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# Digit ratio, emotional intelligence and parenting styles predict female aggression

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ABSTRACT

The contributions of digit ratio (2D:4D), emotional intelligence (EI) and parenting styles to social aggression were examined. Females ($n$ = 215 emerging adults) completed 5 aggression measures, an EI measure, 2 parenting measures, and had their hands measured. Aggression correlated with each of the predictors. Left hand 2D:4D, EI, and parental authoritarianism resulted in the most robust model for predicting aggression. Implications are discussed.



## 1. Introduction

Aggression, defined as behavior intended to harm another, has been argued to be sexually dimorphic, with males displaying higher rates (Archer, 2009). Research supporting this, however, has focused on operationalizations emphasizing overt physical/verbal aggression, which are typical forms of male aggression. By contrast, female aggression is typically social/relational and includes exclusion, gossiping, and/or friendship manipulation (Underwood, 2003). When aggression is reconceptualized as such, females appear more aggressive. Thus, rather than being sex-typed, aggression may manifest in sex-typical forms, with males displaying, on average, higher physical/verbal aggression and females displaying, on average, higher social/relational aggression.

### 1.1. Aggression in females

Three related terms have been used to describe typical female aggression. *Indirect aggression* connotes the "back stabbing" nature of social exclusion, gossiping, and/or friendship manipulation, which may be tempting outlets for aggression because the aggressor can remain unrecognized and immune to others' disapproval or retaliation. *Relational aggression* emphasizes the harm inflicted on relationships. *Social aggression* emphasizes intent to hurt someone by damaging social status (Archer & Coyne, 2005; Underwood, 2003). The term social aggression is used here to represent the constellation of aggressive behaviors more typical of females.

Females are more socially aggressive than males (cf, Archer, 2004, who observed meta-analytic sex differences of $d$ = .74 and .19 for researcher-observed and peer-rated social aggression, respectively). Crick and Grotpeter (1995) found that 15.6% of boys but only 0.4% of girls were classified as "overtly aggressive" while "relationally aggressive" children included 17.4% of girls but only 2.0% of boys. ANOVAs confirmed that boys are more overtly aggressive than girls and girls are more relationally aggressive than boys. The authors maintain that female aggressiveness is underestimated in many studies because of a failure to assess the forms of aggression that are most pertinent for girls.

### 1.2. Origins of aggression

There have been many explanations for the origins of aggression; several are outlined below.

#### 1.2.1. Digit ratio

Testosterone (T) is widely held to be a determinant of aggression, yet mounting evidence indicates this is not a simple correlation (Archer, 2006). One increasingly salient account suggests the relationship between T and aggression lies in the organizational effects of prenatal T. Females with Congenital Adrenal Hyperplasia (CAH), a condition characterized by excessive prenatal T, are more physically aggressive than controls (Pasterski et al., 2007). It is held that prenatal androgen exposure in these females is causally related to later aggression. Research suggests this relationship exists in normal individuals as well. Critical for this research is that

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the ratio of the second (index) finger length to fourth (ring) finger length (2D:4D) is a marker of prenatal T, with smaller ratios indicating greater exposure. For example, males with Klinefelter's syndrome (KS; an endocrine disorder marked by low T levels beginning prenatally) have higher (feminized) 2D:4D compared to fathers, male controls, and mothers (Manning, Kilduff, & Trivers, 2013). Lutchmaya, Baron-Cohen, Raggatt, Knickmeyer, and Manning (2004) measured T in amniotic fluid from women who underwent amniocentesis and subsequently delivered healthy infants. At age 2, children's digits were measured. These data confirm that low 2D:4D is associated with high prenatal T and high 2D:4D is associated with low prenatal T.

It follows that there should be a relationship between 2D:4D and aggression, yet the findings are not straightforward. Hönekopp and Watson (2011) performed a meta-analysis on studies of this relationship. Their conclusions were twofold: There are consistently negative (albeit weak) 2D:4D–aggression relationships in males. However, research has failed to show a relationship in females. It is therefore paramount that operationalizations of aggression be reconsidered. As noted, research has tended to define aggression in male-typical forms, at the expense of female-typical forms. Indeed, Hönekopp and Watson coded physical aggression as high, direct verbal aggression as medium, and "forms of aggression that did not involve face to face contact" (p. 382) as low. This effectively stacks the deck against identifying a 2D:4D–aggression relationship in females given that female aggression is effectively lost in operational translation. It remains reasonable to predict a 2D:4D–aggression relationship in the general population, including females. The current research explores this by including a number of social aggression assessments.

