The Relationship between Mental Health Symptoms and Reactive and Proactive Aggression Among Females in Residential Juvenile Justice Facilities

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Suraji R. Wagage

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To my family and Evgeny for their endless support.

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Abstract

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Naomi E. S. Goldstein, Ph.D.

The female juvenile justice population has been traditionally overlooked in research, though it is the fastest-growing segment of the justice system. Intervention development should focus on this population, which is particularly high in both mental health symptom prevalence and levels and rates of aggression. This study examined the relationship between mental health symptoms (internalizing and externalizing) and aggression (reactive and proactive) among girls in residential juvenile justice facilities, and proposed mediators of this relationship (outcome expectations, hostile attribution bias, and anger). Multiple regression analyses indicated that symptoms of generalized anxiety disorder were associated with reactive aggression and with proactive aggression when controlling for symptoms of major depressive disorder, conduct disorder, oppositional defiant disorder, and attention-deficit/hyperactivity disorder. Parallel mediation analyses revealed that anger significantly mediated the relationships between the predictor variables of internalizing symptoms, generalized anxiety disorder, and externalizing symptoms and the outcome variables of reactive and proactive aggression, while outcome expectations and hostile attribution bias did not. Implications for future intervention development and research and limitations are discussed.

CHAPTER 1. BACKGROUND

Historically, females have been relatively disregarded in juvenile justice research (Bergsmann, 1989; Bloom, Owen, Deschenes, & Rosenbaum, 2002). This disregard has been attributed to researchers' belief that female transgressions are a relatively unimportant subset of juvenile offenses (Hoyt & Scherer, 1998). However, it has been recognized that girls are the fastest-growing segment of the justice system (American Bar Association & National Bar Association, 2001; Puzzanchera & Kang, 2011; Sherman, Mendel, Irvine, & Annie E. Casey Foundation, 2013). During a period of decline in violence among male youth, female juvenile violent crime arrests have increased (Huizinga, Miller, & Conduct Problems Prevention Group, 2013; Puzzanchera, 2010). Therefore, studying female juvenile justice-involved youth is critical to understanding patterns of aggression within the juvenile justice population and to laying the foundation for intervention development for females in the justice system, a requirement of the 1992 Reauthorization of the Juvenile Justice Delinquency Prevention (JJDP) Act. The Reauthorization required that states develop gender-specific services to prevent and treat juvenile delinquency, particularly services for female youth (Snyder & Sickmund, 1996). Furthermore, mental health disorders in juvenile populations predict adult recidivism, underscoring the need for intervention (Barrett, Ju, Katsiyannis, & Zhang, 2013; Cottle, Lee, & Heilbrun, 2001; Hoeve, McReynolds, Wasserman, & McMillan, 2013). Girls in residential juvenile justice placements display particularly high rates of aggression (Odgers & Moretti, 2002), and they are among the most difficult populations to treat and manage (Trupin, Stewart, Beach, & Boesky, 2002). Therefore, this study focused on this serious and high-needs population.

1.1 Aggression and Mental Health

Female juvenile justice-involved youth have a unique profile of aggression and mental health symptoms relative to both male juvenile justice-involved youth and females in community samples. Researchers have traditionally focused on overt or physical aggression, a form of aggressive behavior that is more common among males (Björkqvist, 1994), leading to an early interpretation of empirical findings that males were more aggressive than females (e.g., Buss, 1961; Olweus, 1978). However, females across populations tend to manifest aggression more frequently in relational ways—by damaging others through social relationships—than in physical ways (Crick & Grotpeter, 1995; Lagerspetz, Björkqvist, & Peltonen 1988; Odgers & Moretti, 2002). When accounting for this difference, the gender differences in aggression between males and females diminish (Crick & Grotpeter, 1995). Reported rates of aggression also vary by the methodology used to measure aggression; self-report studies have found that males and females report similar levels of relational aggression, but peer nomination studies have found that girls are more likely to be named as perpetrators of relational aggression (Odgers & Moretti, 2002).

Despite these patterns in the general population, female juvenile justice-involved youth uniquely exhibit high levels of both overt and relational aggression (Odgers & Moretti, 2002). Extant measurements of aggression have tended to focus on either the form of aggression (overt or relational) or its function (proactive or reactive). An examination of both dimensions of aggression and their potentially divergent contributory factors is needed. This study focused on the function of aggression (proactive and reactive) rather than its form because this population demonstrates such elevated levels of

both relational and physical aggression that distinguishing between the two may be less useful than examining the intended function of the aggressive acts. Given that considerable research compares relational and physical aggression in females (e.g., Crick & Grotpeter, 1995; Crick, Ostrov, & Werner, 2006; Lansford et al., 2012; Murray-Close, Ostrov, & Crick, 2007), while much research comparing reactive and proactive aggression focuses on males (Marsee & Frick, 2007), this study sought to examine reactive and proactive aggression in females. Furthermore, relational aggression frequently leads to physical aggression, particularly in urban settings, which supports examining both forms in conjunction (Leff et al., 2010; Talbott, Celinska, Simpson, & Coe, 2002; Sullivan, Farrell, & Kliewer, 2006).

Girls in the juvenile justice system have higher rates of psychiatric disorders than males in similar settings and females in community settings. In particular, females in juvenile justice settings display more symptoms of both internalizing disorders (e.g., generalized anxiety disorder (GAD) and major depressive disorder (MDD)) and externalizing disorders (e.g., conduct disorder (CD), oppositional defiant disorder (ODD), and attention-deficit/hyperactivity disorder (ADHD)) than do males in juvenile justice settings (Cauffman, 2004; Karnik et al., 2009; Timmons-Mitchell et al., 1997). Specifically, juvenile justice-involved females score higher than males on nearly all measured diagnoses, including depression, dysthymic disorder, panic disorder, separation anxiety disorder, post-traumatic stress disorder, generalized anxiety disorder, obsessive-compulsive disorder, ADHD, and ODD (Karnik et al., 2009; Teplin, Abram, McClelland, Dulcan & Mericle, 2002). In community populations, this pattern does not appear: girls tend to suffer from internalizing disorders more frequently than do male peers, and boys

tend to suffer from externalizing disorders more often (Cauffman, 2004). This divergent pattern in juvenile justice settings may result because females typically are less likely than males to be detained and placed post-adjudication; those females who are placed may have more substantial problems, including more severe symptomatology (Girls, Incorporated, 1996).

