p-ISSN: 2184-2205 e-ISSN: 2184-3414 ISBN: 978-989-35106-6-7 © 2024

FATHER-CHILD RELATIONSHIP, PARASYMPATHETIC NERVOUS SYSTEM ACTIVITY AND AGGRESSIVE BEHAVIOR

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Abstract

Parent-child relationship has been widely known to have impacts on child's behavior. However, most of the prior work has focused on mothers, often neglecting fathers. In this study, we investigated the effect of father-child relationship on child's aggressive behavior, and the extent to which this association is influenced by child's autonomic arousal level. Adolescents (13-16 years; n = 83) from the community reported on their aggressive behavior and their relationship with both parents. Their respiratory sinus arrhythmia (RSA), a measure of parasympathetic nervous system activity, were recorded during a 2-min rest period. We found that father discord was significantly associated with both proactive and reactive aggression, and the effect was stronger among children who had high resting RSA. Discordant relationship with mothers were not associated with either type of aggression, although mother discord was found to be associated with proactive aggression, but only in those with high RSA. Findings highlight the role of fathers in child rearing and provide further support to the biological sensitivity to the context theory (Boyce & Ellis, 2005) by demonstrating that negative parent-child relationships contribute to children's aggressive behavior among those who are more biologically susceptible to the impact of environment.

Keywords: *Aggression, biosocial, biological sensitivity to context, arousal, fathers.*

1. Introduction

Parent-child relationship and parenting have been widely known to have impacts on child's aggressive behavior, but the emphasis has mainly focused on mothers. Among the few that have examined the impact of fathers, evidence indicates that negative father-child relationships are associated with greater child conduct problems (Murray et al., 2014). However, little is known if father's role may differ in predicting two subtypes of aggression: reactive and proactive aggression. Reactive aggression refers to aggressive behavior that is characterized by impulsive, hostile, affective, and uncontrolled angery responses to frustration or provocation, whereas proactive aggression is predatory, controlled, and instrumental and is used to obtain rewards (Crick & Dodge, 1996; Raine et al., 2006). Although both types have been associated with antisocial behavior, it has been argued that they may have distinct etiologies (Hubbard et al., 2010). One aim of the current study was to explore if father-child relationship has different impacts on two types of aggression.

In addition, the effect of parenting on child's behavior may be a function of child's sensitivity to the environment. It has been theorized that children with higher physiological reactivity are more sensitive to their social environments (Boyce & Ellis, 2005; Ellis & Boyce, 2008). That is, highly reactive children display poorer behavioral and health outcomes in harmful contexts such as adverse neighborhoods or discordant parent-child relationships. Studies have demonstrated that respiratory sinus arrhythmia (RSA) may moderate the relationship between parenting and child's behavioral problems. For example, negative interaction with parents were found to predict lower adolescents' empathic concerns for boys with high resting RSA (Van der Graaff et al., 2016), and environmental quality negatively predicted toddlers' aggression for those with high resting RSA (Eisenberg et al., 2012). RSA reflects the activity of the parasympathetic nervous system (PNS) that regulates 'rest-and-digest' functions that maintain homeostasis and support relaxation and restoration (Porges, 2007), and high levels of RSA may support youth's active engagement with social environments, reflecting more sensitivity to environmental influences. Therefore, we hypothesized that the effect of father-child relationship quality on child's aggression be stronger for those with high RSA.

2. Methods

2.1. Participants

Adolescents (n = 83, age 13-16 years; 54% female) and their main caregivers from the community were invited to the laboratory for a 2-h testing. Youths completed questionnaires to report their aggression and parent-child relationships. Psychophysiological data were recorded during the 2-m rest period when they were asked to sit still. All families were debriefed in the end and compensated for their participating. Procedures were approved by the institutional IRB.

2.2. Measures and procedures

2.2.1. Reactive-proactive aggression questionnaire. (RPQ; Raine et al., 2006). It includes 11 items assessing reactive aggression and 12 items assessing proactive aggression. For each item, they rated the frequency of occurrence on a scale of 0 (never), 1 (sometimes), or 2 (often). The internal reliability was 0.82 and 0.81 for reactive and proactive aggression scale, respectively.

2.2.2. Network of relationship inventory – relationship quality version. (NRI-RQV; Buhrmester & Furman, 2008). It is a 30-item scale that asks about positive (e.g., companionship, intimate disclosure, satisfaction, emotional support, and approval) and negative dimensions (e.g., conflict/quarreling, criticism, pressure, dominance, exclusion) regarding youths' interpersonal relationships. They rate how frequently each trait occurs in their relationship with each parent using a 5-point Likert scale from "1=Never/Hardly at all" to "5=Always/Extremely Much". The sum of all negative dimensions for each parent was computed to create a Discord score for that parent. In our sample, the Cronbach's alpha values were .77 and .78 for mother discord and father discord, respectively.

