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# Assessing the salience of gene–environment interplay in the development of anger, family conflict, and physical violence: A biosocial test of General Strain Theory

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ABSTRACT

*Purpose:* Agnew (2014) has recently called for future research on General Strain Theory (GST) to focus on examining the interplay between genetic and environmental factors in order to more accurately understand the developmental origins of antisocial behavior. The current study aimed to answer this call by using kinship pair data from a longitudinal population-based sample.
*Methods:* Behavioral genetic methods were used to assess gene–environment interplay between anger, family conflict, and violence using a subsample of kinship pairs drawn from the Child and Young Adult Supplement of the National Longitudinal Survey of Youth.
*Results:* Results revealed a significant shared genetic liability for anger and exposure to family conflict indicating gene–environment correlation (*r*GE). After controlling for *r*GE, nonshared environmental effects on anger were found to be stronger at higher levels of family conflict implying that family conflict experiences unique to each sibling were involved in creating individual differences in anger. Results also suggested that genetic and nonshared environmental effects accounted for the longitudinal association between anger and physical violence.
*Conclusions:* Findings from the current study underscore the importance of using genetically informed methodologies to identify underlying risk factors involved in both exposure and response to different forms of strain.
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Over the past 20 years, General Strain Theory (GST) has emerged as one of the most studied and tested individual-level theories of crime and delinquency. During this time, results from numerous studies have shown that exposure to various sources of strain increases the risk for violent and non-violent offending (Agnew, 2007). Research suggests, for instance, that peer rejection, homelessness, and other forms of victimization are associated with higher levels of antisocial behavior among youth (Agnew, Brezina, Wright, & Cullen, 2002; Baron, Forde, & Kennedy, 2001; Botchkovar, Tittle, & Antonaccio, 2009; Jang & Johnson, 2003), with one of the most consistent criminogenic strains being family conflict. While Agnew has argued that prosocial environmental influences may protect individuals from the negative effects of different strains, an extensive line of GST research has found that exposure to family conflict is a consistent predictor of violent youth behavior (Agnew & White, 1992; Aseltine, Gore, & Gordon, 2000; Cheung, Ngai, & Ngai, 2007; Hollist, Hughes, & Schaible, 2009; Sigfusdottir, Farkas, & Silver, 2004). Overall, these findings support Agnew's GST arguments that high levels of family conflict present negative stimuli, which in turn, likely increase individual resentment or anger towards others and elevate the risk for aggression. Less understood from a GST perspective, however, is why only some individuals exposed to high levels of family conflict engage in violent behavior while others do not.

While previous research has found evidence of links between family conflict, anger, and violent behavior, it remains unclear how much family conflict contributes to the risk for violent behavior since the likelihood of maltreatment and violence within a family may be partially due to common genetic and environmental influences. For example, high levels of genetically influenced anger may increase over time due to continued exposure to physical and/or verbal conflict among biologically related family members who also exhibit similar levels of anger. Indeed, recent GST research has shown that youth who develop negative emotionality later in life are more likely to have abusive biological parents who possess high levels of negative emotionality themselves (Agnew & Brezina, 2012). Although Agnew has argued that varying levels of exposure to strain as well as differences in emotional responses to strain are most likely dependent upon personality traits (e.g., anger), "which are in part biologically based" (Agnew, 2014, pg. 190), no criminological research to date has investigated the interplay between

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genetic and environmental influences on anger, family conflict, and violent behavior. This is surprising given that during the past decade, behavioral scientists have increasingly used methodologies to evaluate how individual genetic differences for maladaptive behaviors are associated with exposure to different environments (Bakermans-Kranenburg, van IJzendoorn, Pijlman, Mesman, & Juffer, 2008; Cheung, Harden, & Tucker-Drob, 2014; Propper, Willoughby, Halpern, Carbone, & Cox, 2007). To date, however, GST research has been slow to adopt this integrative biosocial approach. As a result, much is unknown about the underlying biological and environmental influences on key GST concepts. Specifically, virtually nothing is known about (1) whether and to what extent exposure to family conflict conditions the influence of genetic effects on anger and (2) the magnitude of genetic and environmental effects on the link between anger and future physical violence.

Against this backdrop, the current study utilizes a biosocial approach to examine the dynamic links between genetic and environmental influences involved in the development of anger, family conflict, and physical violence. The primary goal of the present study is to advance current conceptualizations of the GST perspective by elucidating biosocial processes involved in creating individual differences in exposure and response to strain. A more complete understanding of the etiological basis to variation in exposure and response to strain can advance contemporary knowledge on the origins of anger and its association with serious antisocial behavior.