Juvenile justice youths, particularly females, suffer from high rates of comorbidity. More than half of the participants in a sample of girls with conduct disorder met criteria for four or more psychiatric conditions (Odgers & Moretti, 2002). In a sample of juvenile justice youth, nearly 40% of female youth reported symptoms that would result in diagnosis of more than one disorder (McReynolds, Wasserman, Fisher, & Lucas, 2007). Juvenile justice females are significantly more likely than males to suffer from comorbid disorders and to report suicide attempts (Teplin et al., 2002; Wasserman, McReynolds, Schwalbe, Keating, & Jones, 2010). Odgers and Moretti (2002) theorized that high levels of comorbidity in juvenile justice youths stem from the presence of multiple risk factors in the youths' lives, which predispose them both to involvement in the justice system and pathological development. Juvenile justice females' particularly high rates of comorbidity may be caused by familial and social rejection, which may have a greater impact on the psychological functioning of girls than boys due to "sex-typed socialization practices" that encourage females to emphasize relationships with others in identity development (Odgers & Moretti, 2002, p. 110). Male self-development, by contrast, emphasizes independence from others (Odgers & Moretti, 2002).

Alternatively, Crick, Casas, and Mosher (1997) and Crick, Ostrov, and Werner (2006) proposed that females who express a non-gender-normative form of aggression

(e.g., overt aggression) are more likely to have greater mental health symptomatology, perhaps due to the significant peer rejection, sanctions, and intolerance they experience for aggressing in socially unacceptable ways. Although proposed in the context of school-related aggression, this theory may apply to girls in residential juvenile justice placements who tend to have histories of committing non-normative violent or transgressive acts (Crick et al., 1997), including but not limited to those that led to arrest and involvement with the juvenile justice system.

Given that the female juvenile justice population is uniquely high in both mental health symptom prevalence and levels and rates of aggression (Odgers & Moretti, 2002), this population is valuable to studying the relationship between mental health and aggression. Internalizing disorders have been linked with reactive aggression (Crick & Grotpeter, 1995; Loukas, Paulos, & Robinson, 2005; Marsee, Weems, & Taylor, 2008), and externalizing disorders have been linked with both proactive (Crick et al., 1997; Zalecki & Hinshaw, 2004) and reactive aggression (Crick et al., 1997). This study evaluated possible mediators of these relationships.

1.2 Characteristics of Aggressive Youth and Proposed Mediators

Relative to non-aggressive peers, aggressive youths tend to lack emotional understanding (Frick, 2004), be more attentive to hostile social cues (Gouze, 1987), be more likely to attribute hostile intent to ambiguous social cues (i.e., hostile attribution bias) (de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002; Dodge & Frame, 1982), more easily generate aggressive responses to social problems, and overestimate the probability that aggressing will have favorable outcomes (i.e., outcome expectations) (Crick & Dodge, 1994; Dodge, Laird, Lochman, & Zelli, 2002; Gouze, 1987; Guerra &

Slaby, 1990).

These characteristics may be largely understood as stemming from atypical social information processing (Dodge, 1993; Dodge, Pettit, McClaskey, & Brown, 1986). The Social Information Processing (SIP) model identifies six steps between an individual's receipt of a social stimulus (e.g., a peer fails to acknowledge the individual in the hallway at school) and the output of a response (e.g., responding with name-calling) (see Figure 1; Crick & Dodge, 1994). First, during the *encoding* stage, the individual selectively attends to social cues and stores these cues in short-term memory (Crick & Dodge, 1994; Dodge et al., 1986). Second, during the *interpretation* stage, the individual applies meaning to this stimulus (Dodge et al., 1986). Hostile attribution biases are formed at this stage of processing, wherein the individual attaches antagonistic meaning to ambiguous cues (Dodge, 1993). Third, during the *goal clarification* stage, the individual decides on a goal or desired outcome for the exchange (Crick & Dodge, 1994). In the fourth stage, *response access or construction*, the individual conceives of possible responses (Crick & Dodge, 1994; Dodge et al., 1986). In the fifth stage, *response decision*, the individual assesses the acceptability and possible consequences of the potential responses and selects one (Crick & Dodge, 1994; Dodge et al., 1986). At this stage, the individual may gauge the possible outcomes of aggressive responses as more advantageous than those of non-aggressive responses (outcome expectations) and, consequently, select an aggressive response for enactment. In the sixth and final stage, *enactment*, the individual implements the selected response through behavior (Crick & Dodge, 1994; Dodge et al., 1986). The SIP model is non-linear to reflect that individuals engage in multiple steps of social information processing simultaneously, with feedback loops, though processing also

occurs in a logical sequence (Crick & Dodge, 1994).

Atypical social information processing, which is related to aggression in youths (Crick & Dodge, 1996; de Castro et al., 2002; Quiggle, Garber, Panak, & Dodge, 1992), is also related to mental health symptoms (Barrett, Rapee, Dadds, & Ryan, 1996; Daleiden & Vasey, 1997; Dodge, 1993; Quiggle et al., 1992). Therefore, this study proposed a model in which atypical social information processing, particularly hostile attribution bias and outcome expectations, mediates the relationship between internalizing and externalizing symptoms and reactive and proactive aggression (see Figure 2).

1.3 Internalizing Disorders

Symptoms of anxiety and depression are related to atypical social information processing—particularly hostile attribution bias—and reactive aggression. Anxious youths are more likely than non-clinical youths to interpret ambiguous situations in a threatening manner (Barrett et al., 1996), as are anxious adults (Butler & Mathews, 1983; MacLeod, Mathews, & Tata, 1986). This interpretive tendency may be due to anxious individuals' propensities to view the world as threatening and to express attentional biases that emphasize emotionally threatening stimuli (Daleiden, 1997). Depressed children also show a hostile attributional bias (Quiggle et al., 1992). This bias may be due to depressed youths' negative self-schemas (wherein they emphasize negative over positive information) that they apply to the world (Dodge, 1993, Quiggle et al., 1992). Depressed children tend to filter out positive social cues and focus on negative cues (Ingram, 1984). Selective attention to negative cues in both anxious and depressed youths reinforces the tendency to interpret ambiguous cues as hostile (Dodge & Frame, 1982).

