



Linking testosterone and antisocial behavior in at-risk transitional aged youth: Contextual effects of parentification

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ABSTRACT

Parentification refers to parents bestowing adult-like roles on children within families, and studies have linked parentification to individual differences in risk and resilience. The depth of our understanding of the pathways that translate parentification into risk for negative developmental outcomes remains shallow. This study examined whether parentification has a *contextual effect* moderating the expression of links between testosterone and antisocial behavior. Eighty-three participants (M age = 21.37 years, SD = 1.87; 48% Black; 60% female) were interviewed initially and one year later. Audio Computer Assisted Self-Interview methods were used to measure parentification and antisocial behavior. Saliva was sampled on multiple occasions and later assayed for testosterone. Results revealed, for both sexes, testosterone was positively associated with antisocial behavior at baseline and at follow-up when participants scored low on perceived benefits of parentification. This relationship became weaker as levels of perceived benefits of parentification increased. At the highest levels of perceived benefits of parentification, testosterone and antisocial behavior were inversely related. The findings suggest a potentially important role for perceptions of parentification as a moderator for the expression of hormone-behavior relationships and are discussed in terms of implications for the biosocial model of the family.

1. Introduction

Increasing evidence shows that the expression and nature of the association between testosterone and behavior in humans is largely contingent upon social contextual forces. This phenomena, the *context contingency effect*, is a core concept of many contemporary biosocial interactive theoretical frameworks, including the biosocial model of the family (Booth et al., 2000; Dariotis et al., in preparation). This study aims to advance our understanding of the complex determinants of human antisocial behavior (i.e., rule breaking behavior and aggressive behavior) by testing how a prominent feature of dysfunctional families, parents bestowing developmentally inappropriate adult-like roles on their children (i.e., parentification), moderates the expression and direction of the association between testosterone and antisocial behavior.

1.1. Testosterone, problem behavior, and social context

Consistent with findings from animal studies (e.g., Allee et al., 1939; Beeman, 1947; Svare, 1983), research with prison inmates suggests that higher testosterone levels may be associated with violence (Dabbs et al., 1995; Dabbs and Hargrove, 1997; Dabbs et al., 2001). Meta-analyses, however, reveal that the direct bivariate association between testosterone and aggression in humans is weak at best (Archer et al., 2005; Book and Quinsey, 2005; Book et al., 2001). In an effort to explain the discrepancy between the animal and human literatures, researchers have proposed that testosterone's links with behavior are with dominance instead of aggression in humans (Mazur and Booth, 1998). Others have suggested that actual or perceived challenge of, or competition for, status regulates testosterone dynamics in humans (Archer, 2006; Carre and Olmstead, 2015). Investigators have also proposed a biosocial explanation wherein the expression of the testosterone-

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behavior association in humans is highly dependent on social contextual forces (Booth et al., 2003; Booth and Osgood, 1993; Sapolsky, 2017). One commonality among the alternative explanations for the weak testosterone-aggressive behavior link is the realization that for humans contextual factors matter – either in the short-term to regulate testosterone dynamics (“winner-loser effect”: winning stimulate testosterone secretion, see Archer, 2006; Carre et al., 2010) or to influence the expression of a testosterone-behavior link (“context-contingency effect”; see Sapolsky, 2017).

Consistent with the general notion of *context-contingency*, Mazur (1995) reported that a biosocial model involving testosterone and social factors better predicted delinquent behavior than a simple additive model of testosterone and social factors. Similarly, in a large sample of military veterans ($N > 4000$), the positive association between testosterone and delinquency/deviance was much stronger among men with low socioeconomic status (Dabbs and Morris, 1990) and among men with low social integration (Booth and Dabbs, 1993). Hence, incorporating context is informative in testosterone-behavior research.

Only several studies have tested the *context contingency effect* of testosterone on behavior in youth. Using data from rural middle- and working- class families with youth age 6–18 years ($N = 400$; 97% White), Booth et al. (2003) showed that when parent-child relationship quality was low, testosterone was positively associated with rule breaking behavior; when parent-child relationship quality was high, testosterone was negatively associated with rule breaking behavior. A longitudinal study involving over 700 adolescents ($< 10\%$ African American) revealed that testosterone was associated with rule breaking behavior in boys with deviant peers, but was associated with leadership behavior in boys with non-deviant peers (Rowe et al., 2004). Moreover, Fang et al. (2009) found that in low cohesion families (predominantly Whites), testosterone was positively linked to boys' delinquent behavior but was negatively associated with girls' delinquent behavior. Most recently, a study with urban youth ($> 80\%$ African Americans) found that testosterone was positively associated with proactive aggression in boys and girls when they experienced more harsh discipline from their parents; but testosterone was negatively associated with reactive aggression in boys and proactive aggression in girls when they had low levels of harsh discipline (Chen et al., 2018).

