Published in final edited form as:

J Fam Psychol. 2011 April ; 25(2): 174–183. doi:10.1037/a0023049.

The Role of Aggressive Personality and Family Relationships in Explaining Family Conflict

Briana N. Horwitz¹, Jody M. Ganiban², Erica L. Spotts³, Paul Lichtenstein⁴, David Reiss⁵, and Jenae M. Neiderhiser¹

¹ Department of Psychology, The Pennsylvania State University

² Department of Psychology, The George Washington University

³ Division of Behavioral and Social Research, National Institute on Aging

⁴ Department of Medical Epidemiology and Biostatistics, Karolinska Institute

⁵ Child Study Center, Yale University

Abstract

This study investigated whether genetic and environmental influences on global family conflict are explained by parents' personality, marital quality, and negative parenting. The sample comprised 876 same-sex pairs of twins, their spouse, and one adolescent child per twin from the Twin and Offspring Study in Sweden (TOSS). Genetic influences on aggressive personality were correlated with genetic influences on global family conflict. Nonshared environmental influences on marital quality and negative parenting were correlated with nonshared environmental influences on global family conflict. Results suggest that parents' personality and unique experiences within their family relationships are important for understanding genetic and environmental influences on global conflict in the home.

Keywords

Aggression; family conflict; marital quality; negative parenting

Family conflict, as indexed by the Family Environmental Scale (FES), refers to openly expressed anger, hostility, and aggression in the home (Moos & Moos, 1981). Several twin studies have documented both genetic and environmental influences on reports on the FES (e.g., Kendler & Baker, 2007). These previous studies have used ratings by the twins, not other family members; thus, the meaning of the genetic variance is unclear. It may reflect single informant bias or twins' heritable characteristics influencing actual family conflict, as in genotype-environment correlation (*r*GE). Genotype-environment correlation is a process through which a person's heritable characteristics influence the environments he/she inhabits or creates for himself/herself (e.g., Scarr & McCartney, 1983). One strategy to avoid the problem of single informant bias and to index a more general construct of the family environment (global family conflict) is to use a multi-rater assessment of FES (Deal, 1995). Because genetic information comes from the twins, genetic influences on other family members' reports on family conflict can be described as evidence of *r*GE. A more

Corresponding authors: Dr. Jenae M. Neiderhiser, 111 Moore, Department of Psychology, The Pennsylvania State University, University Park, PA 19802-1294, USA. Phone: (814) 865-4818, Fax: (814) 863-7002, jenaemn@psu.edu. Dr. Briana N. Horwitz, 228 Moore, Department of Psychology, The Pennsylvania State University, University Park, PA 19802-1294, USA: (814) 865-4818, Fax: (814) 863-7002, bnh2@psu.edu.

The opinions expressed herein are those of the author and should not in any way be construed to be the opinions of NIH.

recent investigation revealed genetic contributions to the extent of agreement between twin, spouse, and child reports on the FES, suggesting the role *rGE* in shaping family conflict (Horwitz et al., 2010). However, previous studies have not identified sources of genetic and environmental influences on global family conflict. The present study examined the degree to which genetic and environmental effects on global family conflict are accounted for by parents' aggressive personality, marital quality, and negative parenting.

Family systems theory is often used to understand how conflict arises in the home environment (Cox & Paley, 1997). Within this framework, the family environment is a complex, hierarchically organized system that encompasses many subsystems, such as dyadic and triadic family relationships. These subsystems are posited to be interconnected and permeable. Thus, conflict arising from one family subsystem can transfer to another family subsystem, resulting in a more global pattern of family conflict (e.g., Minuchin, 1985). Different models have been proposed to explain how family subsystems give rise to family conflict. From the spillover perspective, conflict originating in one family dyad can carry over to another family dyad, facilitating ongoing family distress (Margolin, Christensen, & John, 1996). According to the triangulation model, conflict in the family triad arises when feuding spouses attempt to reduce their distress by involving the child in their marital conflict (Kerig, 1995; Minuchin, 1974). These models describe environmental or family-based mechanisms that shape unique emotional climates of families.

Another plausible explanation is that family members' heritable characteristics contribute to negativity in the marital and parent-child subsystems via *rGE* resulting in global family conflict. Three different types of *rGE* have been described, including passive, evocative, and active *rGE* (for definitions, see Neiderhiser et al., 2004). There is now evidence that family members' heritable characteristics shape similarities in the emotional quality of different family subsystems. Specifically, research using a parent-based twin design has shown a substantial degree of genetic overlap between marital quality and parenting behaviors (Ganiban et al., 2007). In other words, covariation in marital and parent-child relationships can be partially ascribed to heritable characteristics of the parent. In addition, research using a child-based design, where children vary in their genetic relatedness, has shown that family wide effects (i.e., shared environmental influences) account for a bulk of the overlap between positivity and negativity in mother-child and sibling relationships (Bussell, et al., 1999). Genetic and shared environmental contributions to family relationships in parent-based and child-based designs, respectively could suggest that parents' heritable characteristics shape family wide experiences that cause child siblings to experience their family relationships similarly. For example, a mother's heritable aggression could cause her to have a conflictual relationship with both of her children. Considered together, these studies illustrate how parents' heritable characteristics can shape similarities in the emotional quality of different family subsystems, but they do not explain how global family conflict is shaped (Cox & Paley, 1997). There is evidence that family conflict is disruptive for child adjustment independent of marital quality and parent-child relationships (David, Steele, Forehand, & Amistead, 1996; Jaycox & Repetti, 1993), and in some contexts, family conflict is more predictive of child adjustment problems than lower marital quality (David et al., 1996). For these reasons, it is important to understand how genetic and environmental influences contribute to global conflict within the home.