Hostile attribution bias is related to increased reactive aggression (Crick & Dodge, 1996; Dodge & Coie, 1987). Youths with this bias impute hostile intent to peers and react aggressively to these perceived slights (Crick & Dodge, 1996).

1.4 Externalizing Disorders

Symptoms of ADHD, CD, and ODD are related to atypical social information processing—both hostile attribution bias and positive outcome expectations for aggressing—and to reactive and proactive aggression. Youths with ODD and CD have strong tendencies to interpret ambiguous situations in threatening manners (Barrett et al., 1996; Dodge et al., 1986; Dodge, 1993). These hostile attributions follow the same pathway described above, resulting in reactive aggression (Quiggle, 1992).

Outcome expectations are related to proactive aggression. Proactive aggression is motivated by the aggressor's expectation of external rewards for aggressing (Dodge & Coie, 1987), and proactively aggressive children evaluate the potential gains associated with aggressive acts more positively than do non-proactively aggressive children (Crick & Dodge, 1996). One reason for this positive assessment is that children with externalizing symptoms tend to emphasize instrumental, self-serving goals over relational goals. These instrumental goals may be served by aggressive acts, whereas relational goals may not be fulfilled through proactively aggressive behaviors (Crick & Dodge, 1996). For example, if the youth's goal is to obtain a peer's possession rather than to befriend the peer, proactive aggression that involves taking the object by force would accomplish this goal, and the youth would be more likely to assess this aggressive approach favorably (Crick & Dodge, 1996).

Aggressive acts can produce feedback that can maintain or exacerbate the

internalizing or externalizing symptoms, perpetuating the cycle between mental health symptoms and aggression. When youths are proactively or reactively aggressive, peers are more likely to be hostile towards them in the future, confirming the youths' biased social information processing (Crick & Dodge, 1996), eliciting anger, and exacerbating adjustment difficulties that may worsen mental health symptoms (Crick et al., 1997).

1.5 Hypotheses

1. Symptoms of internalizing disorders (MDD and GAD) would be positively associated with reactive aggression.
2. Symptoms of externalizing disorders (ODD, CD, and ADHD) would be positively associated with reactive aggression.
3. Symptoms of externalizing disorders (ODD, CD, and ADHD) would be positively associated with proactive aggression.
4. Hostile attribution bias would mediate the relationship between symptoms of internalizing disorders and reactive aggression.
5. Hostile attribution bias would mediate the relationship between symptoms of externalizing disorders and reactive aggression.
6. Outcome expectations would mediate the relationship between symptoms of externalizing disorders and proactive aggression.

CHAPTER 2. METHODS

Data come from a larger National Institute of Mental Health-funded randomized controlled trial, the Juvenile Justice Anger Management (JJAM) Treatment for Girls, a manualized group anger management intervention for female juvenile justice-involved youth.

2.1 Participants

Participants were 70 female juvenile justice-involved youth residing in three post-adjudication juvenile justice facilities: one in Pennsylvania and two in New Jersey. Though 75 participants initially enrolled in the study, five youth did not complete the pre-test assessment due to early release from the facility (n = 3) or refusal (n = 2). In order to be included in the study, participants had to be between 12 and 19 years of age at the time of enrollment, free of severe developmental and intellectual disabilities, free of active psychosis, and English-speaking. Participants additionally had to have a placement of at least 90 days at the facility and had to be at least 18 years old or have a parent or legal guardian who could provide permission, and they had to express interest in participating in the study.

Participants' ages ranged from 14-20 (one individual turned 20 between enrollment and participation; M = 17.45, SD = 1.24), and the sample was racially and ethnically diverse (62.9% Black or African American, 11.4% White, 2.9% Asian, and 22.9% more than one race; 25.7% Hispanic).

2.2 Procedures

After clinical staff members at the juvenile justice facilities determined whether potential participants met inclusion criteria, staff members approached eligible youth to describe the study and gauge interest in participating. If youths expressed interest, researchers then sought consent from participants at or above the age of majority (age 18) or sought to obtain parental or guardian permission for minors. If the parent or guardian provided permission, then the participant's assent was sought. If the participant's parent or guardian could not be reached, then an Institutional Review Board-granted waiver of

consent was invoked and assent was provided by the youth in the presence of a participant advocate from the facility, such as a social worker or youth advocate. Data for this study come from pre-test assessments, which required about four hours to complete and were administered individually by trained research assistants in quiet rooms in each facility.

2.3 Measures

Computerized Diagnostic Interview Schedule for Children (C-DISC) (Shaffer, 1991). The C-DISC is a structured computer-assisted diagnostic interview that screens for mental health symptoms using DSM-IV criteria. The C-DISC assesses symptoms of over thirty psychiatric diagnoses. For the purposes of this study, symptoms of GAD, MDD, and disruptive behavior disorders (ADHD, ODD, CD) were examined. The C-DISC showed moderate to good criterion validity (Schwab-Stone et al., 1996) and adequate reliability (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000).

Peer Conflict Scale - Youth Version (PCS) (Marsee & Frick, 2007). The PCS is a 40-item self-report measure designed to assess aggression by its form (relational and physical) and function (reactive and proactive) by asking individuals to rate on a scale from 0 (“not at all true”) to 3 (“definitely true”) how well statements describe them (e.g., “I start fights to get what I want”). The PCS yields six factors: total overt aggression, reactive overt aggression, proactive overt aggression, total relational aggression, reactive relational aggression, and proactive relational aggression. Internal consistency for the scales was adequate, with Cronbach’s alphas ranging from .76-.90 (Marsee & Frick, 2007).

Outcome Expectations Questionnaire (OEQ) (Perry, Perry, & Rasmussen, 1986). The OEQ is a 48-item self-report questionnaire designed to assess youths' expectations about the results of aggressive behaviors (36 items) and prosocial behaviors (12 items) (e.g., "You are at the front of a long lunch line at school. Jane comes up and meanly tries to cut in front of you. You yell and call her bad names. Do you think you will keep your place?"). Participants rated their certainty in a particular outcome, using a scale from 1 ("very sure" that the consequence would not ensue) to 4 ("very sure" that the consequence would ensue). The OEQ is subdivided into six scales based on the type of consequence expected (tangible reward, adult approval, peer approval, reducing aversive treatment, victim suffering, and self-reward). These scales had moderate internal consistency, with alpha coefficients ranging from .51-.67 (Perry et al., 1986).

