Subscale	β	t	R^2	p	β	t	R^2	p
Activity	.03	.14	.00	*ns*	.24	1.78	.06	*ns*
Intensity	-.01	-.05	.00	*ns*	.35	2.77	.12	.01
Mood	-.13	-.75	.02	*ns*	.30	2.33	.09	.03
Distractibility	.31	1.83	.10	*ns*	.08	.59	.01	*ns*
Threshold	-.08	-.42	.01	*ns*	-.04	-.26	.00	*ns*

Post-hoc Analyses

While infant responses to conflict seemed generally to differ across groups, it was not clear how long these differences persisted and whether the persistence of distress differed across groups. To investigate these questions, infant distress ratings were collapsed (by summing postural scores) into four 75-second intervals. Infant responses by group were examined across the four time intervals. A within-subjects, repeated measures ANOVA using a Geisser-Greenhouse correction (to compensate for violations of sphericity) conducted across time periods (each 75-second interval) revealed that a significant interaction existed between time and group such that the exposed group's mean distress level decreased more quickly than did the non-exposed group's [$F(3, 264) = 4.16$, $MSE = 3.28$, $p < .05$].

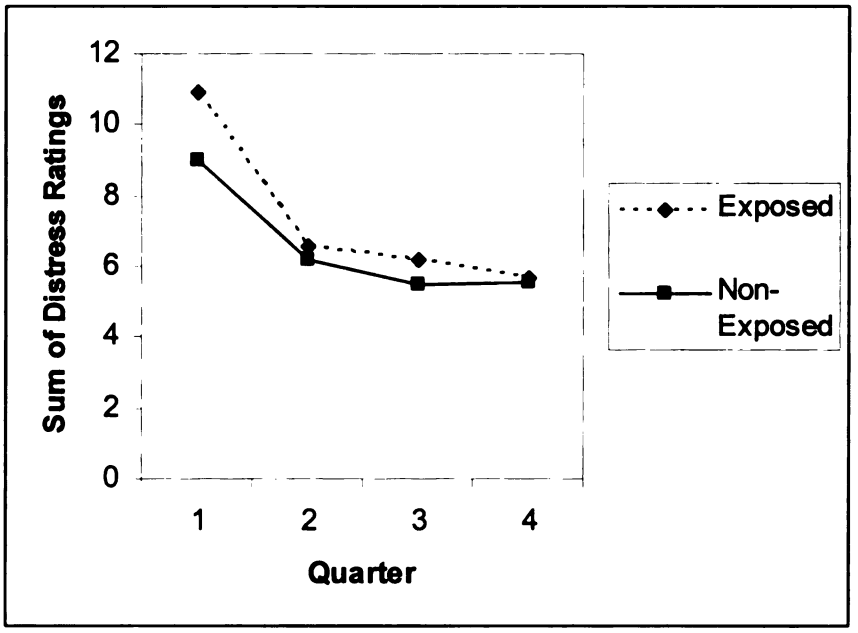

Figure 1. Change in Distress Ratings Across Quarters

Discussion

The results of this study support the assertion that infant exposure to domestic violence may facilitate distress in response to verbal conflict. As predicted in Hypothesis 1, level of exposure to domestic violence (exposed vs. non-exposed) was related to distress in response to simulated adult, verbal conflict, as indicated by the infant's posture. An increased likelihood of distress in response to conflict is consistent with Davies' and Cummings' (1994) "emotional security hypothesis." According to this hypothesis, repeated exposure to destructive conflict causes emotional insecurity, which reduces children's capacity for regulating emotions and behavior. Among the most distressing are conflicts that involve physical aggression between parents (Cummings et al., 1981). Such a result would also be consistent with a learned distress response to verbal conflict, such that children who observe verbal conflict paired with violence develop a distress response to the verbal conflict itself. It was surprising to find that, even given the low power in such a small sample, exposure to violence accounted for a significant difference in distress responses to the simulated conflict.

It is notable that while differences in response to conflict emerged between exposed and non-exposed infants, differences did not emerge between those infants whose mothers indicated that the infants had directly witnessed the abuse and those who lived with it. This is consistent with Levendosky et al.'s (2002) finding that significant differences did not exist in internalizing, externalizing, and PTSD symptoms between pre-school-age eyewitnesses to domestic violence and children whose mothers indicated that they did not witness domestic violence but lived in homes where domestic violence occurred. This apparent equivalence of groups may simply be a result of mothers under-

reporting children's witnessing of violence. Clinical work with older children suggests that parents may minimize the degree to which children are present during violence. Jaffe, Wolfe, and Wilson (1990) state that children described detailed accounts of violence that their mother or father never realized they witnessed.

It is also interesting to note that the only significant results were found using the postural indicators of distress. This may be largely due to the fact that postural ratings of distress could be collected for all subjects at nearly all time intervals, while facial and vocal ratings were sometimes not possible to obtain. This was both an artifact of the data collection process (infants often faced away from the camera, and microphones often failed to adequately pick up vocalizations) and simply the result of typical behavior of one-year-old infants (many infants did not vocalize for long periods of time, if at all). Additionally, evidence exists that infants may display postural responses to conflict even when they do not display facial responses (Hiatt et al., 1979). This finding has interesting implications for research on infant expression of emotions in general. While mechanical failures, such as the microphone's inability to register some vocalizations, can certainly be corrected, it seems clear that to consistently identify an infant's facial expression in videotaped data, the infant must in some way be restrained to remain facing a camera, as is often done in studies of infant facial expression. However, restraining infants in this way not only may affect the infant's mood, possibly frustrating or frightening an infant, but also may make observations of postural expression of emotions difficult or impossible. Rather than restraining infants for measurement of emotion and losing potentially valuable information that may be

conveyed through posture, it seems that further development of scales of emotional expression in infants that include interpretation of posture would be prudent.

Support was indicated for Hypothesis 2, that temperament would affect infants' response to conflict differently depending on whether or not the infant had been exposed to domestic violence. However, this moderation did not occur in the manner expected. As suggested by Strelau (1995), it was expected that temperament would function as a risk factor only when combined with an environmental factor which made a specific temperamental characteristic undesirable. In this study, it was expected that temperamentally reactive infants would be at an increased likelihood to display distress in response to verbal conflict only if the temperamental characteristic occurred in combination with exposure to domestic violence. Contrary to this prediction, temperamental intensity and negative mood predicted greater distress among infants *not* exposed to domestic violence. Among infants exposed to domestic violence, temperament did not impact distress.