Parents' personality traits could be one route through which genetic effects contribute to global family conflict. Personality refers to a set of enduring characteristics that influence behavior and perceptions. Studies have shown that personality explains genetic variance in single informant assessments of family relationships and the family environment (e.g., Chipuer, Plomin, Pedersen, McClearn, & Nesselroade, 1993; Jockin, McGue, & Lykken, 1996; Johnson, McGue, Krueger, & Bouchard, 2004). Additional work has examined the

extent to which twins' personality traits explain multi-informant measures of their current family relationships using data from the Twin and Offspring Study in Sweden (TOSS). Within one such study, female twins' personality contributed to the extent of agreement between twins' and spouses' reports on their marital quality (Spotts et al., 2005). More recent evidence using self-report and observational measures of family relationships has shown that twins' aggressive personality partially contributes to genetic overlap between marital quality and negative parenting (Ganiban et al., 2009). Taken together, this research suggests that personality may influence family relationships through *rGE*.

The personality trait of aggression may be especially important for understanding how parental characteristics influence global family conflict. Aggression is defined as hostility, anger, and irritability, as well as a readiness to engage in physical and verbal aggression (e.g., Buss & Perry, 1992; Derryberry & Rothbart, 1997; Zuckerman, 2005). Genetic influences further contribute variation in aggressive personality, with heritability estimates of approximately 50% (Miles & Carey, 1997). Aggressive personality also appears to be relatively stable overtime (Zuckerman, 2005), and contributions to this stability are largely accounted for by genetic effects (Gillespie, Evans, Wright, & Martin, 2004). In addition, aggression may influence family relationships. For example, studies using longitudinal designs have found that anger proneness and aggression during childhood are predictive of relationship instability and divorce during adulthood (Caspi, 1987; Kinnunen & Pulkkinen, 2003). Thus, genetic influences on parents' aggressive personality may be linked to global family conflict.

The contribution of parents' heritable aggressive personality to global family conflict may occur in a variety of ways. First, aggression encompasses heightened sensitivity to cues of hostility from others (e.g., Coie & Dodge, 1998; Crick & Dodge, 1996; Derryberry & Rothbart, 1997; Wikowski & Robinson, 2008). As such, parents may be biased towards perceiving greater hostility from their spouse and child which may then cause the parents to behave with greater hostility and anger towards these family members (Wikowski & Robinson, 2008). The anger and hostility may evoke more hostile behaviors from their spouse and child via evocative *rGE*. In addition, children could inherit aggressive personality characteristics from their parent(s), also increasing the likelihood of negativity in the family subsystems and global family conflict through passive *rGE*. However, prior research has suggested that assortative mating (a type of active *rGE* that refers to mate selection for similar heritable characteristics) is less likely to play a role (Krueger, Moffitt, Caspi, Bleske, & Silva, 1998). Evocative and passive *rGE* are, therefore, plausible mechanisms through which parents' aggressive personality may influence negativity across family subsystems and global family conflict.

The present study used the TOSS data set to investigate whether parents' aggressive personality, marital quality, and negative parenting explain genetic, shared environmental, and nonshared environmental influences on global family conflict. Prior research using TOSS has indicated that genetic and nonshared environmental influences account for covariation between family relationships (Ganiban et al., 2007) and global family conflict (Horwitz et al., 2010). For these reasons, we hypothesized that both genetic and nonshared environmental influences on parents' aggressive personality, marital quality, and negative parenting would be correlated with genetic and nonshared influences on global family conflict.

The TOSS data set includes information from monozygotic (MZ) twins who share 100% of their genes, DZ twins who share, on average, 50% of their genes, as well as each twin's spouse and child. Genetic influences on associations among aggressive personality, marital quality, negative parenting, and global family conflict would suggest that the twin's

aggressive personality contributes to negativity in the family subsystems as well as global family conflict through *r*GE. Nonshared environmental effects could reflect that unique facets of the twin's family that are distinct from the co-twin's family (e.g., spouse personality) (Spotts, et al., 2004) contribute to the twins' aggressive personality, family relationships, and global family conflict.

Method

Participants

Participants were from the Twin and Offspring Study in Sweden (TOSS), including 909 same-sex monozygotic (MZ) and dizygotic (DZ) twin pairs, their spouse and one adolescent child, collected in two cohorts (Neiderhiser & Lichtenstein, 2008). Zygosity was determined through the use of DNA for most twins (89%) with a subset being assigned zygosity based on questionnaires. TOSS was reviewed by Institutional Review Boards (IRB) in Sweden and the United States, and all participants provided written informed consent before participating in the study. More detailed information about recruitment, inclusion criteria and other sample description is available elsewhere (Ganiban et al., 2007; 2009; Neiderhiser & Lichtenstein, 2008). The current study included a subset of 876 twin pairs for whom data were complete, including 327 male pairs ($n = 124$ MZ pairs; $n = 203$ DZ pairs) and 549 female pairs ($n = 263$ MZ pairs; $n = 286$ DZ pairs). Twins and their spouses ranged in age from 32 to 60 ($M = 44.86, \pm 4.89$) and 25 to 65 ($M = 45.55, \pm 5.37$), respectively. The adolescent children included both sons (52%) and daughters (48%), ranging in age from 11 to 22 ($M = 15.74, \pm 2.41$). The majority of the sample was middle class. Additionally, 82% of the sample was married, with the remaining participants in cohabitating relationships— a common and socially acceptable practice in Sweden. There was no difference in marital quality between married and cohabitating couples. The average length of marriage/ cohabitation was 19.4 years ($SD = 6$ years), and 76% of the sample had not been married prior to their current relationship.

Measures

Aggressive personality—Two well-established and widely used self-report personality measures were used to assess aggressive personality, including the Temperament and Character Inventory (TCI; Cloninger, Svrakic, & Przybeck, 1993) and the Karolinska Scales of Personality (KSP; Schalling & Edman, 1993). This study included the novelty seeking subscale (20 items, $\alpha = 0.65$) from the TCI and the verbal aggression (5 items, $\alpha = 0.66$) and indirect aggression (5 items, $\alpha = 0.59$) subscales from the KSP. Common factor analysis with an oblique rotation demonstrated that these three personality subscales loaded onto one factor: Verbal aggression (.53), Indirect aggression (.48), and Novelty Seeking (.48). This single factor reflected a tendency toward reactive, unregulated aggression, and impulsivity.