Hostile Attribution Bias, "Why Kids Do Things" (HAB) (Crick & Dodge, 1996). This instrument consists of ten vignettes describing situations in which the provocateur's intention is ambiguous (e.g., a peer breaks the individual's possession while the individual is out of the room). For each question, participants select one of four possible reasons for the provocation, two of which are indicative of the provocateur's hostile intent, and two of which are indicative of benign intent. Participants also indicate whether the provocateur's action is intentional or accidental. Internal consistency was good, with Cronbach's alpha of .90 for the intent attribution scale (Crick & Dodge, 1996).

Anger, Aggression Questionnaire (AQ) (Buss & Perry, 1992). The AQ is a 29-item self-report measure designed to assess individuals' "dispositional subtraits" of aggression (Bryant & Smith, 2001, p. 139) by asking individuals to rate how well statements describe them (e.g., "When frustrated, I let my irritation show"). The AQ

yields four factor scores, including anger, physical aggression, indirect aggression, and hostility. Total scores and subscale scores have demonstrated good internal consistency (Buss & Warren, 2000) and stability over time (Buss & Perry, 1992).

2.4 Method of Analysis

Internalizing disorders were measured by adding the C-DISC symptoms endorsed for GAD and MDD and calculating the percentage of total symptoms endorsed (Crawford, Cohen, Midlarsky, & Brook, 2001). Externalizing disorders were measured by adding the C-DISC symptoms endorsed for ADHD, ODD, and CD and calculating the percentage of total symptoms endorsed (Crawford et al., 2001). ADHD, ODD, and CD were considered externalizing disorders and examined together, consistent with previous research deeming them "disruptive behavior disorders" that are "characterized by behavioral disinhibition" (King, Iacono, & McGue, 2004, p. 1548; Waschbusch & Willoughby, 1998). Examining these disorders together is considered to have been "established empirically, with documented reliability, validity, and utility" (Waschbusch & Willoughby, 1998, p. 397; Lahey, Applegate, Barkley, et al., 1994).

C-DISC symptoms were used instead of diagnoses because frequencies of diagnoses in our sample were unusually low given the high number of symptoms endorsed by participants. Though participants, on average, endorsed 3.32 symptoms (*SD* = 3.29) of GAD out of a possible 12 total, 6.54 symptoms (*SD* = 5.39) of MDD out of 22, 4.97 symptoms (*SD* = 5.20) of ADHD out of 23, 10.06 symptoms (*SD* = 6.02) of CD out of 26, and 3.70 symptoms (*SD* = 3.22) of ODD out of 12, zero participants received a positive diagnosis of GAD, 2 participants received a positive diagnosis of MDD, 3 participants received a positive diagnosis of ADHD, 8 participants received a positive

diagnosis of CD, and 3 participants received a positive diagnosis of ODD. Therefore, utilizing C-DISC diagnosis rates would have been misleading because diagnosis rates in this sample did not appear to accurately reflect level of mental health distress, as indicated by the high rates of endorsed symptoms. High levels of symptoms despite low numbers of diagnoses may indicate distress that crosses diagnostic categories. Given expected high levels of comorbidity in this population, it is also important to note that C-DISC symptoms do not overlap between diagnoses: each question counts toward only one diagnosis.

Reactive aggression was measured by adding PCS scores for reactive overt aggression and reactive relational aggression (Marsee, 2008). Proactive aggression was measured by adding PCS scores for proactive overt aggression and proactive relational aggression (Marsee, 2008). Hostile attribution bias was measured by total score on the HAB. Outcome expectations were measured by total score on the OEQ. Anger was measured by anger score on the AQ.

To evaluate the relationship between mental health symptoms and reactive aggression, reactive aggression was regressed simultaneously on internalizing symptoms and externalizing symptoms. In order to examine these relationships in greater detail, multiple regression equations were calculated in which *relational* reactive aggression was regressed simultaneously on symptoms of individual disorders (MDD, GAD, CD, ODD, ADHD), and in which *overt* reactive aggression was regressed simultaneously on symptoms of MDD, GAD, CD, ODD, and ADHD. To examine the relationship between externalizing symptoms and proactive aggression, proactive aggression was regressed on externalizing symptoms. Furthermore, *relational* proactive aggression was regressed

simultaneously on symptoms of MDD, GAD, CD, ODD, and ADHD, and *overt* proactive aggression was regressed simultaneously on symptoms of MDD, GAD, CD, ODD, and ADHD.

Preacher and Hayes' (2004) SPSS nonparametric bootstrapping macro for parallel mediation, with 10,000 re-samples, was used to examine mediation. Potential mediators included in parallel mediation analyses included hostile attribution bias, outcome expectations of aggression, and anger T-scores. Three sets of mediation analyses were conducted to evaluate whether these variables mediated the effect of internalizing symptoms, GAD, and externalizing symptoms respectively on *reactive* aggression. Three sets of mediation analyses were then conducted to evaluate whether these variables mediated the effect of internalizing symptoms, GAD, and externalizing symptoms respectively on *proactive* aggression. GAD symptoms were used as a predictor in separate mediation analyses because of their association with reactive and proactive aggression when controlling for other symptoms (see Results).

A sample size of seventy was likely sufficient to power the mediation analyses, which find significant results with even small samples (Preacher & Hayes, 2004, 2008). An a priori power analysis for linear multiple regression with five predictors (GAD, MDD, ODD, CD, and ADHD) revealed that 92 participants would be needed to produce a power of .80 to detect a medium effect ($f^2 = 0.15$; Cohen, 1988), if one exists, at an alpha level of .05. Six hundred and forty-seven participants would be needed to produce a power of .80 to detect a small effect ($f^2 = 0.02$; Cohen, 1988) with an alpha level of .05 with five predictors. For a linear multiple regression analysis with two predictors (internalizing and externalizing symptoms) and an alpha level of .05, 68 participants

would be needed to produce a power of .80 to detect a medium effect, and 485 participants would be needed to produce a power of .80 to detect a small effect.