2.2.3. RSA data acquisition and quantification. All physiological data were obtained using a BIOPAC MP 150 system (BIOPAC Inc., CA). RSA was derived from the ECG100C amplifier with a band pass filter of 35 Hz and 1.0 Hz and a RSP100C respiration amplifier with a band pass filter of 1.0 Hz and 0.05 HZ. RSA was computed in milliseconds as the difference between the minimum and the maximum R-R intervals during respiration.

3. Results

3.1. Father discord and proactive/reactive aggression

Hierarchical linear regression showed that after controlling for sex, age, and race, father discord was positively associated with proactive aggression (B = 0.58, SE = 0.28, t = 2.06, p = .04). The father discord by RSA interaction was also significant (B = 0.02, SE = 0.01, t = 2.89, p = .005). Simple slope analysis showed that high father discord was associated with more proactive aggression at high (B = 1.37, SE = 0.45, t = 3.06, p < .001) but not low RSA (B = -0.26, SE = 0.34, t = -0.76, p = .45). See Figure 1a.

Similarly, father discord was positively associated with reactive aggression (B= 1.73, SE = 0.68, t = 2.54, p = .01). The discord by RSA interaction was significant (B = 0.03, SE = 0.01, t = 2.53, p = .01). High father discord was associated with more reactive aggression at high (B = 3.39, SE = 1.08, t = 3.15, p < .001) but not low RSA (B = -0.05, SE = 0.82, t = - 0.06, p = .96). See Figure 1b.

3.2. Mother discord and proactive/reactive aggression

Mother discord was not significantly associated with proactive aggression (B = 0.31, SE = 0.33, t = 0.95, p = .35). The mother discord by RSA interaction was significant (B= .02, SE = .01, t = 2.72, p = .008). High mother discord was associated with more reactive aggression at high (B = 1.20, SE = 0.53, t = 2.26, p = .03) but not low levels of RSA (B = -0.60, SE = 0.39, t = - 1.55, p = .12). See Figure 1c.

Mother discord was not significantly associated with reactive aggression (B = 1.08, SE = 0.80, t = 1.35, p = .18). Finally, the mother discord by RSA interaction was marginally significant (B = 0.03, SE = 0.02, t = 1.70, p = .09).

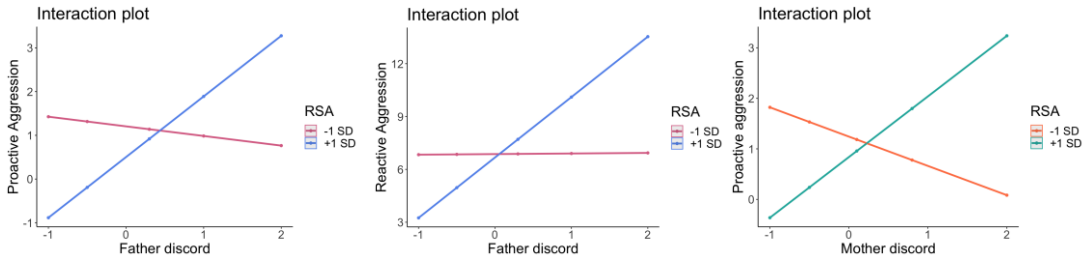
4. Discussion

The purpose of the study was to examine if father-child relationship quality was differently associated with the reactive and proactive aggression, and whether RSA moderates the relationships. Our findings indicated that father discord was linked to aggression, regardless of type, and that the effects

were significant for youths with high RSA but not low RSA. Mother's discord was also associated with proactive aggression in those with high RSA only. These findings are consistent with the biological sensitivity to the context theory (Boyce & Ellis, 2005) and provide further evidence that high resting RSA may reflect high levels of sensitivity to environmental influences.

It is important to note that both parent-child relationship and child's aggression were reported by youths. We cannot tease out the possibility that children who score high on aggression tend to rate their relationship quality with parents, in particular with father, as low. This could in turn partly explain our finding that the effect of father discordant was stronger than that of mother discord. Another limitation is its moderate sample size, which prevented us from examining unique effects for each sex. Future longitudinal studies with larger samples are needed to investigate the directionality and sex-specific effects.

Figure 1. Father discord was associated with proactive (a) and reactive (b) aggression at high RSA only. Mother discord was associated with proactive aggression at high RSA only (c).



Acknowledgments

We would like to thank the Psychophysiological Lab research staff for their assistance in collecting and processing data, and the families for participating. Research reported in this publication was supported by the National Institutes of Health to Y.G. under awards numbers SC2HD076044 and SC1GM127243. The content is solely the responsibility of the authors and does not represent the official views of the National Institutes of Health.

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