Marital quality—Marital quality was measured using twins' and spouses' reports on the Dyadic Adjustment Scale (DAS; Spanier, 1976), the Expressed Emotion Scale (EE; Hansson & Jarbin, 1997) and the Marital Instability Scale (Booth, Johnson, & Edwards, 1983). The DAS includes four subscales: dyadic satisfaction, dyadic consensus, affectional expression, and dyadic cohesion ($\alpha s = .74$ to $.93$). The EE includes three subscales tapping the degree to which participants appraise receiving criticism from their spouse, directing criticism toward their spouse, and are emotionally overinvolved with their spouse ($\alpha s = .72$ to $.88$). Finally, a single item from the Marital Instability Scale tapped whether respondents discussed divorce or separation with a friend. Internal consistency for the composite measures used in the current report was acceptable ($\alpha = .73$). Factor analysis showed that dyadic satisfaction, dyadic cohesion, and affectional expression loaded onto the marital quality factor, whereas

marital instability, emotional overinvolvement, and criticism loaded negatively onto this factor.

Negative parenting—Negative parenting was assessed via twins' and children's reports on four scales that have been validated and used successfully in prior research examining adolescent samples (Hetherington & Clingempeel, 1992; Reiss, Neiderhiser, Hetherington, & Plomin, 2000). The negative parenting scales included a subscale of the Parent-Child Relationships Scale capturing parent-child conflict ($\alpha = .68$), subscales of the Expressed Emotion Scale (Hansson & Jarbin, 1997), a summary scale from the Parent-Child Agreement scale assessing total disagreements between the parent and child ($\alpha = .95$), and the Child Rearing Issues Scale assessing the parent's disciplinary practices with his/her child, including punitive discipline ($\alpha = .86$) and permissive discipline ($\alpha = .69$). Cronbach's alpha across each subscale was equal to .81.

Global family conflict—Family conflict was assessed via spouses' and children's reports on the Family Environment Scale (FES) (Moos & Moos, 1981). The FES conflict subscale includes 5 items assessing the degree of openly expressed anger, aggression, and hostility in the home. FES scores for the spouse ($\alpha = .81$) and child ($\alpha = .85$) reports were computed separately, with higher scores indicating greater family conflict. An exploratory factor analysis suggested a single factor explained common variance (69%) in spouses' (.83) and children's reports (.83) on family conflict, and this common factor was used in all subsequent analyses as an index of global family conflict.

Biometric Model Fitting

A multivariate Cholesky model was fit by maximum likelihood estimation of the raw data in Mx (Neale, Boker, Xie, & Maes, 2003). Multivariate Cholesky models estimate simultaneously the relative additive genetic (A), shared environmental (nongenetic factors contributing to twin similarity; C), and nonshared environmental (nongenetic factors contributing to twin dissimilarity; E) contributions to each observed variable, as well as associations between variables (Figure 1). Aggressive personality was entered first, as it is predictive of later relationship difficulties (Caspi, 1987; Kinnunen & Pulkkinen, 2003). The subsequent entry of marital quality, negative parenting, and global family conflict was based on the rationale that negativity in the marital relationship transfers to the parent-child relationship and to the family environment (e.g., Margolin et al., 1996). This model includes latent genetic (A1, A2, A3, A4), shared environmental (C1, C2, C3, C4), and nonshared environmental (E1, E2, E3, E4) factors. As depicted in Figure 1, A1, C1, and E1 account for variance in aggressive personality. The relative contributions of A1, C1, and E1 to aggressive personality are estimated by paths a_{11} , c_{11} , e_{11} . A1, C1, and E1 may also explain variance in marital quality (paths a_{21} , c_{21} , e_{21}), negative parenting (paths a_{31} , c_{31} , e_{31}), and global conflict (paths a_{41} , c_{41} , e_{41}). For example, genetic influences that are accounted for by aggressive personality and also explain covariation among marital quality, negative parenting, and global family conflict are denoted by the following: a_{11} , a_{21} , a_{31} , and a_{41} . A2, C2, and E2 represent latent influences on marital quality (paths a_{22} , c_{22} , e_{22}), controlling for aggressive personality. These latent factors may also account for variance in negative parenting (paths a_{32} , c_{32} , e_{32}) and global family conflict (paths a_{42} , c_{42} , e_{42}). A3, C3, and E3 denote latent influences on negative parenting, controlling for aggressive personality and marital quality (paths a_{33} , c_{33} , e_{33}). A3, C3, and E3 may also account for variance in global family conflict (paths a_{43} , c_{43} , e_{43}). Finally, A4, C4, and E4 denote latent influences on global family conflict, independent of aggressive personality, marital quality, and negative parenting (paths a_{44} , c_{44} , e_{44}). The degree to which latent factors associated with aggressive personality, marital quality, and negative parenting explain variance in global family conflict can be computed as: $(a_{41}^2 + c_{41}^2 + e_{41}^2 + a_{42}^2 + c_{42}^2 + e_{42}^2 + a_{43}^2 + c_{43}^2 + e_{43}^2)$. The

degree to which latent factors explain global conflict independent of aggressive personality, marital quality, and negative parenting can be computed as: $(a_{44}^2 + c_{44}^2 + e_{44}^2)$.

The full ACE model was compared with more parsimonious models with fewer parameters, referred to as nested models. Because more parsimonious models are nested within the full ACE model, the relative fits of nested models and the full model could be tested by dropping all pathways that were not statistically different from 0 using the likelihood ratio test (LRT). The LRT assesses whether nested models reflect a significantly worse fit to the data than the full ACE model by testing differences in the χ^2 values of the models ($\Delta \chi^2$) in relation to differences in their degrees of freedom. If the χ^2 value for a nested model relative to the full model is nonsignificant, the nested model accurately represents the data and is, therefore, a preferable fit compared to the full model. The χ^2 statistic is likely to reject a model that fits the data well but imperfectly, is highly sensitive to sample size and is more likely to favor saturated models (Mulaik et al., 1989; Neale & Cardon, 1992). For these reasons, we also calculated the Bayesian Information Criteria (*BIC*) fit statistic (Raferty, 1995). The *BIC* statistic refers to the χ^2 statistic for a model minus the product of the degrees of freedom and the natural log likelihood of the sample size. Negative or smaller *BIC* values are suggestive of a preferable fit, reflecting model parsimony for large sample sizes.

