

Domestic violence and vagal reactivity to peer provocation

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Abstract

This paper examined whether individual differences in children's vagal reactivity to peer provocation were related to domestic violence within the family. It also examined the question of whether conduct-problem children who show vagal augmentation to peer provocation come from families with high levels of domestic violence. During the peer provocation, children were expecting to interact with a difficult peer while vagal reactivity was assessed. Groups were divided into children who showed vagal augmentation and vagal suppression to the stressful peer interaction. Findings indicated that conduct-problem children who showed vagal augmentation to interpersonal challenge came from families with the highest levels of domestic violence. Vagal augmentation was also associated with a greater number of conduct-related problems for those children exposed to high levels of domestic violence. Discussion highlights the role of individual differences in physiological reactivity in understanding children's behavior problems in relation to domestic violence.

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1. Domestic violence and vagal reactivity to peer provocation

In his seminal paper, Porges (1995) suggested that the tonus of the vagus nerve provides a theoretical basis for the child's ability to focus attentional processes, inhibit irrelevant activity, regulate emotion, and appropriately engage with the environment. While early work on vagal tone largely examined individual differences in baseline vagal functioning, more recently investigators have turned their attention to understanding individual differences in children's physiological response to environmental challenge (e.g., Calkins and Dedmon, 2000).

In general, children's ability to suppress vagal tone has been found to be the adaptive response to challenge. In infancy, a reduction in vagal tone during challenging situations is related to better state regulation, greater self-soothing and more attentional control. For example, DeGangi et al. (1991) reported that regulatory-disordered infants with high vagal tone exhibited the least vagal suppression during cognitive challenge. Infants who exhibited relatively small reductions in vagal tone during administration of the Bayley Scales were

rated by their mothers as more aggressive, more depressed, and more withdrawn at age 3 than were infants who exhibited larger vagal reductions (Porges et al., 1996). Similarly, reductions in vagal tone have also been linked with fewer behavior problems and more appropriate emotion regulation in toddlers and preschoolers (Calkins, 1997; Calkins and Dedmon, 2000; Porges et al., 1996) and sustained attention in school-aged children (Suess et al., 1994).

Yet recent findings suggest that some children not only fail to suppress vagal tone but also may in fact exhibit vagal augmentation during challenge. For example, DiPietro et al. (1992) found that infants who showed increases in vagal tone during presentation of a surprising stimulus (i.e., a jack-in-the-box toy) were more attentive to the stimulus than infants who showed decreases in vagal tone. However, the psychological significance of an augmentation in vagal reactivity is unclear. DiPietro et al. (1992) interpreted their findings to suggest that in infants vagal augmentation may reflect heightened attentiveness and the ability to detect environmental change. This interpretation is consistent with Porges' (1995) Social Engagement System model, which would predict that enhanced parasympathetic activation would occur during increased engagement with the environment. Increased attentiveness may help the child resist unintentional shifting to irrelevant or distracting information and, in the context of challenging circumstances, support emotion regulation efforts necessary for

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the child to effectively manage the challenge (Derryberry and Rothbart, 1988; Wilson and Gottman, 1996).

At the extreme, increased engagement or attentiveness may reflect hypervigilance to environmental events. Hypervigilance may develop in response to threatening environmental conditions, and may in fact be an adaptive response to particularly challenging life circumstances. For children, the family is a key social context that fosters socioemotional development. In family environments in which threat and hostility are habitual and salient social processes, children may learn to become hypervigilant to even mild forms of interpersonal negativity, as they portend escalation in conflict and may signal the potential for harm to themselves or family members. Children in these types of family environments may show heightened parasympathetic activation, particularly when they are in social situations that are stressful or conflictual since these types of settings may be reminders of the negative interactions they have observed at home (Katz, 2001).

In this paper, we examine vagal augmentation in children and its relation to the interpersonal environment. Exposure to domestic violence is examined as a salient interpersonal context that may be associated with vagal augmentation. Katz (2001) suggested that children from domestically violent homes may need to be hypervigilant to their surroundings, scanning their environment for cues of threat so that threat is detected early and an action plan can be developed. In this way, hypervigilance may help the children effectively monitor their own safety and support the emotion regulation efforts necessary to prepare for danger.