This suggests that infants exposed to domestic violence may have reached a "threshold" for distress. In other words, the infants' environmental circumstances are negative enough that distress becomes more easily elicited in these infants regardless of temperament. It appears that, in a non-violent home, only infants who have higher temperamental intensity or negative mood are likely to respond to verbal conflict with displays of distress. However, when verbal conflict has been paired with domestic violence, infants' distress in response to verbal conflict appears to be elicited regardless of temperament. The intensity of the experience of domestic violence may "override" temperament, eliciting distress responses to stimuli, such as mild verbal conflict, which

would typically not be distressing to less temperamentally reactive infants. This finding suggests that all infants, not only temperamentally reactive ones, may be at risk for adverse affects of exposure to domestic violence.

Alternately, temperament might not function in the expected manner because domestic violence is unique in that, unlike other stressors infants might be exposed to (e.g., poverty), it may be preceded by cues, such as verbal conflict, to which infants may develop learned responses. Temperament may appear to be "overridden" because temperamentally non-reactive infants display the effect of an association between a cue that would typically be neutral for them, a mild verbal conflict, and an unconditionally distressing event, domestic violence. While temperamentally reactive infants might always be likely to experience verbal conflict as distressing, temperamentally less reactive infants might typically experience mild verbal conflict as a neutral event. Infants have been shown to learn distress responses to neutral stimuli when this stimuli has previously been paired with a distress inducing event (Watson & Rayner, 1920). Additionally, research with animal models has shown that the development of a distress response to a neutral stimulus is most likely to occur when the cue is presented just before exposure to a negative event (Domjan, 1993). Thus, the development of a learned distress response to verbal conflict may be facilitated by the fact that, unlike other risk factors, domestic violence is often preceded by a cue, verbal conflict.

Another interesting finding of the current study is that the exposed and non-exposed infants tended to differ in their patterns of distress over the five-minute interval studied. Infants exposed to domestic violence were more likely to show higher distress initially (in the first 75-second quarter), but after this their mean distress ratings

descended quickly and became similar to those of the non-exposed group. Thus, while infants exposed to domestic violence do appear to have stronger reactions to verbal conflict, these reactions are of short duration. This is consistent with short durations of distress found by other research with infants. For example, Axia, Bonichini, & Benini (1999) found that displays of distress following inoculations decreased in duration during the first year of life and were, on average, just under 15 seconds by 11 months of age. Thus, the short durations of distress found in the current study may be typical of infants of this age.

One possible implication of this finding is that these displays of distress in response to conflicts that are short-lived might easily go unnoticed by parents. If an infant displays the greatest distress during and in the seconds immediately following a heated verbal argument, parents may not perceive the distress due to their involvement in the argument. This may be exacerbated by the fact that distress tended to be expressed through posture, rather than a more easily noticeable response, such as loud crying. Thus, parents of infants experiencing increased distress in response to conflict may be largely unaware of this fact, suggesting that studies which employ parental report to measure infant distress after verbal conflict may fail to capture existing distress.

This study has several limitations, which may have influenced the findings described above. First, sample size was small. The small sample made it very difficult to draw conclusions about differences between infants who had witnessed domestic violence and infants who lived with, but did not witness, domestic violence. While the results of other studies also suggest that maternal report of this distinction may not be

related to outcomes (Jaffe et al., 1990; Levendosky et al., 2002), it is also possible that distinctions do exist and that a sufficiently large sample size would have yielded significant results. Small sample size may also have masked the role of temperament, as less pronounced differences in responding would be unlikely to achieve statistical significance in such a small sample. The lack of support found for the moderating role of other temperament subscales between domestic violence and infant responses to simulated verbal conflict may be due largely to the low number of participants included in the study.

Second, as noted above, only 90 of the possible 181 mother-infant pairs interviewed during this wave of data collection were included in this study. As infants who were fussy or reacted very strongly to separation from their mother were excluded from the sample, the more temperamentally reactive infants may have been excluded from the sample. At the same time, infants who were extremely sleepy or listless by the time the experimental procedure was to take place were also excluded, potentially excluding infants who were temperamentally less reactive. Thus, it is possible that the sub-sample of infants included in the study was temperamentally homogenous. Such a restriction of range in temperament would make it unlikely that significant results would emerge. Consistent with this hypothesis, examination of study mean and standard deviations as compared to standardization means and standard deviation (Fullard et al., 1984) revealed that standard deviations (and thus variances) tended to be higher in the standardization sample (see Table 6).

Table 6

Temperament Means and Standard Deviation in the Current Study as Compared to the Standardization Sample

	Study Sample		Standardization Sample	
Activity	$M = 3.96$	$SD = .68$	$M = 4.13$	$SD = .80$
Intensity	$M = 3.75$	$SD = .61$	$M = 4.03$	$SD = .76$
Mood	$M = 3.08$	$SD = .68$	$M = 2.96$	$SD = .69$
Distractibility	$M = 4.21$	$SD = .59$	$M = 4.39$	$SD = .76$
Sensory threshold	$M = 3.68$	$SD = .79$	$M = 3.61$	$SD = .88$

Third, the measure used to ascertain infant response to conflict, the "Angry Phone Call", had several limitations. Clearly, this measure did not approximate the type of verbal conflict infants exposed to domestic violence are most likely to fear, verbal conflict between their mother and a male partner. While such a measure might have better elicited responses from the infants, the use of a methodology such as one in which an infant's mother is asked to simulate an argument with a male experimenter would have the potential to be traumatic for women involved in violent relationships and possibly for the infants as well. Given the paucity of research on the impact of domestic violence on infants and the subsequent lack of understanding of how infants and mothers might be impacted by such an experimental design, a more direct approximation of the type of verbal conflict typical of domestic violence would not have been justified. It is also notable that we chose to measure an infant's response not only to verbal conflict but also to an angry experimenter. It is possible that anger may not be the emotional aspect of an episode of domestic violence that is most salient to the infant. Indeed, research with older children (aged 6-16 years) indicates that adult

expressions of fear elicit the greatest negative emotional response (De Arth-Pendley & Cummings, 2002).