These studies differ substantially in the social context of interest, behavioral assessments, and participant characteristics such as age and race, which reveals limits of our knowledge of how robust and applicable the *context contingency effect* might be across diverse families, groups, social ecologies, and cultures. Nonetheless, the biosocial research on testosterone does suggest a common theme – that adverse contextual factors, such as high levels of harsh discipline, low quality of parent-child relationships, and more deviant peers, increase the probability of the expression of a positive association between testosterone and antisocial behavior.

The possibility that *context-contingency effects* could operate to influence the expression of a positive relationship between testosterone and prosocial outcomes (or decline in negative outcomes) has rarely been considered. Interestingly, this is consistent with the main tenants of the *Differential Susceptibility Hypothesis* (Belsky and Pluess, 2009), which highlights the varying degrees of susceptibility to the environmental influences that individuals have. Those with high levels of susceptibility benefit most from enriched/nurturing environments but are also influenced the most by adversity in terms of their behavior outcomes; and those with low susceptibility do not have much fluctuation in terms of their behavior outcomes whether they are in an enriched/nurturing or adverse environment. It is tempting to speculate that testosterone could operate as a susceptibility factor for antisocial behavior outcome. The empirical findings provided some support for this conceptualization (e.g., Booth et al., 2003; Chen et al., 2018). The increasing recognition of the testosterone dynamic provides additional rationale for such conceptualization. Testosterone level is not fixed or changes only as a result of biological maturation. Instead, testosterone

interacts with situational factors and displays situational change. This is evident in the large literature exploring the winner-loser effect where individuals' prior winning experience in competition increased their subsequent testosterone levels (Carre and Olmstead, 2015; Eisenegger et al., 2011). If testosterone could change under situational influences (e.g., winning or losing), it is possible that testosterone adjusts its set points to accommodate and adapt to the broader environment. This is supported by empirical findings regarding changes in testosterone when men marry/divorce or have children (Gettler et al., 2011; Mazur and Michalek, 1998).

Summarizing the nature of the association between testosterone and human behavior, Sapolsky notes that testosterone does not cause behavior, instead it increases the probability that behavioral tendencies that already exist are expressed given appropriate contextual demands (Sapolsky, 2017). Reviewing evidence across two decades, researchers interested in the expression of testosterone-behavior link among youth have focused their research attention on *context-contingency effects*, specifically within the context of the family (see reviews by Booth et al., 2000; D'Onofrio and Lahey, 2010).

1.2. Parentification

Within the context of the family, the natural social-structural hierarchy imposes many responsibilities onto parents including care-giving, teaching, socialization, financial support, and discipline roles. As articulated in Minuchin's family system theory, a hierarchy of power exists among the family subsystems, “with the parental subsystem ‘on top’ vis-à-vis the offspring subsystem” (Miller, 2011, p. 8). Clear hierarchical boundaries between parents and children are considered by family scholars to be critical to healthy family and children's positive development (e.g., Minuchin et al., 1967). The dissolution in the family structural boundaries, and process where “parents relinquish executive function of the family by delegating instrumental roles to a child or by totally abandoning family psychologically or physically” is referred to as *parentification* (Minuchin et al., 1967, p. 219). Other terms describing a similar process include spousification, adultification, and “little parents” (e.g., Burton, 2007; Byng-Hall, 2008). The alteration of such boundaries and shift in power hierarchy has important implications for children's behavioral and moral development, which could also alter the expression of testosterone-behavior link among youth.

Parentification is considered particularly detrimental when youth are forced to assume tasks that go beyond their developmental abilities and coping skills and when they do not receive adequate support or acknowledgement (Jurkovic, 1997; Patterson, 2002). Parentification is associated with both internalizing and externalizing behavior problems in youth. A retrospective study of female college students shows that parentification was linked to depression and anxiety (Jacobvitz and Bush, 1996). Prospective studies revealed that (a) parentification during the toddler and preschool periods predicted externalizing problems in later years (Macfie et al., 2005), (b) parentification predicted adolescent's internalizing problems a year later (Van Loon et al., 2017), and (c) parentification in adolescence was associated with increased emotional distress, substance use and conduct problems 6 month later (Stein et al., 1999).

In contrast, early theoretical work acknowledged that parentification could be a normal relationship process and is not necessarily pathological (Boszormenyi-Nagy and Spark, 1973). Jurkovic (1997) introduced *adaptive parentification* to describe circumstances where youth assume parental roles of moderate intensity in a time-limited manner and their contributions are appreciated. In such circumstances, parentification could influence youth development in a beneficial manner by providing youth with opportunities to master socialization skills as well as lessons in responsibility and self-reliance that contribute to healthy identity formation and self-esteem. Consistent with this proposition, recent studies revealed that early parentification among children of parents with HIV/AIDS predicted more adaptive coping

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