Results

Preliminary Analyses

Prior to all analyses, we examined covariates for associations with the key variables of interest. Findings showed that children's age was associated with negative parenting ($r = -.11$), twins' age was associated with their aggressive personality ($r = -.16$) and children's sex was related to their FES reports ($r = .14$; daughters reported greater family conflict). Other covariates, including the spouses' sex and age and contact between the twins were not significantly associated with any of the study's key variables. As such, the effects of children's age were residualized from negative parenting, twins' age from aggressive personality, and children's sex from their own FES reports prior to all subsequent analyses (McGue & Bouchard, 1984).

Phenotypic correlations indicated that higher levels of global family conflict were associated with greater aggressive personality, lower marital quality, and greater negative parenting (Table 1). We also tested for the association between anxiety (a personality trait previously linked to marital quality and negative parenting in TOSS, Ganiban et al., 2009) and global family conflict, but the association was minimal ($r = .09$) and, therefore, was not included in the Cholesky model. Finally, we tested for the presence of genetically-influenced assortative mating such that twins selected spouses due to their heritable aggressive personality. If individuals select mates with similar heritable aggressive personality, correlations among the spouses of MZ twins on aggressive personality would be twice the magnitude of the correlations among the spouses of DZ twins (Reynolds, Baker, & Pederson, 2000). Findings revealed the assortment for heritable aggressive personality was not present in that the correlations among the spouses of MZ pairs ($r = .14$) were similar in magnitude to the correlations among the spouses of DZ pairs ($r = .13$).

Biometric Model Fitting

The full model was fit first (model fit: $-2LL = 15394.76$, $df = 5706$, $BIC = -11632.74$). Within this model, all paths that were estimated as not significantly different from 0 were dropped to create a more parsimonious model (model fit: $-2LL = 15419.26$, $\Delta df = 17$, $BIC = -11678.08$). Elimination of these paths did not significantly affect the fit of the model. The parameter estimates from the full and parsimonious models are summarized in Table 2. In

the parsimonious model, latent genetic factors accounted for 22% of the total variance in global family conflict ($a_{41}^2 + a_{44}^2 = .35^2 + .32^2 = .22$). Over half (55%) of the genetic contributions to family conflict were accounted for by the latent genetic factor related to aggressive personality (A1) ($.35^2 / .22 = .55$). The remaining genetic variance (45%) in global family conflict was unique to global family conflict (A4) and independent of all other variables in the model. Latent nonshared environmental factors explained the remaining variance in global family conflict ($e_{42}^2 + e_{43}^2 + e_{44}^2 = .34^2 + .34^2 + .74^2 = .79$). Interestingly, marital quality (E2) and negative parenting (E3) collectively explained 30% of the nonshared environmental variance in global family conflict, while aggressive personality did not account for nonshared environmental influences on global family conflict. Nonshared environmental factors related to marital quality, but unrelated to aggressive personality (E2) contributed to variance in global family conflict, as well as negative parenting. This latent factor explained 15% of the nonshared environmental variance ($e_{42}^2 / e_{42}^2 + e_{43}^2 + e_{44}^2 = .34^2 / .79 = .15$) and 12% of the total variance in global family conflict ($e_{42}^2 = .34^2 = .12$). An additional latent factor (E3) contributed to the association between negative parenting and global family conflict, independent of aggressive personality and marital quality. This factor also contributed 15% of the nonshared environmental variance and 12% of the total variance in global family conflict. The remaining total variance unique to global family conflict (55%) was attributable to a nonshared environmental factor (E4). Finally, this pattern of findings did not differ according to twins' sex.

Discussion

This study investigated whether genetic and environmental influences on global family conflict are explained by parents' aggressive personality, marital quality, and negative parenting. Findings revealed that a genetic factor contributing to the association between twins' aggressive personality, marital quality, and negative parenting explained more than half of the genetic variance in global family conflict. The genetic overlap suggests that heritable influences on parents' aggression contribute to negativity across family subsystems as well as global family conflict via *r*GE. Accordingly, accumulating studies that have been primarily based upon the TOSS data set have indicated that a twin's heritable characteristics influence his/her marital quality and parenting behaviors through *r*GE (e.g., Ganiban et al., 2007, 2009; Neiderhiser et al., 2004; Spotts et al., 2004). A twin's heritable aggressive personality could cause him/her to be more hostile towards and more readily construe hostility from the spouse and child (Coie & Dodge, 1998). Consistent with evocative *r*GE, these characteristics could further elicit hostility from the spouse and child, facilitating negativity across family subsystems and global family conflict. Also, marital conflict arising from the spouse's negative responses towards the twin's aggressive personality could cause both parents to detour their conflict to the child (Kerig, 1995; Margolin et al., 1996). The genetic overlap could also reflect the role of passive *r*GE. For example, a twin may genetically transmit aggression to his/her child and shape the conflict to which the child is exposed. In additional explanation is that family members' reports of the family climate may be disproportionately influenced by the most conflict prone member of the family. There was also genetic variance in global family conflict that was independent of aggressive personality, marital quality, and negative parenting. This residual genetic variance could reflect the role of positive parental traits (e.g., empathy and conflict solving) influencing the emotional dynamics within family subsystems and family conflict. Future research should delineate the specific kinds of *r*GE involved and examine additional parental characteristics explaining the genetic variance in global family conflict.