Finally, it is not clear whether exposure to domestic violence may be presumed to be the only factor contributing to differences in infant responses to the simulated verbal conflict. Other environmental risk factors such as such as lower socioeconomic status (Spaccarelli et al., 1994) and general levels of violence in the community (Richters & Martinez, 1993) have been shown to commonly co-occur with domestic violence. In addition, history of exposure to verbal conflict has been shown to impact response to simulated verbal conflict in pre-school age children (El-Sheikh et al., 1996). As the current study did not directly examine factors such as additional environmental stressors and history of exposure to verbal conflict, it is not clear whether these factors might account for the relationship between infant response to simulated verbal conflict and exposure to domestic violence.

Despite these limitations, this study is unique in that it is the first to demonstrate differential distress responses to verbal conflict according to whether or not infants have been exposed to domestic violence. This reinforces clinical evidence that even infants as young as one year of age are not immune to the effects of living in homes where domestic violence occurs. Importantly, infants display these effects even in the absence of cues from their mothers, who were not present during the episode. Thus, this suggests support for the hypothesis that infants exposed to domestic violence may develop a conditioned distress response to verbal conflict because of the association between verbal conflict and domestic violence in their homes.

This is a preliminary study and needs replication. Research with different examples of verbal conflict would help to develop a better understanding of how infants exposed to domestic violence may differ in their responses to conflict. In particular, research in which infants are exposed to fearful vs. angry behavior may elicit information about which aspects of conflict are most distressing to infants. In addition, longitudinal research is needed to determine if infants exposed to domestic violence develop different responses to verbal conflict that are stable over time. Longitudinal research will also illuminate whether some infants may show a delayed impact of exposure to violence in infancy.

Future research is also needed to understand other factors, in addition to exposure to domestic violence, which might influence infants' responses to conflict. For example, the mother's response to her abuse might mediate the relationship. Partner physical violence toward women has repeatedly been associated with increased levels of psychological distress (Cascardi & O'Leary, 1992; Christopoulos, Cohn, Shaw, Joyce, & et al., 1987; Kemp, Rawlings, & Green, 1991; Mitchell & Hodson, 1983; Thompson et al., 2000; Wolfe, Zak, Wilson, & Jaffe, 1986). Thus, infants of mothers who are victims of domestic violence may be subject to the adverse effects of these associated problems.

Indeed, the fact that no significant differences emerged between the "witnessed" and "lived with groups" suggests that the effect of domestic violence may be mediated through impact on the mother. For example, domestic violence may impact infants as a result of its impact on mothers, rather than directly via witnessing abuse. In addition, infants may not directly witness an incident of violence, but may witness its aftermath,

such as a mother crying, a mother's injuries, a parent's absence, the use of emergency medical care, or police intervention (Edleson, 1999). A clearer understanding of how infants are both directly and indirectly influenced by domestic violence will enable professionals to better serve families recovering from domestic violence and will facilitate the development of interventions and programs serving victims of domestic violence.

Appendices A-F

Appendix A

Demographic Questionnaire

1. Name of child: _____ (Interviewer: Get this information from T2 interview prior to interview)
2. Child's birthdate: ____/____/____ (Interviewer: Get this information from T2 interview prior to interview)
3. Since you gave birth to _____ [name of child], have you had any:

   YES NO (a) miscarriages

   YES NO (b) still births

   YES NO (c) abortions

   YES NO (d) other children
4. Are you currently pregnant? YES NO
5. How many biological children do you currently have?
6. How many people, including yourself, live in your household?

   (If participant is living in a shelter, questions 6 & 7 refer to household composition before moving into shelter.)
7. Please list these: (Write in specific relationship to mother. Be specific--is the person (for ex.) a husband, stepfather, biological child, foster child, or partner's child?)

self			

8. Choose the one that best describes your current marital/relationship status (choose only one):

   (1) single, never married

   (2) married (a) For how long? _____ (in months)

   (3) separated (b) For how long? _____ (in months)

   (4) divorced (c) For how long? _____ (in months)

   (5) widowed (d) For how long? _____ (in months)

9. When we interviewed you during your pregnancy, you had been involved with _____ [name of T1 partner] for at least six weeks during the pregnancy. What has happened to this relationship since we interviewed you then? (Read all choices and circle one)

   (1) I am still in a relationship with him.

   (2) We have been together off and on since the interview, and we are currently together.

   (3) We have been together off and on since the interview, and we are currently <u>not</u> together.

   (4) I have not had a relationship with him since the interview.

10. Since the birth of your baby, please list the first names of the people with whom you had a romantic relationship that lasted at least 6 weeks. Please start with the most recent or current relationship and go back in time. Include the person listed in Question #9 *(T1 partner)* if appropriate.

10a. _____

Was this person the same person you were involved with when we last interviewed you? YES NO

Is this person the father of your baby? YES NO

Are you currently involved? YES NO

Anyone else?

10b. _____

Was this person the same person you were involved with when we last interviewed you? YES NO

Is this person the father of your baby? YES NO

Are you currently involved? YES NO

Anyone else?

10c. _____

Was this person the same person you were involved with when we last interviewed you? YES NO

Is this person the father of your baby? YES NO

Are you currently involved? YES NO

Anyone else?

10d. _____

Was this person the same person you were involved with when we last interviewed you? YES NO

Is this person the father of your baby? YES NO

Are you currently involved? YES NO

Anyone else?

(Interviewer: If there are other partners, please list them on the back of page and ask the 3, yes/no questions for each partner.)

11. What is your current relationship with the father of your baby? (Circle one)

1 = spouse

2 = ex-spouse

3 = partner/fiancé

4 = ex-partner

5 = friend

6 = acquaintance

7 = stranger

8 = other Please specify: _____

12. Is the baby's father involved with the baby? YES NO

13. Does the baby's father live with the baby? YES NO

14. Does the baby live with you? YES NO

If NO, who does the baby live with? _____
(relationship of person to mother)

15. What is your religious affiliation? _____

16. Do you currently work outside the home? YES NO

If NO, did you work outside the home anytime during the last year?

YES NO

17. Do you currently work at home (e.g., daycare provider or home office)?

YES NO

18. [*If YES to either part of Questions 16 and 17*]: What is/was your occupation?