CHAPTER 3. RESULTS

3.1 Descriptive Statistics

Table 1 presents the means and standard deviations of the primary variables examined in this study: proactive aggression (relational and overt), reactive aggression (relational and overt), internalizing symptoms (including symptoms of MDD and GAD), externalizing symptoms (including symptoms of ODD, ADHD, and CD), hostile attribution bias, outcome expectations, and anger. Participants' aggression scores did not differ significantly from those of the normative sample of detained girls on the PCS Total Proactive Aggression subscale, $t(126) = 0.40$, $p = 0.69$, $d = 0.07$ (small), 95% CI [-0.29, 0.43]. However, participants' scores on the Total Reactive Aggression subscale were significantly lower than those of the normative sample of detained girls, $t(126) = 2.17$, $p = .03$, $d = 0.39$ (small), 95% CI [0.02, 0.75].

3.2 Analyses

No significant violations of data analytic assumptions (i.e., normality, linearity, multicollinearity and homoscedasticity) were identified.

Reactive Aggression. As predicted, both internalizing, $r = .31$, $p = .02$, and externalizing, $r = .29$, $p = .03$, symptoms were positively associated with reactive aggression. However, when examined simultaneously via a multiple regression equation, neither internalizing symptoms, $b = .12$, $SE_b = .07$, $p = .11$, nor externalizing symptoms, $b = .11$, $SE_b = .09$, $p = .24$, were positively associated with reactive aggression, $R^2 = 0.13$, $f^2 = 0.15$ (medium), 95% CI [-.02, .39]. However, symptoms of generalized anxiety

disorder were associated with reactive aggression, $b = 1.68$, $SE_b = .70$, $p = .02$, when symptoms of MDD, CD, ODD and ADHD were simultaneously entered as predictors in a multiple regression equation, $R^2 = 0.19$, $f^2 = 0.23$ (medium), 95% CI [.03, .53] (see Table 2 for full results).

The relationship between GAD symptoms and reactive aggression appears to be a relationship between GAD (and internalizing symptoms more generally) and *relational* reactive aggression, rather than overt reactive aggression. Internalizing symptoms were associated with relational reactive aggression, $b = .06$, $SE_b = .03$, $p = .05$, when controlling for externalizing symptoms, $b = .01$, $SE_b = .04$, $p = .73$; $R^2 = 0.11$, $f^2 = 0.12$ (small), 95% CI [-.03, .33]. Symptoms of GAD were strongly associated with relational reactive aggression, $b = .86$, $SE_b = .31$, $p < .01$, when controlling for symptoms of MDD, CD, ODD, and ADHD, $R^2 = 0.19$, $f^2 = 0.23$ (medium), 95% CI [.03, .53] (see Table 3 for full results). Internalizing, $b = .06$, $SE_b = .05$, $p = .25$, and externalizing symptoms, $b = .09$, $SE_b = .06$, $p = .12$, were not associated with overt reactive aggression when simultaneously entered as predictors in a multiple regression equation, $R^2 = 0.12$, $f^2 = 0.14$ (small), 95% CI [-.02, .37].

Proactive Aggression. Contrary to predictions, externalizing symptoms were not positively associated with proactive aggression, $b < .01$, $SE_b = .07$, $p = .97$, when controlling for internalizing symptoms, $b = .09$, $SE_b = .06$, $p = .10$; $R^2 = 0.07$, $f^2 = 0.08$ (small), 95% CI [-.05, .23]. However, internalizing symptoms were found to be associated with proactive *relational* aggression, $b = .06$, $SE_b = .03$, $p = .04$, when controlling for externalizing symptoms, $b = -.03$, $SE_b = .03$, $p = .41$; $R^2 = 0.09$, $f^2 = 0.09$ (small), 95% CI [-.04, .27]. Furthermore, symptoms of GAD were associated with

proactive aggression, $b = 1.22$, $SE_b = .54$, $p = .03$, when controlling for symptoms of MDD, CD, ODD, and ADHD, $R^2 = 0.14$, $f^2 = 0.16$ (medium), 95% CI [-.01, .39] (see Table 4 for full results). The relationship between GAD and proactive aggression was observed with both overt proactive aggression, $b = .68$, $SE_b = .31$, $p = .04$; $R^2 = 0.14$, $f^2 = 0.16$ (medium), 95% CI [-.01, .39] (see Table 5 for full results), and relational proactive aggression, $b = .54$, $SE_b = .26$, $p = .04$; $R^2 = 0.14$, $f^2 = 0.16$ (medium), 95% CI [-.01, .39] (see Table 6 for full results).

Mediation. Mediation analyses revealed that hostile attribution bias and outcome expectations of aggression did not significantly mediate the relationships between internalizing and externalizing symptoms and reactive and proactive aggression; the 95% bias corrected and accelerated confidence intervals were estimated to include zero. Because atypical social information processing and, in particular, hostile attribution bias also lead to increased expressions of anger (Dodge & Coie, 1987), this study also evaluated whether anger mediated the relationship between internalizing and externalizing symptoms and reactive and proactive aggression. Anger was found to significantly mediate the relationships between the predictor variables of internalizing symptoms, GAD, and externalizing symptoms and the outcome variables of reactive and proactive aggression. See Tables 7 and 8 for 95% bias corrected and accelerated confidence intervals.

CHAPTER 4. DISCUSSION

Though the results of the current study did not support the full hypothesized model, they raise important considerations for future intervention development and research. For instance, this study highlights the connections among mental health, anger,

and aggression, finding that anger mediated the relationship between mental health symptoms and aggression, and underlines the importance of further investigating the demonstrated relationship between anxiety and aggression.

The current study's finding that anger mediated the relationship between mental health and aggression suggests a basis for understanding how similar techniques in anger management and mental health treatment protocols may effect the same changes, though they are aimed at different mechanisms. Anger management techniques that overlap with treatment protocols for internalizing and externalizing symptoms include emotion regulation, relaxation training, cognitive restructuring, problem-solving skills, and mindfulness techniques (Blake & Hamrin, 2007). Anger management interventions have effectively used cognitive behavioral techniques (Beck & Fernandez, 1998; Deffenbacher, Oetting, & DiGiuseppe, 2002). For example, of programs developed for juvenile justice populations, the Juvenile Justice Anger Management Treatment for Girls (JJAM), a specialized anger management and aggression reduction intervention for adolescent girls in juvenile justice facilities, is based on cognitive-behavioral principles, including emotion regulation, social problem solving, and cognitive restructuring of hostile attributions (Goldstein et al., 2013). Aggression Replacement Training (ART), which was developed for male and female juvenile justice-involved youth in residential placement and has been widely implemented, also involves teaching "skills for dealing with feelings" (i.e., emotion regulation skills; Goldstein & Glick, 1994, p. 10), as well as problem-solving skills, identifying triggers that provoke heightened emotional responses, relaxation techniques, and cognitive self-evaluation (Goldstein et al., 1986). These programs are based, in part, upon conceptualizations that view cognitive distortions (e.g.,

dysfunctional appraisals) and cognitive skills deficits (e.g., impaired problem-solving skills) as contributing to aggression in these juvenile justice populations (Tate, Reppucci, & Mulvey, 1995).