Findings also revealed that a nonshared environmental factor that was correlated with marital quality and negative parenting, independent of aggressive personality contributed to the global family conflict. This nonshared environmental overlap may reflect distinct

experiences occurring within the family that twins do not share with their co-twins. Consistent with this viewpoint, research has shown that twins' marriages to different spouses explain nonshared environmental contributions to marital quality (Spotts et al., 2004; Spotts et al., 2005). Because assortative mating for aggressive personality is low (Krueger et al., 1998), it is possible that the unique experiences of each twin due to his/her spouse's heritable aggressive personality could lead to differences in each twin's marital quality. Lower marital quality resulting from a twin's interaction with a spouse who is higher in aggressive personality could generate negative parenting behaviors and global family conflict via spillover and/or triangulation (Margolin et al., 1996; Minuchin, 1974). Other nonshared environmental effects could reflect the influence of adverse life events (Towers, 2003) or work stressors (Horwitz, Luong, & Charles, 2008). Additional nonshared environmental influences explained an association between negative parenting and family conflict. These influences could represent the child's influence on the twin's behaviors (e.g., Narusyte et al., 2008; Neiderhiser et al., 2004; also see Harris, 1995). Moreover, the lack of association with marital quality may reflect global family conflict arising from other family subsystems linked to negative parenting, including a child's relationship with his/her sibling. The lack of association with marital quality may further illustrate variability in how parents' marriages are affected by children (e.g., by forming an alliance against the child or by experiencing decrements in marital quality due to parenting a child with adjustment problems).

Implications and Limitations

The present study underscores current preventive and therapeutic interventions that focus on marital dynamics. These interventions enhance the capacity of couples to resolve conflicts (Cowan & Cowan, 2010) and help them wall off their relationship problems from intruding on family life (Kerig & Swanson, 2010). Results clarify that the genetic component of aggressive personality plays a decisive role in influencing marriage, parenting, and system-wide family conflict. Second, there is substantial overlap of genetic influences on these three components of the family system. Finding effective ways to prevent the intrusion of personality-based interaction patterns on the broader family system is important. While therapeutic interventions to alter aggressive personality structure and process can be daunting, the aggressive personality feature of an individual parent has an important interface with the family system: aggressive personality shaped perceptions of each other and of their children. These perceptions, rather than the underlying aggressive personality dynamics, may be quite amenable to change, particularly when the children are still young (Bugental et al., 2002; Bugental & Schwartz, 2009; Bugental & Shennum, 1984). Results coupled with a recent publication from TOSS (Schermerhorn et al., 2010) also enhance our understanding of family dynamics. Schermerhorn et al. (2010) revealed that marital quality is linked to child problem behaviors through genetic and environmental pathways, whereas family conflict is linked to child behavior problems family conflict entirely through environmental pathways. The genetic pathway linking marital quality to child problem behaviors suggest that parents' heritable characteristics influencing marital quality are also transmitted to the child and are expressed as problem behaviors. Thus, when family conflict ripples beyond the marriage into the global family environment, as demonstrated in the present study, the child has an additional burden, this time one due entirely to exposure to an adverse family environment.

Findings and implications should be considered in light of certain limitations. First, the cross sectional nature of the data does not provide insight into how aggressive personality and emotional dynamics in families unfold over time. A second potential limitation is the self-report nature of the data, which may produce stronger associations among the study's variables than other more objective approaches such as behavioral observation. We strove to

reduce this possible bias by using a multi-informant assessment of family conflict. Third, it is important to note the wide age range of children in the sample (11 to 22 years), as the meaning of aspects of the negative parenting measure (e.g., parental discipline) may not be the same for adolescents aged 11 years and young adults aged 22 years. At the same time, the focus of these analyses is on variation of discipline across the cousin pairs who are no more than 4 years apart in age. Thus although there may be differences in discipline for 11 to 22 year old children there will likely be much smaller variation in discipline for cousin pairs of, for example, 11 and 15 years or 18 to 22 years. Fifth, biometric models assume a lack of $G \times E$, and $G \times E$ effects that are present and have not been accounted for typically inflate estimates of the nonshared environment (e.g., Johnson, 2007). Thus, future research focused on unpacking family conflict should examine $G \times E$. Finally, while TOSS is predominately comprised of married couples, the use of a Swedish sample is important to consider when examining marital quality, as cohabitation is more widespread in Sweden than in any other country (Bernhardt, 2004). However, research has demonstrated genetic influences on marital quality in samples from both Sweden and the United States (e.g., Spotts et al., 2004; Spotts, Prescott, & Kendler, 2006).

Conclusion

Findings from the present study revealed that parents' aggressive personality contributes genetic variance to global family conflict through rGE . Marital quality and negative parenting are associated with global family conflict via nonshared environmental influences that are independent of aggressive personality. Collectively, these results suggest that future research could focus on delineating the specific rGE pathways that are responsible for shaping global family conflict. Future research could also employ the MZ discordant twin design to identify specific nonshared environmental factors that are responsible for shaping family conflict (e.g., spouse personality). Finally, an important avenue for future research is to employ longitudinal, genetically informed research to assess how the association between aggressive personality, family relationships, and the global family climate unfold over time.

Acknowledgments

The Twin and Offspring Study in Sweden was supported by the National Institute of Mental Health (NIMH) Grant R01MH54610 (PI: Reiss – Cohort 1; PI: Neiderhiser – Cohort 2).