_____

□ *Please be specific. For example, bookkeeper, cashier, computer programmer.*

□ *If there were two jobs/occupations, have participant choose the one that she feels best represents her occupation.*

19. What is the highest level of education you have completed? (Circle one)

a. Grade: 1 2 3 4 5 6 7 8 9 10 11 12 13=GED

b. Some college

c. Trade School (Cosmetology, Nursing, Technical/Vocational)

d. AA degree

e. BA/BS

f. Some grad school

g. Graduate degree

1. MA? ____

2. Ph.D.? ____

3. Law? ____

4. MD? ____

20. Have you been in school during the last year? YES NO

If YES, please describe: _____

_____

21. Does your current partner work outside the home? (Circle one)

1 = YES

2 = NO

888 = not applicable; no current partner

If YES, what is his occupation? _____
(Please be specific)

22. What is the highest level of education your current partner/spouse has completed? (Circle one)

a. Grade: 1 2 3 4 5 6 7 8 9 10 11 12 13=GED

b. Some college

c. Trade School (Cosmetology, Nursing, Technical/Vocational)

d. AA degree

e. BA/BS

f. Some grad school

g. Graduate degree

1. MA? ____

2. Ph.D.? ____

3. Law? ____

4. MD? ____

h. Not applicable = 888

23. What is your total family income per month (estimate)? _____

24. Do you currently receive services from . . . ?

a. WIC YES NO

b. AFDC YES NO

c. Protective Services YES NO

c. Food Stamps YES NO

d. Medicaid YES NO

e. SSI (Disability) YES NO

f. FIA cash assistance/grant YES NO

g. Any child related programs (e.g., 0-3; Mother-Infant Program; Head Start)?

YES NO

25. Are you currently residing in a shelter for battered women?

(a) YES NO/888

(b) If YES, # days?_____

26. Since (child's name) was born, have you stayed in a shelter for battered women?

(a) YES NO/888

(b) If YES, # days? _____

27. Since (child's name) was born, have you stayed in a homeless shelter?

(a) YES NO/888

(b) If YES, # days? _____

Appendix B

Conflict Tactics Scale

*****This questionnaire refers to _____ [NAME, see page 2, Question 10]*****

Use a separate form for each partner listed on page 2, Question 10

INTERVIEWER: If participant did not have a romantic partner in the last year, do not administer: code all answers as "X."

Instructions: No matter how well a couple gets along, there are times when they disagree on major decisions, get annoyed about something the other person does, or just have spats or fights because they're in a bad mood or tired or for some other reason. They also use many different ways of trying to settle their differences. I'm going to read a list of some things that you and your partner might have done when you had a dispute. For each one, indicate how often your partner did the following to you (1) during the last year and (2) how many times (child's name) saw or heard what happened.

A	BB	C	D	E	F	G	X
Never	Once	Twice	3-5 Times	6-10 Times	11-20 Times	More than 20 Times	No Partner During Last Year

During the last year? ↓	Times baby saw or heard what happened? ↓	
_____	_____	1. Insulted or swore at you
_____	_____	2. Sulked and/or refused to talk about it
_____	_____	3. Stomped out of the room or house (or yard)
_____	_____	4. Did or said something to spite you
_____	_____	5. Threatened to hit or throw something at you
_____	_____	6. Threw or smashed or hit or kicked something
_____	_____	7. Threw something at you
_____	_____	8. Pushed, grabbed, or shoved you
_____	_____	9. Slapped you
_____	_____	10. Kicked, bit, or hit you with a fist
_____	_____	11. Hit or tried to hit you with something
_____	_____	12. Beat you up
_____	_____	13. Threatened you with a knife or gun
_____	_____	14. Used a knife or gun on you

Appendix C

Severity of Violence Against Women Scales

*****This questionnaire refers to _____ [NAME, see page 2, Question 10]*****Use a separate form for each partner listed on page 2, Question 10

INTERVIEWER: If participant did not have a romantic partner in the last year, do not administer: code all answers as "X." INSTRUCTIONS: You and your partner have probably experienced anger or conflict. Below is a list of behaviors he may have done. Describe how often he has done each behavior to you during the last year and how many times your baby saw or heard what happened by choosing a letter from the following scale.

A	BB	C	D	X
never	once	a few times	many times	no partner during last year

During the last year:

↓ *Times your baby saw or heard what happened:* ↓

1. ____ ____ Hit or kicked a wall, door or furniture
2. ____ ____ Threw, smashed or broke an object
3. ____ ____ Driven dangerously with you in the car
4. ____ ____ Threw an object at you
5. ____ ____ Shook a finger at you
6. ____ ____ Made threatening gestures or faces at you
7. ____ ____ Shook a fist at you
8. ____ ____ Acted like a bully toward you
9. ____ ____ Destroyed something belonging to you
10. ____ ____ Threatened to harm or damage things you care about
11. ____ ____ Threatened to destroy property
12. ____ ____ Threatened someone you care about
13. ____ ____ Threatened to hurt you
14. ____ ____ Threatened to kill himself

15. ____ ____ Threatened you with a club-like object

16. ____ ____ Threatened you with a knife or gun

17. ____ ____ Threatened to kill you

18. ____ ____ Threatened you with a weapon

19. ____ ____ Acted like he wanted to kill you

20. ____ ____ Held you down, pinning you in place

21. ____ ____ Pushed or shoved you

22. ____ ____ Shook or roughly handled you

23. ____ ____ Grabbed you suddenly or forcefully

24. ____ ____ Scratched you

25. ____ ____ Pulled your hair

26. ____ ____ Twisted your arm

27. ____ ____ Spanked you

28. ____ ____ Bit you

29. ____ ____ Slapped you with the palm of his hand

30. ____ ____ Slapped you with the back of his hand

31. ____ ____ Slapped you around your face and head

32. ____ ____ Kicked you

33. ____ ____ Hit you with an object

34. ____ ____ Stomped on you

35. ____ ____ Choked you

36. ____ ____ Punched you

37. ____ ____ Burned you with something

38. ____ ____ Used a club-like object on you

39. ____ ____ Beat you up

40. ____ ____ Used a knife or gun on you

41. ____ ____ Demanded sex whether you wanted to or not

42. ____ ____ Made you have oral sex against your will

43. ____ ____ Made you have sexual intercourse against your will

44. ____ ____ Physically forced you to have sex

45. ____ ____ Made you have anal sex against your will

46. ____ ____ Used an object on you in a sexual way

47. Were you ever pregnant during the time that any of these events occurred?

(1) *yes* (2) *no* (888) *n/a*

Appendix D

Angry Phone Call Script

Experimenter: What! You are going to be late! I know it is only a few minutes, but I have an extremely tight schedule and can't have any inconveniences like that to deal with. It shouldn't be so hard to get here anyway. I was counting on you being on time! Everything is going to be messed up because you are going to be late! You think you are the only one with a busy life, you are so inconsiderate. I can't believe how irresponsible you are. I am so mad at you and I never want to work with you again.