Anger's role as a link between mental health and aggression, if it is supported by additional research with larger samples, would provide a basis of support for anger management requirements in juvenile dispositions, as it may be important to both wellbeing and criminogenic needs. However, anger management protocols designed for the particular needs of female youths are rare. For example, development and validation of Aggression Replacement Training has generally utilized male participants (Leeman, Gibbs, & Filler, 1993; Glick & Goldstein, 1987; Goldstein et al., 1986). The JJAM intervention sought to fill this gap by focusing on female youths, targeting girls' use of relational aggression and the importance of strengthening relationships (Goldstein et al., 2013).

4.1 Anxiety and Aggression

Additionally, internalizing symptoms, in particular symptoms of GAD, were found to be associated with relational reactive aggression and overt and relational proactive aggression. A host of evidence links anxiety and aggression. Anxious individuals—youths and adults—show a propensity to interpret ambiguous situations as threatening (Barrett et al., 1996; MacLeod, Mathews, & Tata, 1986), selectively perceive hostility in others, and have greater hostile feelings towards others (DeWall, Buckner, Lambert, Cohen, & Fincham, 2010). Anxiety, if viewed as "emotional anticipation of an aversive situation" (Neumann, Veenema, & Beiderbeck, 2010, p. 2), can be conceptualized as a precursor to anger and aggression if the anticipated aversive

situations are interpersonal. In other words, anxious youths may anticipate hostility in others and react aggressively to perceived slights, resulting in negative outcomes which may engender increased anxiety in the future. Such youths may also use proactive aggression to achieve goals, in anticipation of hostility from others that has not yet occurred. Neumann et al. (2010) hypothesized an overlap between the neurocircuitry and neurochemical systems that regulate anxiety and aggression; for example, benzodiazepines tend to reduce aggressive behavior, along with their anxiolytic effects (Cherek & Lane, 2001), and drugs used to treat aggression-related disorders act through the dopaminergic and serotonergic systems, which are both implicated in anxiety (Millan, 2003). Among juvenile justice-involved girls in particular, anxiety disorders have been found to be a risk factor for future offending (Plattner et al., 2009). The current study suggests that the association of anxiety and aggression is relevant to female juvenile justice involved youths as well as the other populations in which anxiety and aggression have been studied—generally adult males. Many treatments for youths with justice involvement focus on reducing aggression as a means of preventing recidivism (e.g., the Juvenile Justice Anger Management Treatment for Girls [Goldstein et al., 2013]; Aggression Replacement Training [Glick & Goldstein, 1987]; Anger Control Training [Feindler, Marriott, & Iwata, 1984]; stress inoculation [Schlichter & Horan, 1981]). These results suggest that more attention should be paid to the treatment of internalizing disorders, and particularly GAD—not only as a clinical intervention goal, but as a rehabilitative goal for addressing criminogenic needs and reducing recidivism risk. Treatments that reduce anxiety in juvenile justice-involved girls may be associated with reductions in aggression and recidivism as well.

Externalizing symptoms (symptoms of ODD, CD, and ADHD) were hypothesized to be associated with reactive and proactive aggression because youths with externalizing disorders tend to interpret ambiguous situations as threatening (hostile attribution bias; Barrett et al., 1996; Dodge et al., 1986; Dodge, 1993), expect positive outcomes for aggressing (outcome expectations; Dodge & Coie, 1987) and feel confident in their abilities to carry out aggressive acts (Matthys, Cuperus, & Van Engeland, 1999), which in turn lead to increased aggression. This aspect of the hypothesized model—the relationship between externalizing symptoms and aggression—was not supported in this study, which was inconsistent with previous research (e.g., Barrett et al., 1996; Dodge & Coie, 1987; Matthys et al., 1999). This relationship may have been present but may not have been detected due to insufficient sample size to observe a small effect with two or five predictors or a medium effect with five predictors, and minimally sufficient sample size to obtain a power of .80 to observe a medium effect with two predictors. Alternatively, the relationship may not have been present due to nuances in symptoms of each disorder. For example, it is possible that endorsed symptoms of ADHD in this sample were more often symptoms of inattentiveness than of hyperactivity, which could have led to withdrawal instead of aggression, or that endorsed symptoms of ODD and CD were more strongly associated with withdrawal, isolation, and rule-breaking than with aggression against others.

Regarding more specific components of this model, hostile attribution bias and outcome expectations did not appear to mediate the relationships between mental health symptoms and aggression, contrary to predictions. This may be due in part to a lack of sensitivity of the measures to detect an extant relationship. For example, measures of

hostile attribution bias and outcome expectations rely on youths' abilities to accurately predict their thoughts and reactions in hypothetical situations. Youths' abilities to predict and report their reactions may vary across youths and situations, even though youths may in fact exhibit hostile attribution bias or hold positive expectations for aggressing during real-life interpersonal exchanges and instances of proactive or reactive aggression.

Or the model, as hypothesized, may have been inaccurate, perhaps due to the presence of trauma histories, which could serve as a more significant mechanism in this model than hostile attribution bias and outcome expectations. Female justice-involved youth tend to have high levels of trauma-related symptoms (Abram et al., 2004; Brosky & Lally, 2004), which may inform the model describing the relationship between mental health symptoms and aggression in ways not addressed by this study. Girls in secure juvenile justice placements report trauma histories (often consisting of "multiple ongoing incidents consistent with complex trauma") at very high rates, from 70% to 90% (Abram et al., 2004; Cauffman et al., 1998; Ford, Chapman, Connor, & Cruise, 2012, p. 712). Complex trauma involves the experience of traumatic events either at an early age or in a context that jeopardizes youths' attachment with caregivers and the ability to regulate emotions, and often involves ongoing events and multiple types of stressors (Cook et al., 2005; Ford, 2005; Ford et al., 2012). Complex trauma may include abuse, assault, family and community violence, and bullying (Finkelhor, Ormrod, & Turner, 2009; Ford et al., 2012).