References

- Bernhardt, E. Cohabitation in marriage?. Preferred living arrangements in Sweden. 2004. (Publication., from Retrieved March 15, 2010 from <http://www.oif.ac.at/sdf/sdf04-04-bernhardt.pdf>)
- Booth A, Johnson D, Edwards JN. Measuring marital instability. *Journal of Marriage and the Family*. 1983; 45:387–394.10.2307/351516
- Bugental DB, Ellerson PC, Lin EK, Rainey B, Kokotovic A, O'Hara N. A cognitive approach to child abuse prevention. *Journal of Family Psychology*. 2002; 16:243–258.10.1037/0893-3200.16.3.243 [PubMed: 12238408]
- Bugental DB, Schwartz A. A cognitive approach to child mistreatment prevention among medically at-risk infants. *Developmental Psychology*. 2009; 45:284–288.10.1037/a0014031 [PubMed: 19210009]
- Bugental DB, Shennum WA. Difficult Children as Elicitors and Targets of Adult Communication Patterns: An Attributional Behavioral Transactional Analysis. *Monographs of the Society of Research in Child Development*. 1984; 49:1–69.10.2307/1165910
- Buss AH, Perry M. The aggression questionnaire. *Journal of Personality and Social Psychology*. 1992; 63:452–459.10.1037/0022-3514.63.3.452 [PubMed: 1403624]
- Bussell DA, Neiderhiser JM, Pike A, Plomin R, Simmens S, Howe GW, Carroll E, Reiss D, Pike A, Plomin R, Hetherington M. Adolescents' relationships to siblings and mothers: a multivariate

- genetic analysis. *Developmental Psychology*. 1999; 35:1248–1259.10.1037/0012-1649.35.5.1248 [PubMed: 10493650]
- Caspi A. Personality in the life course. *Journal of Personality and Social Psychology*. 1987; 53:1203–1213.10.1037/0022-3514.53.6.1203 [PubMed: 3694456]
- Chipuer HM, Plomin R, Pedersen NL, McClearn GE, Nesselroade JR. Genetic influence on family environment: The role of personality. *Developmental Psychology*. 1993; 29:110–118.10.1037/0012-1649.29.1.110
- Cloninger CR, Svrakic DM, Przybeck TR. A psychobiological model of temperament and character. *Archives of General Psychiatry*. 1993; 50:975–990. [PubMed: 8250684]
- Coie, JD.; Dodge, KA. Aggression and antisocial behavior. In: Damon, W.; Eisenberg, N., editors. *Handbook of child psychology: Vol 3. Social, Emotional, and Personality Development*. 5. New York: Wiley & Sons; 1998. p. 779-862.
- Cook WL, Snyder DK. Analyzing nonindependent outcomes in couple therapy using the actor-partner interdependence model. *Journal of Family Psychology*. 2005; 19:133–141.10.1037/0893-3200.19.1.133 [PubMed: 15796659]
- Cowan, PA.; Cowan, CP. How working with couples fosters children's development: From prevention science to public policy. Schulz, Marc S., editor. 2010. p. 211-228.
- Cox MJ, Paley B. Families as systems. *Annual Review of Psychology*. 1997; 48:243–267.10.1146/annurev.psych.48.1.243
- Crick NR, Dodge KA. Social information-processing mechanisms on reactive and proactive aggression. *Child Development*. 1996; 67:993–1002.10.2307/1131875 [PubMed: 8706540]
- David C, Steele R, Forehand R, Armistead L. The role of family conflict and marital conflict in adolescent functioning. *Journal of Family Violence*. 1996; 11:81–91.10.1007/BF02333341
- Deal JE. Utilizing data from multiple family members: A within-family approach. *Journal of Marriage and the Family*. 1995; 57:1109–1121.10.2307/353426
- Derryberry D, Rothbart MK. Reactive and effortful processes in the organization of temperament. *Developmental Psychopathology*. 1997; 9:633–652.10.1017/S0954579497001375
- Ganiban JM, Spotts EL, Lichtenstein P, Khera GS, Reiss D, Neiderhiser JM. Can genetic factors explain the spillover of warmth and negativity across family relationships? *Twin Research Human Genetics*. 2007; 10:299–313.10.1375/twin.10.2.299
- Ganiban JM, Ulbricht JA, Spotts EL, Lichtenstein P, Reiss D, Hansson K, Neiderhiser JM. Understanding the role of personality in explaining associations between marital quality and parenting. *Journal of Family Psychology*. 2009; 23:646–660.10.1037/a0016091 [PubMed: 19803601]
- Gillespie NA, Evans DE, Wright MM, Martin NG. Genetic simplex modeling of Eysenck's dimensions of personality in a sample of young Australian twins. *Twin Research*. 2004; 7:637–648.10.1375/1369052042663814 [PubMed: 15607015]
- Hansson K, Jarbin G. A new self-rating questionnaire in Swedish for measuring expressed emotion. *Nordic Journal of Psychiatry*. 1997; 5:287–297.10.3109/08039489709090721
- Harris JR. Where is the child's environment? A group socialization theory of development. *Psychological Review*. 1995; 102:458–489.
- Hetherington EM, Clingempeel GW. Coping with marital transitions: A family systems perspective. *Monographs of the Society for Research in Child Development*. 1992; 57:1–242.10.2307/1166050
- Horwitz BN, Luong G, Charles ST. Neuroticism and Extraversion Share Genetic and Environmental Effects with Negative and Positive Mood Spillover in a Nationally Representative Sample. *Personality and Individual Differences*. 2008; 45:636–642.10.1016/j.paid.2008.07.003 [PubMed: 19430588]
- Horwitz BN, Neiderhiser JM, Ganiban JM, Spotts EL, Lichtenstein P, Reiss D. Genetic and environmental influences on global family conflict. *Journal of Family Psychology*. 2010; 24:217–220. doi: 2010-07067-014. [PubMed: 20438198]
- Jaycox LH, Repetti RL. Conflict in families and psychological adjustment of preadolescent children. *Journal of Family Psychology*. 1993; 7:344–355.10.1037/0893-3200.7.3.344
- Jockin V, McGue M, Lykken DT. Personality and divorce: a genetic analysis. *Journal of Personality and Social Psychology*. 1996; 71:288–299.10.1037/0022-3514.71.2.288 [PubMed: 8765483]