Wait five minutes and then read the following:

Experimenter: Hi. I am calling to apologize for how I acted just now on the telephone. I really got carried away. I hope you will accept my deepest apologies. I really shouldn't have said those things. You are a very nice person and don't deserve to be treated so badly by me. I am sorry that I lost control of myself. You have been a wonderful person to work with and everything I said was not true. I really apologize and wish that I could take back the things I said to you.

Appendix E

Coding Manual for Angry Phone Call

Facial Expression

This scale consists of 8 points ranging from 1 (bright smile) to 8 (cryface or angry face). Please indicate the highest rating criteria met during the fifteen-second segment.

0 **No assessment possible:** The baby is out of camera range or otherwise cannot be observed facial for the entire rating period. If the infant can be observed for any portion of the scoring period, rate on this basis. If the infant cannot be rated for the entire period, provide an inference of the baby's facial expression in parentheses – that is, your best guess of the baby's expression (e.g. 0(2), 0 (4), etc.).

1 **Bright smile:** This expression is similar to the "full smile" (#2), in that the infant is showing a full smile with lips pulled back and turned up, the mouth is open, and clear naso-labial folds are apparent (i.e., fold running down from the nose to the outer edge of the mouth beyond the lip corners), often with puffy cheeks. In addition, this high-intensity smile is accompanied by a narrowing of the eyes and, sometimes, the appearance of crows-feet crinkling at the outer edges of the eyes. Sometimes the nose is scrunched-up as well. In short, the distinguishing characteristic of this expression is the participation of the eyes region in the smile, conveying the impression of a bright, animated pleasure response. (Note: Occasionally eye-narrowing or squinting is due either to the peek-a-boo cloth moving across the baby's face or to being touched or tickled

with the puppet in the face. Discount these instances of eye-narrowing, since they may be due simply to the facial stimulation which is involved, and not really reflect a high-intensity pleasure response.)

2 **Full smile:** In this expression, the infant displays a full, open-mouth smile, with the lips pulled back and turned up, puffy cheeks, and clear naso-labial folds. Occasionally dimples may appear. Eyes are usually focused and attentive.

3 **Grin or faint smile:** This expression denotes a clearly pleasurable but muted response in either of the following ways:

a. There is a small upturning of the corners of the mouth, sometimes barely enough to be called a smile. In contrast to the full smile, there is little or no pulling back of the corners of the lips, and thus little puffing of cheeks or naso-labial folds.

b. The baby grins with a small, closed mouth smile or a narrow open-mouth smile. The lip corners are puled back somewhat and are turned up, resulting in some naso-labial folds. However, the lips are not pulled back sufficiently to produce the open-mouth expression characteristic of a full smile.

4 **Attentive, receptive expression:** This category includes facial expressions, which lack distinctly positive or negative expressive features; quite often these occur when the infant is attending to some event. Usually the eyes are widened, and the mouth is straight (or, for some babies, the corners of the mouth may be

slightly downturned). Mouth may be either closed or opened slightly. Naso-labial folds are absent. Eyebrow position can be variable: either straight but drawn together toward the middle (4a), narrowed a bit toward the middle (4c) (both indicating focused attention or interest), or raised (indicating surprise) (4b).

5 **Wary brow:** The distinguishing characteristic of this category is the eyebrows: they are drawn close together and slightly raised where they meet at the center of the forehead, resulting in ridges over the baby's eyes and in the middle of the forehead. Use this category when the wary brow is unaccompanied by any other signs of distress in the baby's face; when other distress cues co-occur with the wary brow, use higher rating categories.

6 **Pout:** This expression denotes low level fear or distress, and it is denoted by a mild turning down of the corners of the mouth and/or a jutting lower lip. The mouth may be either open or closed, and naso-labial folds may be apparent. The pout may or may not be accompanied by the brow furrowing described in the preceding category (#5).

7 **Partial Cryface:** Expressions included in this category show elements of the cryface described below, but the face is not entirely screwed-up, and the eyes are open and focused. The eyebrows are furrowed and drawn together at the center or the forehead. The mouth may assume a pout with a jutting-out of the lower lip. More typically, however, the mouth is open and round or kidney-

shaped (as in the illustration), with the corners downturned. Naso-labial folds are apparent. Together, these cues indicate definite distress in the baby.

8a **Angry cryface:** Expressions in this category are distinguished from those which are rated as typical cryface (#8b) in either of the following ways:

a) The eyebrows are drawn down together in the middle of the forehead, with vertical lines appearing between the brows and, usually, ridges evident higher in the forehead.

b) The mouth is open and is squarish or box-shaped rather than turned-down at the corners or kidney shaped. Naso-labial folds are apparent.

In the angry cryface, the facial features are generally screwed-up, although often not as much as in the more typical cryface expression. In particular, eyes are likely to be open and focused.

8b **Cryface**: Expressions in this category are characterized by the screwing-up of facial features: eyes are narrow and compressed by brow-furrowing, with the result that the infant's gaze is squinted and often nondirected; the nose is wrinkled; the mouth is open (and may be kidney-shaped) with naso-labial folds apparent; eyebrows are lowered in the forehead and narrowed. The infant looks clearly distressed.

Vocal Expression

Please rate the infant's vocal expression of emotion on the following scale. Please take into account differences in intensity, rythmicity, continuity, pitch, and sound quality of infant vocalizations. Please indicate the highest rating criteria met during the fifteen-second segment.

0 **No vocalization** was heard at any time during the scoring interval.

1 **Pleasure vocalization:** This includes squeals or shrieks of delight, cooing, laughing, or other vocalizations denoting excitement or positive engagement in some activity. These are characteristically intermittent, of brief duration, and discontinuous in quality. Pitch varies, but is usually high. Sometimes the baby uses words that have a positive tone; in these instances use the notation 1(w).