Histories of complex trauma place youths at risk for internalizing and externalizing disorders and aggressive behavior (Ford et al., 2012). Several hypothesized mechanisms connect traumatic experience, mental health symptoms, and aggression.

Youths who spend a period of time in childhood "preoccup[ied] with detecting and surviving threats" are hypothesized to undergo changes in psychological, behavioral, and nervous system functioning (Ford et al., 2012, p. 696). Psychological and behavioral changes include "hypervigilance, dysphoria, reduced tolerance for frustration and delayed gratification, [and] impulsivity," and nervous system changes alter "reward and motivation systems… distress tolerance systems… and 'executive' systems" (Ford et al., 2012, p. 696). These changes predispose youths to suffer from psychopathology including internalizing and externalizing disorders, and impairment of self-regulatory systems can lead to increased aggression.

Beyond individual factors, this model also did not account for factors related to youths' families, schools, or communities that contribute to normative beliefs about aggression. For instance, exposure to community violence causes youths to "habituate to" aggression and "experience it as less aversive," thereby altering youths' beliefs about the acceptability of aggression (Guerra, Huesman, & Spindler, 2003, p. 1561). Beliefs about the acceptability of aggression predict aggressive behavior in peer, teacher, and self-reports (Henry et al., 2000; Huesman & Guerra, 1997). Exposure to community violence may also result in psychopathology (Guerra et al., 2003).

The absence of predictive factors, such as trauma history or normative beliefs about aggression, may help explain the low percentages of explained variance (between 7% and 19%) that were observed in regression analyses—inclusion of these factors may decrease percentages of unexplained variance.

4.2 Aggression

When seeking to understand aggression among youths, it is important to consider the form that the aggression takes (relational or overt) and function that it serves (reactive or proactive). These nuances are particularly important when it comes to female youths, as females and males may show similar levels of aggression when relational aggression is taken into consideration (Crick and Grotpeter, 1995), but not when overt aggression alone is studied (Björkqvist, 1994). Subtypes of aggression may also have different relationships with mental health symptoms, as Crick, Casas, and Mosher (1997) proposed that girls who express more overt aggression may be more likely to suffer from greater mental health concerns.

This study found that internalizing symptoms overall and GAD are more strongly associated with relational aggression than with overt aggression. Girls who are anxious may tend to be more aggressive, as described above, and may express this aggression through relational means. This finding emphasizes the importance of taking into account the form that aggression takes when examining the relationship between mental health and aggression. Furthermore, as relational aggression is associated with social rejection independent of overt aggression (Crick & Grotpeter, 1995), this link between anxiety and relational aggression may lead to a cycle wherein anxious individuals aggress relationally, triggering social rejection, which further intensifies anxiety. The link between anxiety and relational aggression and its association with social rejection should be examined further.

Reactive aggression and proactive aggression are distinct but correlated types of aggression (Kempes, 2005; Vitaro, Gendreau, Tremblay, & Oligny, 1998). Among boys

in the community, proactive but not reactive aggression (as reported by teachers) predicted delinquency and externalizing problems (ODD and CD; Vitaro et al., 1998). In this sample of girls, externalizing symptoms did not predict aggression, though this study measured self-reported aggression; in interpreting youths' reactive and proactive aggression, one must keep in mind that instances that may appear to staff or peers as unprovoked proactive aggression may be considered reactive by the aggressor. For example, given aggressive youths' propensities to interpret neutral stimuli as threatening, a stimulus that bystanders may not notice or may consider benign could instigate an aggressive reaction. Therefore, in order to understand and address aggression, the aggressor's perspective—rather than the perspective of staff or peers—is critical when conducting assessments and evaluating responses to treatment. In juvenile justice settings, disciplinary measures in response to aggressive acts are typically enforced based on staff perspectives, but it may be especially important to the success of behavioral shaping techniques to consider the youths' perspectives of aggressive acts.

4.3 Limitations

Results from the current study must be interpreted in light of several limitations. First, the limited sample size may have restricted power to detect small-to-moderate effects, particularly with respect to broader model testing; nevertheless, this study involved an average-to-large sample size for studies of girls in residential post-adjudication facilities (e.g., Dixon, Howie, & Starling, 2005 [100 female youths]; Kataoka et al., 2001 [54 female youths]; Timmons-Mitchell et al., 1997 [52 female youths]). Second, all measures used were self report. Though this is advantageous in terms of examining youths' reasons for aggressing and gathering information about

internal experiences of anger and mental health symptoms, additional methods of reporting could increase the validity of the findings (e.g., if youths who report high levels of aggression are also considered more aggressive by staff or peers). Furthermore, the measures assess youths' experiences and perspectives at one time point, which limits conclusions that can be drawn. For example, measurement at different time points could examine whether changes in mental health symptoms are associated with changes in anger and aggression, which would support a model linking mental health symptoms, anger, and aggression. Given that this study used measurements at one time point, it may appear to support a unidirectional model, wherein anger mediates the relationship between mental health and aggression. However, the hypothesized model is multidirectional: aggression may lead to mental health symptoms, and the described effects may have feedback effects (e.g., anxiety may lead to aggression, which causes peer hostility and intensifies existing mental health concerns). This study could not evaluate such effects due to its temporal limitation.

4.4 Conclusions

Further research should investigate the impact of trauma history on this model, because trauma has been shown to affect and interact with mental health symptoms, aggression, and anger. Future studies, as discussed, could examine this model in a research design that incorporates other ratings, such as peer, teacher, or staff behavioral observations, and compare them to self report, and could also examine this model in different populations (e.g., youths with more serious aggression and mental health concerns). Further research should also examine whether changes in mental health

symptoms—particularly internalizing symptoms and symptoms of GAD—are associated with changes in anger and aggression in both juvenile justice and community youths.

Overall, this study lays the groundwork for future intervention development and research regarding the relationships among mental health, anger, and aggression in juvenile justice involved females. This study suggests that—if these results are replicated with larger samples—it may be worthwhile to integrate mental health and anger management treatment for girls in post-adjudication facilities rather than delivering the two separately, as they may be achieving outcomes through similar mechanisms. This study also indicates the importance of the theoretical distinction between form and function of aggression, providing a conceptual framework within which to examine future hypotheses related to the relationships among aggression, mental health, and anger.