- Johnson W. Genetic and environmental influences on behavior: Capturing all the interplay. *Psychological Review*. 2007; 114:423–440.10.1037/0033-295X.114.2.423 [PubMed: 17500633]
- Johnson W, McGue M, Krueger RF, Bouchard TJ Jr. Marriage and personality: a genetic analysis. *Journal of Personality and Social Psychology*. 2004; 86:285–294.10.1037/0022-3514.86.2.285 [PubMed: 14769084]
- Kendler KS, Baker JH. Genetic influences on measures of the environment: a systematic review. *Psychological Medicine*. 2007; 37:615–626.10.1017/S0033291706009524 [PubMed: 17176502]
- Kerig PK. Triangles in the family circle: Effects of family structure on marriage, parenting, and child adjustment. *Journal of Family Psychology*. 1995; 9:28–43.10.1037/0893-3200.9.1.28
- Kerig, PK.; Swanson, JA. Ties that bind: Triangulation, boundary dissolution, and the effects of interparental conflict on child development. Schulz, Marc S., editor. 2010. p. 59-76.
- Kinnunen U, Pulkkinen L. Childhood socio-emotional characteristics as antecedents of marital stability and quality. *European Psychologist*. 2003; 8:223–237.10.1027/1016-9040.8.4.223
- Krueger RF, Moffitt TE, Caspi A, Bleske A, Silva PA. Assortative mating for antisocial behavior: developmental and methodological implications. *Behavior Genetics*. 1998; 28:173–186.10.1023/A:1021419013124 [PubMed: 9670593]
- Lichtenstein P, De Fraire U, Floderus B, Svartengren M, Svedberg P, Pedersen NL. The Swedish Twin Registry: A unique resource for clinical, epidemiological and genetic studies. *Journal of Internal Medicine*. 2002; 252:184–205. [PubMed: 12270000]
- Margolin G, Christensen A, John RS. The continuance and spillover of everyday tensions in distressed and nondistressed families. *Journal of Family Psychology*. 1996; 10:304–321.10.1037/0893-3200.10.3.304
- McGue M, Bouchard TJ Jr. Adjustment of twin data for the effects of age and sex. *Behavior Genetics*. 1984; 14:325–343.10.1007/BF01080045 [PubMed: 6542356]
- Miles DR, Carey G. Genetic and environmental architecture of human aggression. *Journal of Personality and Social Psychology*. 1997; 72:207–217.10.1037/0022-3514.72.1.207 [PubMed: 9008382]
- Minuchin, P. Families and family therapy. Cambridge, MA: Harvard University Press; 1974.
- Minuchin P. Families and individual development: provocations from the field of family therapy. *Child Development*. 1985; 56:289–302. [PubMed: 3886321]
- Moos, RH.; Moos, BS. Family Environmental Scale Manual. Palo Alto, CA: Consulting Psychologists Press; 1981.
- Mulaik SA, James LR, Alstine JV, Bennett N, Lind S, Stilwell CD. Evaluation of goodness-of-fit indices for structural equation models. *Psychological Bulletin*. 1989; 105:430–445.10.1037/0033-2909.105.3.430
- Narusyte J, Neiderhiser JM, D’Onofrio BM, Reiss D, Spotts EL, Ganiban J, Lichtenstein P. Testing different types of genotype-environment correlation: An Extended Children-of-Twins model. *Developmental Psychology*. 2008; 44:1591–1603.10.1037/a0013911 [PubMed: 18999324]
- Neale, MC.; Cardon, LR. Methodology for genetic studies of twins and families. Boston: Kluwer Academic; 1992.
- Neale, MC.; Boker, S.; Xie, G.; Maes, H. Mx: Statistical Modeling. Box 126 MCV. Richmond, VA: Department of Psychiatry; 1999.
- Neiderhiser JM, Lichtenstein P. The Twin and Offspring Study in Sweden: Advancing our understanding of genotype-environment interplay by studying twins and their families. *Acta Psychologica Sinica*. 2008; 40:1116–1123.
- Neiderhiser JM, Reiss D, Pederson NL, Lichtenstein P, Spotts EL, Hansson K, Cederblad M, Ellhammer O. Genetic and environmental influences on mothering of adolescents: A comparison of two samples. *Developmental Psychology*. 2004; 40:335–351.10.1037/0012-1649.40.3.335 [PubMed: 15122961]
- Raferty AE. Bayesian model selection in social research. *Sociological Methodology*. 1995; 25:111–163.
- Reiss, D.; Neiderhiser, J.; Hetherington, EM.; Plomin, R. The Relationship Code: Deciphering genetic and social influences on adolescent development. Cambridge, MA: Harvard University Press; 2000.

- Reynolds CA, Baker LA, Pederson NL. Multivariate models of mixed assortment: Phenotypic assortment and social homogamy for education and fluid ability. *Behavior Genetics*. 2000; 30:455–476.10.1023/A:1010250818089 [PubMed: 11523705]
- Scarr S, McCartney K. How people make their own environments: a theory of genotype greater than environment effects. *Child Development*. 1983; 54:424–435. [PubMed: 6683622]
- Schalling, D.; Edman, G. The Karolinska Scales of Personality (KSP) Manual: An Inventory for Assessing Temperamental Dimensions Associated with Vulnerability for Psychosocial Deviance. Schalling, D.; Edman, G., editors. Department of Psychiatry, Karolinska Institute; Stockholm, Sweden: Stockholm: The Department of Psychiatry: The Karolinska Institute; 1993.
- Schermerhorn AC, D'Onofrio BM, Turkheimer E, Ganiban JM, Spotts EL, Lichtenstein P, Reiss D, Neiderhiser JM. A genetically informed study of associations between family functioning and child psychosocial adjustment. *Developmental Psychology*. 2010.10.1037/a0021362
- Spanier GB. Measuring dyadic adjustment: New scales for assessing quality of marriage and similar dyads. *Journal of Marriage and the Family*. 1976; 38:15–28.10.2307/350547
- Spotts EL, Lichtenstein P, Pederson N, Neiderhiser JM, Hansson K, Cederblad M, Reiss D. Personality and marital quality: A behavioural genetic analysis. *European Journal of Personality*. 2005; 19:205–227.10.1002/per.545
- Spotts EL, Neiderhiser JM, Towers H, Hansson K, Lichtenstein P, Cederblad M, Pederson NL, Reiss D. Genetic and environmental influences on marital relationships. *Journal of Family Psychology*. 2004; 18:107–119.10.1037/0893-3200.18.1.107 [PubMed: 14992614]
- Spotts EL, Prescott C, Kendler K. Examining the origins of gender differences in marital quality: A behavior genetic analysis. *Journal of Family Psychology*. 2006; 20:605–613.10.1037/0893-3200.20.4.605 [PubMed: 17176195]
- Towers H. Contributions of current family factors and life events to women's adjustment: Nonshared environmental pathways (Doctoral dissertation, The George Washington University, 2003). *Dissertation Abstracts International*. 2003; 63(12-B):6123.
- Wikowski BM, Robinson MD. The cognitive basis of trait anger and reactive aggression: An integrative analysis. *Personality and Social Psychological Review*. 2008; 12:3–21.10.1177/1088868307309874
- Zuckerman, M. *Psychobiology of personality*. 2. Cambridge: Cambridge University Press; 2005.