2 **Neutral vocalization:** This includes babbling and other vocalizations that have neither a distressed nor a positive quality to them. Like pleasure vocalizations, these are also characteristically intermittent, of brief duration, and discontinuous in quality. Whereas the pitch of pleasure vocalizations is usually high and varies a great deal, the pitch of most neutral vocalizations is characteristically lower and is less variable. Sometimes the baby uses words that have neither a distinctively distressed nor positive tone; in these instances, use the notation 2(W).

3 **Mild distress:** This includes brief, mild whines, squeals of frustration or anguish, mild wails or sobs, fretting, and other vocalizations which have a distinctly negative quality. These are characteristically intermittent, discontinuous, and of brief duration. While not full-fledged crying or calling as such, they nevertheless indicate mild or low level distress in the infant. Sometimes the baby uses words, which have a distressed quality; in these instances, use the notation 3(W).

4 **Calling:** This includes vocalizations, which seem intended to signal or summon the caretaker, and they have a distinctly negative or distressed quality. Like protest crying, there is an imperative tone to this kind of vocalization. In contrast to protest, however, calling is brief and of intermittent duration, is more discontinuous, and conveys much milder distress. Sometimes words are used in this capacity (such as "Ma!Ma!"), and in these instances use the notation 4(W).

5 **Distress gasps:** The infant's breathing has become audible and the rate has increased; the baby is taking breaths in short, quick gasps. What has become audible is the breathing; there is no cry accompanying this. Often, but not always, gasping of this kind occurs as a prelude to a full-fledged cry, or immediately follows a long bout of sobbing.

6 **Fussing or whimpering:** The cry is partial or intermittent rather than continuous over the scoring interval, conveying the impression of

moderate distress. In particular, the pattern of breathing and crying is arhythmic, in contrast to the more rhythmic alternation of cry and inhalation which is more characteristic of sobbing. In fussing, the cry is more intermittent and discontinuous; crying is interrupted frequently. The cry also has a distressed rather than an angry or anxious tone. Pitch may vary widely, but generally is moderate or low.

7 **Whining:** The quality of this cry conveys the kind of moderate distress, which is also characteristic of fussing; in contrast to fussing, however, whining denotes anxiety or frustration rather than clear-cut distress. This is conveyed especially by the tone and pitch of the cry: Whining characteristically has a moderate to high pitch and a strident quality; it is intermittent and discontinuous. Whining also has a demanding or insistent quality, due largely to its persistence over time; in contrast, fussing either tends to cease over the short run or develops into a kind of crying denoting more intense distress. Fussing and whining usually are also distinguished by their characteristic pitch, with whining usually somewhat higher in pitch than fussing/whimpering.

8 **Protest:** This is a hard cry, which sounds as much like shouting as it does crying, and conveys an angry, imperative quality. The cry is typically of a strong intensity; the pitch is characteristically low or moderate. The cry is

usually continuous, with the pattern of cry and inhalation somewhat rhythmic, but not always: An imperative, demanding cry.

9 **Sobbing:** A full-fledged cry denoting clear-cut distress. It lacks the angry, imperative quality of protest. Sobbing is continuous and of moderate to long duration; its rhythmicity is revealed in the regular alternation of crying and inhalation. Sobbing may occur at either moderate or very high intensity, depending on the intensity of distress. Pitch is usually medium to low.

10 **Screaming:** An intense, abrasive cry of high pitch and intensity; the infant sounds as if in pain. This is characteristically a hard cry, and its abrasiveness derives from the high pitch. The cry is usually continuous, and the pattern of cry and inhalation characteristically somewhat rhythmic. Usually there are longer bursts of crying than is the case with sobbing, with similarly lengthened breathing pauses. The infant sounds distressed rather than angry.

11 **Panic Cry:** This cry characteristically comes in three distinct stages: first a long sob which is of greater than usual duration; then a long (almost interminable) pause in which the infant is continuing to exhale but no sound can be heard; and finally an audible inhalation before the next sob.

12 **Hyperventilated Cry:** This is a cry denoting very intense distress, largely due to the rapid alternation of cry and inhalation at a rate which is faster than normal sobbing. The cry is also very intense, continuous and rhythmic.

Postural Indication

Please rate the infant's postural expression of distress on the following scale from 1-5. Please indicate the highest rating criteria met during the fifteen-second segment.

0 **No assessment possible:** The infant is not visible.

1 **No postural indicators of distress:** The infant's behavior continues apparently unaffected, or the infant displays mild curiosity and/or pleasure.

2 **Mild postural indication of distress is present:** The infant averts his gaze from the experimenter, by turning his head or whole body away from the experimenter. The infant may flinch. Play may slow, but doe not stop completely.

3 **Postural indicators of distress present but not severe:** The infant stops play completely. He may seek comfort by crawling into the experimenter's lap or move away from the experimenter. He may also throw toys. The infant may display vigilance, carefully observing either the experimenter, telephone or both, typically from a distance. (Note: this must not be as a result of playful interaction with the experimenter.)

4 **Marked distress indicated:** The infant may cower (curling his shoulders toward his chest and lowering his head) or move away and avoid looking at the experimenter. The infant may also display aggression toward the experimenter or telephone, hitting them once.

5 **Severe distress clearly indicated:** The infant is thrashing limbs as in a tantrum, hiding behind furniture (not playfully as in a "peek-a-boo" game), freezing for long periods of time, clinging to the experimenter, or trying to leave the room. The infant may also display extensive aggression toward the experimenter or telephone, striking them repeatedly, kicking or throwing the phone violently.

Experimenter Simulation of Anger

Please rate the degree to which the experimenter displays anger.

1 The experimenter displays no anger. Her voice is not raised and she does not use intonation to suggest anger.

2 The experimenter displays mild anger or irritation. Her voice is slightly raised and her intonation suggests irritation.

3 Anger is clearly expressed. The experimenter's voice is raised. She expresses emotion and modulates her voice consistently with anger.

Appendix F

Toddler Temperament Scale

Here are some questions about your toddler's temperament. There are no right or wrong or good or bad answers, only descriptions of your toddler. Please base your rating on your toddler's recent and current behavior (the last four to six weeks). Some items may seem alike but are not the same. If an item doesn't apply to your toddler, just mark that it's "not applicable or N/A." Each item is rated on a six-point scale.

The scale used for each question is:

1 = almost never

2 = rarely

3 = variable, usually does not

4 = variable, usually does

5 = frequently

6 = almost always

[Note: Variable means the same thing as changeable.]

Using the scale below, please circle the number that tells how often the toddler's recent and current behavior has been like the behavior described by each item.