To the extent that vagal augmentation indexes hypervigilance, children who exhibit conduct-problem behavior may be particularly likely to show a heightened parasympathetic response since they have been described as being hypervigilant to interpersonal threat. Social information processing models suggest that aggressive children have a hostile attributional bias, characterized by a tendency to see hostility in the environment even with ambiguous social cues (Crick and Dodge, 1994). Because children with conduct problems have a tendency towards hypervigilance, they may be particularly sensitized to domestic violence and may be at risk for developing a pattern of heightened parasympathetic activation that generalizes to other difficult interpersonal situations. That is, one possibility is that for conduct-problem children vagal augmentation develops in response to a hostile and threatening social environment. If this is the case, we would expect that for conduct-problem children, vagal augmentation will be associated with higher levels of domestic violence while for typically developing children, there would be less of an association between vagal augmentation and domestic violence.

A related possibility is that vagal augmentation to interpersonal challenge is an endophenotype (e.g., Gottesman and Gould, 2003; Iacono, 1998) of those at risk for conduct-problems. An endophenotype is a heritable internal phenotype discoverable by analysis of biological functioning (Gottesman and Gould, 2003) that functions as a vulnerability factor. If vagal augmentation to interpersonal challenge is an endophenotype of

risk for conduct problems, growing up in a family environment with high levels of violence may act as a catalyst and increase the child's likelihood of exhibiting conduct-problem behaviors. To the extent that this is true, vagal augmentation should be associated with a greater number of conduct-related problems for those children exposed to high levels of domestic violence.

Both of these hypotheses will be tested in the present study. To provide a context for these arguments, we begin with a review of findings related to domestic violence and child adjustment. We then review the current state of knowledge on domestic violence and children's vagal functioning, and suggest that examining vagal tone to interpersonal stress that is personally relevant more closely indexes their physiological response to the stressful interpersonal interactions children exposed to domestic violence experience in their daily home lives. The notion of individual differences in children's vagal response to domestic violence is then discussed, and hypotheses related to differential reactions of conduct-problem children to exposure to DV are presented.

1.1. Domestic violence and child adjustment

One of the most salient contexts for children's development is the family environment, and when family relations go awry, children exhibit a variety of behavior problems (Mash and Barkley, 2003). Being exposed to domestic violence (DV) is perhaps one of the most stressful life circumstances for children. Consequently, children from domestically violent homes show a variety of mental health problems. One of the most consistent findings is that children from DV homes show externalizing problems, such as aggression, delinquency, and hostility towards others (Fantuzzo et al., 1991; Jouriles et al., 2001; Jaffe et al., 1986; O'Keefe, 1994; Wolfe et al., 1985; Wolfe and Korsch, 1994). They are also at increased risk for difficulties with anxiety (Christopolous et al., 1987; Hughes, 1988), depression (Spaccarelli et al., 1994; Sternberg et al., 1993), and self-esteem (Hughes, 1988).

The majority of research on children exposed to DV has examined children's global psychological functioning, perhaps because of its over-reliance on parental report of child functioning. Little is known about the specific contexts that are most difficult for children who have experienced DV. Observational studies of marital and parent-child interaction suggest that children of battered women live in a family environment characterized by high levels of anger and hostility. When attempting to resolve marital conflict, DV couples use more provocative forms of negative effect such as contempt and belligerence than their maritally distressed but nonviolent counterparts (Burman et al., 1992; Jacobson et al., 1994; Margolin et al., 1988), escalate negative interactions by reciprocating their partner's negative effect (Coan et al., 1997), and are less likely to accept influence from their partners (Coan et al., 1997). In studies of parenting, domestic violence is associated with increased levels of conflict and controlling behavior (Holden and Ritchie, 1991; Margolin et al., 1996), and higher rates of parent-child aggression (Jouriles and Norwood, 1995; O'Keefe, 1995a,b). Since their family environments are

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