Figure 1.

Multivariate Cholesky Model. The sample model include latent genetic (A1, A2, A3, A4), shared environmental (C1, C2, C3, C4), and nonshared environmental (E1, E2, E3, E4) influences on aggressive personality, marital quality, negative parenting and global family conflict for one twin in a pair. Genetic, shared environmental and nonshared environmental variance accounted for by aggressive personality are denoted by the path estimates a_{11} , a_{21} , a_{31} , a_{41} , c_{11} , c_{21} , c_{31} , c_{41} , e_{11} , e_{21} , e_{31} , e_{41} , variance accounted for by marital quality are denoted by the path estimates a_{22} , a_{32} , a_{42} , c_{22} , c_{32} , c_{42} , e_{22} , e_{32} , e_{42} , variance accounted for by negative parenting are denoted by the path estimates a_{33} , a_{43} , c_{33} , c_{43} , e_{33} , e_{43} , variance unique to global family conflict are denoted by the path estimates a_{44} , c_{44} , e_{44} .

Table 1

Ranges, mean, standard deviations, and phenotypic correlations between aggressive personality, marital quality, negative parenting and global family conflict

	Range	Mean	SD	Aggressive personality	Marital satisfaction	Negative parenting
Aggressive personality	-3.05 to 3.41	.00	1.00	--		
Marital satisfaction	-4.65 to 2.07	.00	1.00	-.26	--	
Negative parenting	-2.17 to 6.18	.00	1.00	.17	-.32	--
Global family conflict	-2.82 to 2.74	.00	1.00	.25	-.41	.50

Note. $p < .05$ for all correlations shown here.

Table 2

Multivariate Cholesky Model

Variable 1: Aggressive personality			Variable 2: Marital quality		Variable 3: Negative parenting		Variable 4: Global family conflict	
Latent Factor	Path	Estimate (CI)	Path	Estimate (CI)	Path	Estimate (CI)	Path	Estimate (CI)
Full Model								
Variance accounted for by aggressive personality								
A1	a11	.68 (.58,.73)	a21	.21 (.08,.39)	a31	.16 (.00,.33)	a41	.23 (.11,.36)
C1	c11	.05 (.00,.29)	c21	.15 (.00,.41)	c31	.12 (.00,.41)	c41	.02 (.00,.33)
E1	e11	.73 (.68,.79)	e21	.15 (.07,.24)	e31	.06 (.00,.17)	e41	.13 (.05,.21)
Variance accounted for by marital quality								
A2	a22	.42 (.00,.55)	a32	.24 (.00,.50)	a42	.23 (.00,.51)		
C2	c22	.03 (.00,.41)	c32	.18 (.00,.41)	c42	.06 (.00,.34)		
E2	e22	.86 (.80,.92)	e32	.25 (.15,.36)	e42	.28 (.20,.36)		
Variance accounted for by negative parenting								
A3	a33	.16 (.00,.48)	a43	.34 (.00,.47)				
C3	c33	.00 (.00,.40)	c43	.00 (.00,.33)				
E3	e33	.88 (.80,.94)	e43	.32 (.24,.41)				
Variance unique to global family conflict								
A4	a44	.14 (.00,.43)						
C4	c44	.00 (.00,.33)						
E4	e44	.74 (.69,.80)						
Parsimonious Model								
Latent Factor	Path	Estimate (CI)	Path	Estimate (CI)	Path	Estimate (CI)	Path	Estimate (CI)
Variance accounted for by aggressive personality								
A1	a11	.68 (.62,.74)	a21	.33 (.26,.40)	a31	.23 (.14,.31)	a41	.35 (.28,.41)
C1	c11	-	c21	-	c31	-	c41	-
E1	e11	.73 (.68,.78)	e21	-	e31	-	e41	-
Variance accounted for by marital quality								
A2	a22	.36 (.21,.46)	a32	-	a42	-		
C2	c22	-	c32	-	c42	-		
E2	e22	.87 (.82,.92)	e32	.30 (.23,.36)	e42	.34 (.28,.39)		

	Variable 1: Aggressive personality	Variable 2: Marital quality	Variable 3: Negative parenting	Variable 4: Global family conflict
Variance accounted for by negative parenting				
A3	a33	-	a43	-
C3	c33	-	c43	-
E3	e33	.93 (.90, .95)	e43	.34 (.29, .39)
Variance unique to global family conflict				
A4			a44	.32 (.18, .41)
C4			c44	-
E4			e44	.74 (.69, .79)

Note. Latent factors and paths correspond to Figure 1. Each path name has three components: a lower case letter, followed by two subscripted numbers. The lower case letter and first subscripted number refer to a specific latent factor: A, C or E. The second subscripted number refers to the specific manifest variable (identified by its 'order in the model') that is linked to the latent factor via the path. For example, path a21 links latent factor A1 to the second variable in the model A1. CI = 95% Confidence Intervals. For the most parsimonious model, dashes (–) indicate parameters that could be dropped without resulting in a significant increase in the χ^2 value.