1 = ALMOST NEVER 2 = RARELY 3 = VARIABLE, USUALLY DOES NOT

4 = VARIABLE, USUALLY DOES 5 = FREQUENTLY 6 = ALMOST ALWAYS

1 2 3 4 5 6 N/A	1. The child gets sleepy at about the same time each evening (within ½ hour).

1 2 3 4 5 6 N/A	2. The child fidgets during quiet activities (story telling, looking at pictures).
1 2 3 4 5 6 N/A	3. The child takes feedings quietly with mild expressions of likes and dislikes.
1 2 3 4 5 6 N/A	4. The child is pleasant (smiles, laughs) when first arriving in unfamiliar places.
1 2 3 4 5 6 N/A	5. The child's initial reaction to seeing the doctor is acceptance.
1 2 3 4 5 6 N/A	6. The child pays attention to games with parent for only a minute or so.
1 2 3 4 5 6 N/A	7. The child's bowel movements come at different times from day to day (over one hour difference).
1 2 3 4 5 6 N/A	8. The child is fussy on waking up (frowns, complains, cries).
1 2 3 4 5 6 N/A	9. The child's initial reaction to a new baby sitter is rejection (crying, clinging to mother, etc.).
1 2 3 4 5 6 N/A	10. The child reacts to a disliked food even if it is mixed with a preferred one.
1 2 3 4 5 6 N/A	11. The child accepts delays (for several minutes) for desired objects or activities (snacks, treats, gifts).
1 2 3 4 5 6 N/A	12. The child moves little (stays still) when being dressed.
1 2 3 4 5 6 N/A	13. The child continues an activity in spite of noises in the same room.

1 2 3 4 5 6 N/A	14. The child shows strong reactions (cries, stamps feet) to failure.
1 2 3 4 5 6 N/A	15. The child plays continuously for more than 10 minutes at a time with a favorite toy.
1 2 3 4 5 6 N/A	16. The child ignores the temperature of food, whether hot or cold.
1 2 3 4 5 6 N/A	17. The child varies from day to day in wanting a bottle or snack before bedtime at night.
1 2 3 4 5 6 N/A	18. The child sits still while waiting for food.
1 2 3 4 5 6 N/A	19. The child is easily excited by praise (laughs, yells, jumps).
1 2 3 4 5 6 N/A	20. The child cries after fall or bump.
1 2 3 4 5 6 N/A	21. The child approaches and plays with unfamiliar pets (small dogs, cats).
1 2 3 4 5 6 N/A	22. The child stops eating and looks up when a person walks by.
1 2 3 4 5 6 N/A	23. The child seems unaware of differences in taste of familiar liquids (type of milk, different juices).
1 2 3 4 5 6 N/A	24. The child moves about actively when he/she explores new places (runs, climbs or jumps).
1 2 3 4 5 6 N/A	25. The child fusses or whines when bottom cleaned after bowel movement.
1 2 3 4 5 6 N/A	26. The child smiles when played with by unfamiliar adults.
1 2 3 4 5 6 N/A	27. The child looks up from play when mother enters the room.

1 2 3 4 5 6 N/A	28. The child spends over an hour reading a book or looking at the pictures.
1 2 3 4 5 6 N/A	29. The child responds intensely (screams, yells) to frustration.
1 2 3 4 5 6 N/A	30. The child eats about the same amount of solid food at meals from day to day.
1 2 3 4 5 6 N/A	31. The child remains pleasant when hungry and waiting for food to be prepared.
1 2 3 4 5 6 N/A	32. The child allows face washing without protest (squirming, turning away).
1 2 3 4 5 6 N/A	33. The amount of milk or juice the child takes at mealtime is unpredictable from meal to meal (over 2 oz. difference).
1 2 3 4 5 6 N/A	34. The child practices physical activities (climbing, jumping, pushing objects) for under 5 minutes.
1 2 3 4 5 6 N/A	35. The child vigorously resists additional food or milk when full (spits out, clamps mouth closed, bats at spoon, etc.).
1 2 3 4 5 6 N/A	36. The child plays actively (bangs, throws, runs) with toys indoors.
1 2 3 4 5 6 N/A	37. The child ignores voices when playing with a favorite toy.
1 2 3 4 5 6 N/A	38. The child approaches (moves toward) new visitors at home.
1 2 3 4 5 6 N/A	39. The child plays outside on hot or cold days without seeming to notice differences in temperature.

1 2 3 4 5 6 N/A	40. The child continues playing with other children for under five minutes and then goes elsewhere.
1 2 3 4 5 6 N/A	41. The child continues to look at a picture book in spite of distracting noises (car horns, doorbell).
1 2 3 4 5 6 N/A	42. The child wants a snack at a different time each day (over one hour difference).
1 2 3 4 5 6 N/A	43. The child is pleasant (smiles) when put down for nap or at night.
1 2 3 4 5 6 N/A	44. The child takes several days to get used to (show usual behavior in) new situations away from parent (play group, day care center, sitter).
1 2 3 4 5 6 N/A	45. The child speaks (or vocalizes) right away to unfamiliar adults.
1 2 3 4 5 6 N/A	46. The child reacts strongly (cries or screams) when unable to complete a play activity.
1 2 3 4 5 6 N/A	47. The child enjoys games with running and jumping over games done sitting down.
1 2 3 4 5 6 N/A	48. The child notices wet clothing, and wants to be changed right away.
1 2 3 4 5 6 N/A	49. The child is fussy or moody throughout a cold or an intestinal virus.
1 2 3 4 5 6 N/A	50. The child ignores parent's first call while watching a favorite TV program.

1 2 3 4 5 6 N/A	51. The child loses interest in a new toy or game within an hour.
1 2 3 4 5 6 N/A	52. The child runs to get where he/she wants to go.
1 2 3 4 5 6 N/A	53. For the first few minutes in a new place (store, home or vacation place) the child is wary (clings to mother, holds back).
1 2 3 4 5 6 N/A	54. The child takes daytime naps at differing times (over ½ hour difference) from day to day.
1 2 3 4 5 6 N/A	55. The child reacts mildly (frown or smile) when his/her play is interrupted by parent.
1 2 3 4 5 6 N/A	56. The child accepts being dressed and undressed without protest.
1 2 3 4 5 6 N/A	57. The child is outgoing with adult strangers outside the home.
1 2 3 4 5 6 N/A	58. The child runs ahead when walking with the parent.
1 2 3 4 5 6 N/A	59. The child's period of greatest physical activity comes at the same time of day.
1 2 3 4 5 6 N/A	60. The child can be coaxed out of a forbidden activity.
1 2 3 4 5 6 N/A	61. The child stops play and watches when someone walks by.
1 2 3 4 5 6 N/A	62. The child goes back to the same activity after brief interruption (snack, trip to toilet).
1 2 3 4 5 6 N/A	63. The child laughs or smiles when meeting other children.
1 2 3 4 5 6 N/A	64. The child sits still while watching TV or listening to music.