#### 1.2.2. Emotional intelligence

Trait emotional intelligence (EI), defined as self-perceived emotion-related abilities and dispositions (Petrides & Furnham, 2000)[1], is theorized to promote pro-social behavior and inhibit anti-social behavior. Petrides, Sangareau, Furnham, and Frederickson (2006) found that children with high EI scores on a self-report measure also received high peer-ratings on cooperation and leadership and low ratings on aggression. Children with high EI also received higher pro-social ratings, and lower anti-social ratings, from teachers. The authors maintain that EI influences children's peer relations given that it is inversely associated with aggression. In a subsequent study with adolescents, Mavroveli, Petrides, Rieffe, and Bakker (2007) found positive associations between EI and peer-ratings of social competence and cooperation and a negative, but non-significant, relationship between EI and peer-rated aggression. Finally, Cleverley, Szatmari, Vaillancourt, Boyle, and Lipman (2012) measured overt and social aggression in children from age 10 to 15. At age 18–19, individuals completed an EI measure. Those with a history of high/stable childhood social aggression scored lower on EI than those with low childhood social aggression. It is reasonable to suppose this negative association between social aggression and EI begins in childhood and continues into adulthood.

#### 1.2.3. Parenting

Baumrind (1973) identified *authoritative parenting*, characterized as warm and affectionate, as a correlate of low aggression. *Positive parenting*, marked by autonomy support, involvement, and warmth, is similarly associated with low aggression (Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994). *Authoritarian parenting*, which entails low warmth/affection with high control and punitive discipline, and *permissive parenting*, which lacks rules/monitoring, are associated with high aggression (Casas et al., 2006).

Research on parenting and *social* aggression has netted mixed results. Nelson and Crick (2002) and Nelson, Hart, Yang, Olsen, and Jin (2006) found parental control (a dimension of authoritarianism) related to girls' social aggression. However, multiple studies have failed to identify such relations (e.g., Underwood, Beron, Gentsch, Galperin, & Risser, 2008). Underwood et al. (2008) maintain that measurement error may account for these failures because parenting has been assessed using self-report, which may not be valid. Kawabata, Alink, Tseng, van Ijzendoorn, and Crick (2011) addressed the inconsistent findings by conducting meta-analyses with data from 48 studies. Effects of authoritativeness, authoritarianism, and permissiveness were found for both parents. Thus, meta-analytic study indicate that parenting styles *are* associated with social aggression although parental self-report may mask this effect.

### 1.3. Current study

Associations between social aggression and 2D:4D, EI, and parenting are explored in a female sample.

#### 1.3.1. 2D:4D

Research has failed to confirm a 2D:4D–aggression relationship for females. The current study posits that this failure is due to operationalizations that neglect the forms of aggression that typify females. This limitation is addressed by including assessments of social aggression. 2D:4D is predicted to be inversely associated with aggression.

#### 1.3.2. EI

Aggression has been associated with low EI (Cleverley et al., 2012). In keeping with the developmental research, females who score higher on aggression are predicted to concurrently score lower on EI.

#### 1.3.3. Parenting

In keeping with Kawabata et al.'s (2011) meta-analytic findings, authoritativeness and positive parenting are predicted to be negatively associated with aggression. Authoritarianism and permissiveness are predicted to be positively associated with aggression. Given the sample age, and concern regarding self-report of parenting, participants reported on the parenting styles they experienced. Indeed, it may be *perceptions* of parents' behavior that counts the most vis-a-vis antecedents of children's behavior.

In sum, this study aimed to identify associations between social aggression and 2D:4D, EI, and parenting. Together, 2D:4D, EI, and parenting styles were hypothesized to yield a model with significant predictive power.

## 2. Method

### 2.1. Participants

Participants included 215 female US undergraduates ($M$ age = 20, $SD$ = 2.84). Potential participants were approached randomly in the university library by undergraduate research assistants and asked if they would be interested in participating in a research study. Others were invited to participate through the Psychology Department Subject Pool. There were no differences in the data as a result of recruitment method.

This sample was ethnically diverse; 29% Hispanic/Latino, 17% Asian, 17% Black/African American, 12% White, 3% Native Hawaiian/Pacific Islander, 4% other; 20% identified as multi-ethnic.

[1] This is distinct from *ability* EI which is emotion-related cognitive abilities, measured via performance test (Petrides et al., 2006).