## Theoretical background

GST posits that strain or certain stressors increase the likelihood of engaging in crime or delinquency (Agnew, 2007). In contrast to previous structural strain theories emphasizing the importance of social status and monetary goal attainment (Cloward & Ohlin, 1960; Cohen, 1955; Merton, 1938), GST uses a psychosocial approach to understand individual differences in response to negative life events with criminal or delinquent behavior (Agnew, 1992, 2007). Essential to this model is an individual's emotional response – or negative state – to a stressful experience that, according to Agnew (2001, 2007), increases pressure for corrective action which may take the form of violent or nonviolent offending. To date, GST research has found strong-to-moderate associations between various types of strain, violent delinquency, and nonviolent delinquency (Agnew, 2014). In general, findings indicate that those who experience violent victimization (Hay & Evans, 2006; Spano, Rivera, & Bolland, 2006), parental abuse (Hollist et al., 2009), and peer conflict (Wong & Schonlau, 2013) are more likely to engage in some form of deviant behavior, especially when the experienced strain is anticipated to continue in the near future (Agnew, 2002).

### *Family conflict and violent delinquency*

Within this extensive body of GST research, numerous studies have found that individuals exposed to high levels of family conflict are more likely to engage in violent delinquent behavior (Agnew, 1985; Agnew & White, 1992; Aseltine et al., 2000; Cheung et al., 2007; Hollist et al., 2009; Piquero & Sealock, 2000; Sigfusdottir et al., 2004). In one of the first empirical tests of GST, Agnew (1985) analyzed data from the Youth in Transition study and found that adolescents who experienced aversive family strain demonstrated higher levels of aggression, which was also partially mediated by anger. Following this analysis, Agnew and White (1992) conducted another test of GST and found that parental fighting was significantly and positively associated with adolescent violence while controlling for a range of potential confounds. Over time, other studies analyzing different samples have reported similar associations between physical violence among family members and serious delinquent behavior (Sigfusdottir et al., 2004), including, in particular, violent delinquency (Aseltine et al., 2000). A more recent study by Moon, Morash, McClusky, and Hwang (2009) reported that family conflict significantly predicted violent delinquency among a sample of South Korean youth thus highlighting the robust relation between family stress and delinquency across heterogeneous cultures. In sum, contemporary GST research indicates that family conflict is a pervasive source of strain commonly linked to youth violence.

### *The role of anger*

According to Agnew (1992), exposure to strain may cause an individual to develop negative emotions such as anger, fear, or depression. Among these negative emotions, Agnew (1992) posits that anger is the most criminogenic emotional response because it creates a desire for retaliation or revenge. Notably, and of particular importance to the scope of the current study, previous research has found that anger plays a key role in the association between family conflict and violence (Aseltine et al., 2000). Studies have shown that anger tends to mediate part of the association between parental conflict and violent delinquent behavior (Botchkovar et al., 2009; Sigfusdottir et al., 2004). Other research has reported that youth with elevated levels of anger are more likely to also contribute to family conflict problems (Burt, McGue, Krueger, & Iacono, 2005; Pettit & Arsiwalla, 2008). However, little is known about the etiological factors involved in this bidirectional association between anger and family conflict. More specifically, no study within criminology has examined the role of genetic and environmental influences on this dynamic relationship between anger, family conflict/strain, and violent delinquency. Indeed, Agnew (2014) has acknowledged this complex developmental process in stating that:

> Biopsychological factors influence the environments individuals are exposed to and their reaction to these environments, and the social environment influences biopsychological factors. (p. 197)

## Gene–environment interplay between anger, family conflict, and physical violence

As behavioral scientists have increasingly become aware of the synergistic relationship between genetic and environmental influences on individual behavior and exposure to particular social environments, researchers have begun to realize that gene–environment interplay is actually the rule rather than the exception (Rutter, 2007). Rather than conceptualizing that genes and environments function independently and in isolation from one another, understanding the interplay between genes and salient environments on theoretical constructs such as anger, family conflict/strain, and violent behavior is of primary importance to understanding the development of antisocial behavior through a GST lens. With this in mind, the following section will briefly discuss specific forms of gene–environment interplay hypothesized to be involved in creating individual differences in anger and exposure to family conflict/strain (for an extensive review of gene–environment interplay involved in antisocial behavior see Beaver, 2013, Knafo & Jaffee, 2013, and Moffitt, 2005).

### *Gene–environment correlation (rGE)*

Gene–environment correlation (*r*GE) refers to the process in which differential exposure to certain environments is dependent on individual genetic differences (Scarr & McCartney, 1983). Prior research has found that almost every environment of interest to criminologists is moderately impacted by genetic influences (Jaffee & Price, 2007; Kendler & Baker, 2007). In the context of anger and family conflict, there are two forms of *r*GE expected to be involved in creating this association: passive *r*GE and evocative *r*GE. Passive *r*GE results from biological parents passing down genetic material for the development of personality traits, but also a family/household environment for their children. This process creates a correlation between a child's genotype for behavioral development and the type of environment they are raised

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