1 2 3 4 5 6 N/A	65. The child will avoid repetition of misbehavior if punished firmly once or twice.
1 2 3 4 5 6 N/A	66. The child continues to play with a toy in spite of sudden noises from outdoors (car horn, siren, etc.)
1 2 3 4 5 6 N/A	67. The child ignores dirt on himself/herself.
1 2 3 4 5 6 N/A	68. The child's time of waking in the morning varies greatly (by 1 hour or more) from day to day.
1 2 3 4 5 6 N/A	69. The child has moody or "off" days when he/she is fussy all day.
1 2 3 4 5 6 N/A	70. The child reacts mildly (frown or smile) when another child takes his/her toy.
1 2 3 4 5 6 N/A	71. The child stays with a routine task (dressing, picking up toys) up to 5 minutes or more.
1 2 3 4 5 6 N/A	72. The child stops eating and looks when he/she hears an unusual noise (telephone, doorbell).
1 2 3 4 5 6 N/A	73. The child sits still (moves little) during procedures like hair brushing or nail cutting.
1 2 3 4 5 6 N/A	74. The child shows much body movement (stomps, writhes, swings arms) when upset or crying.
1 2 3 4 5 6 N/A	75. The child is pleasant (smiles, laughs) during face washing.
1 2 3 4 5 6 N/A	76. The child's initial reaction at home to approach by strangers is acceptance (looks at, reaches out).

1 2 3 4 5 6 N/A	77. The child is hungry at dinner time.
1 2 3 4 5 6 N/A	78. The child continues to get into forbidden areas or objects in spite of parents' repeated warnings.
1 2 3 4 5 6 N/A	79. The child stops to examine new objects thoroughly (5 minutes or more).
1 2 3 4 5 6 N/A	80. The child ignores odors (cooking, smoke, perfume) whether pleasant or not.
1 2 3 4 5 6 N/A	81. The child looks up from an activity when he/she hears the sounds of children playing.
1 2 3 4 5 6 N/A	82. The child falls asleep at about the same length of time after being put to bed.
1 2 3 4 5 6 N/A	83. The child greets babysitter loudly with much expression of feeling whether positive or negative.
1 2 3 4 5 6 N/A	84. The child is moody for more than a few minutes when corrected or disciplined.
1 2 3 4 5 6 N/A	85. The child sits still (little squirming) while traveling in car or stroller.
1 2 3 4 5 6 N/A	86. The child watches TV for under 10 minutes, then turns to another activity.

1 2 3 4 5 6 N/A	87. The child is shy (turns away or clings to mother) on meeting another child for the first time.
1 2 3 4 5 6 N/A	88. The child is still wary of strangers after 15 minutes.
1 2 3 4 5 6 N/A	89. The child frets or cries when first learning a new task (dressing self, picking up toys).
1 2 3 4 5 6 N/A	90. The child sits quietly in the bath.
1 2 3 4 5 6 N/A	91. The child practices a new skill (throwing, piling, drawing) for 10 minutes or more.
1 2 3 4 5 6 N/A	92. The child ignores differences in taste or consistency of familiar foods.
1 2 3 4 5 6 N/A	93. The child sleeps poorly (restless, wakeful) in new places for first 2 or 3 times.
1 2 3 4 5 6 N/A	94. Child is fearful of being put down in an unfamiliar place (supermarket cart, new stroller, playpen) with parent present.
1 2 3 4 5 6 N/A	95. The child frowns or complains when left to play by self.
1 2 3 4 5 6 N/A	96. The child accepts within 10 minutes (feels at home, at ease) new surroundings (home, store, play area).
1 2 3 4 5 6 N/A	97. The child looks up from play when the telephone or doorbell rings.

Appendix G

Consent Form

Thank you for participating in the first two interviews for this study. This study is part of a survey of women in Michigan, some of whom may be experiencing domestic violence. We hope to learn about the strengths that you bring to your situation, your feelings, your perceptions of your baby, and your relationships with others, including family members, partners, and friends. We hope to use this information to help plan better programs for families experiencing domestic violence.

If you decide to take part in the survey today, you will be asked questions about how you have been feeling recently, events that have happened to you in the last year, and your feelings about your baby and the people in your life who provide support for you. You will also be asked to participate in some play with your baby that will be videotaped. Your baby will also play with some toys and games with an interviewer for about an hour. The total interview will take about 3-4 hours. You will be paid $75 for your participation and you will also receive a toy for your baby.

All information that you give us will be kept strictly confidential among the project staff. Your name or your baby's will not be on any questionnaires and videotapes; an identification number will be put on them instead. All questionnaires and videotapes will be kept in locked file cabinets in a locked office. Your identity will not be revealed in any reports written about this study. We will summarize information from all study participants and will not report information about yourself or any individuals. Your privacy will be protected to the maximum extent allowable by law.

The only exception to full confidentiality is in the case of ongoing child abuse or neglect. If you indicate that child abuse or neglect is occurring in your household, we are required to make a report to Child Protective Services. We would inform you if we thought we needed to make such a report.

You have the right to refuse to answer any questions or to withdraw from this study at any point during the interview with no penalty or negative consequences. Your decision about whether to participate or not will not affect your relationship with any agencies or Michigan State University. If you have any questions, please ask us. If you have any questions about the study later, you can contact Dr. Anne Bogat or Dr. Alytia Levendosky at (517) 432-1447. If you have questions about your rights as a participant in this research study you may contact Dr. David Wright at 355-2180.

We may be interested in recontacting you 2 years after the birth of your baby. At the end of the interview today, we will ask you to update the contact information that we have for you. Your participation today does not obligate you to participate in any future interviews.

I have read this form and agree to participate.

_____	_____
Signature of Participant	Date
_____	_____
Witness	Date

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