List of References

Abram, K. M., Teplin, L. A., Charles, D. R., Longworth, S. L., McClelland, G. M., & Dulcan, M. K. (2004). Posttraumatic stress disorder and trauma in youth in juvenile detention. *Archives of General Psychiatry*, *61*(4), 403-410.

American Bar Association, United States of America & National Bar Association, United States of America (2001). Justice by gender: The lack of appropriate prevention, diversion and treatment alternatives for girls in the justice system.

Barrett, D. E., Ju, S., Katsiyannis, A., & Zhang, D. (2013). Females in the juvenile justice system: Influences on delinquency and recidivism. *Journal of Child and Family Studies*, 1-7.

Barrett, P. M., Rapee, R. M., Dadds, M. M., & Ryan, S. M. (1996). Family enhancement of cognitive style in anxious and aggressive children. *Journal of Abnormal Child Psychology*, *24*(2), 187-203.

Beck, R., & Fernandez, E. (1998). Cognitive-behavioral therapy in the treatment of anger: A meta-analysis. *Cognitive Therapy and Research*, *22*(1), 63-74.

Bergsmann, I. R. (1989). The forgotten few: juvenile female offenders, *Federal Probation*, *53*, 73-78.

Björkqvist, K. (1994). Sex differences in physical, verbal, and indirect aggression: A review of recent research. *Sex Roles*, *30*(3-4), 177-188.

Blake, C. S., & Hamrin, V. (2007). Current approaches to the assessment and management of anger and aggression in youth: A review. *Journal of Child and Adolescent Psychiatric Nursing*, *20*(4), 209-221.

Bloom, B., Owen, B., Deschenes, E. P., & Rosenbaum, J. (2002). Moving toward justice for female juvenile offenders in the new millennium modeling gender-specific policies and programs. *Journal of Contemporary Criminal Justice*, *18*(1), 37-56.

Brosky, B. A., & Lally, S. J. (2004). Prevalence of trauma, PTSD, and dissociation in court-referred adolescents. *Journal of Interpersonal Violence*, *19*(7), 801-814.

Bryant, F. B., & Smith, B. D. (2001). Refining the architecture of aggression: A measurement model for the Buss–Perry Aggression Questionnaire. *Journal of Research in Personality*, *35*(2), 138-167.

Buss, A. H. (1961). *The psychology of aggression.* New York, NY: Wiley.

Buss, A. H., & Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology*, *63*(3), 452-459.

Buss, A. H., & Warren, W. L. (2000). *Aggression questionnaire (AQ) manual*. Torrance, CA: Western Psychological Services.

Butler, G., & Mathews, A. (1983). Cognitive processes in anxiety. *Advances in Behaviour Research and Therapy*, *5*(1), 51-62.

Cauffman, E., Feldman, S. S., Waterman, J., & Steiner, H. (1998). Posttraumatic stress disorder among female juvenile offenders. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 1209-1216.

Cauffman, E. (2004). A statewide screening of mental health symptoms among juvenile offenders in detention. *Journal of the American Academy of Child & Adolescent Psychiatry*, *43*(4), 430-439.

Cherek, D. R., & Lane, S. D. (2001). Acute effects of D-fenfluramine on simultaneous measures of aggressive escape and impulsive responses of adult males with and without a history of conduct disorder. *Psychopharmacology*, *157*(3), 221-227.

Cohen, J. (1988). The effect size. *Statistical Power Analysis for the Behavioral Sciences*, *2*, 77-83.

Cook, A., Spinazzola, P., Ford, J., Lanktree, C., Blaustein, M., Cloitre, M., . . . van der Kolk, B. (2005). Complex trauma in children and adolescents. *Psychiatric Annals, 35*, 390-398.

Cottle, C. C., Lee, R. J., & Heilbrun, K. (2001). The prediction of criminal recidivism in juveniles: A meta-analysis. *Criminal Justice and Behavior*, *28*(3), 367-394.

Crawford, T. N., Cohen, P., Midlarsky, E., & Brook, J. S. (2001). Internalizing symptoms in adolescents: Gender differences in vulnerability to parental distress and discord. *Journal of Research on Adolescence*, *11*(1), 95-118.

Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information-processing mechanisms in children's social adjustment. *Psychological Bulletin*, *115*(1), 74-101.

Crick, N. R., & Dodge, K. A. (1996). Social information-processing mechanisms in reactive and proactive aggression. *Child Development*, *67*(3), 993-1002.

Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development*, *66*(3), 710-722.

Crick, N. R., Casas, J. F., & Mosher, M. (1997). Relational and overt aggression in preschool. *Developmental Psychology*, *33*(4), 579.

Daleiden, E. L., & Vasey, M. W. (1997). An information-processing perspective on childhood anxiety. *Clinical Psychology Review*, *17*(4), 407-429.

de Castro, B. O., Veerman, J. W., Koops, W., Bosch, J. D., & Monshouwer, H. J. (2002). Hostile attribution of intent and aggressive behavior: A meta-analysis. *Child Development*, *73*(3), 916-934.

Deffenbacher, J. L., Oetting, E. R., & DiGiuseppe, R. A. (2002). Principles of empirically supported interventions applied to anger management. *The Counseling Psychologist*, *30*(2), 262-280.

DeWall, C. N., Buckner, J. D., Lambert, N. M., Cohen, A. S., & Fincham, F. D. (2010). Bracing for the worst, but behaving the best: Social anxiety, hostility, and behavioral aggression. *Journal of Anxiety Disorders*, *24*(2), 260-268.

Dixon, A., Howie, P., & Starling, J. (2005). Trauma exposure, posttraumatic stress, and psychiatric comorbidity in female juvenile offenders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *44*(8), 798-806.

Dodge, K. A. (1993). Social-cognitive mechanisms in the development of conduct disorder and depression. *Annual Review of Psychology*, *44*(1), 559-584.

Dodge, K. A., & Coie, J. D. (1987). Social-information-processing factors in reactive and proactive aggression in children's peer groups. *Journal of Personality and Social Psychology*, *53*(6), 1146-1158.

Dodge, K. A., & Frame, C. L. (1982). Social cognitive biases and deficits in aggressive boys. *Child Development, 53*(3), 620-635.

Dodge, K. A., Laird, R., Lochman, J. E., & Zelli, A. (2002). Multidimensional latent-construct analysis of children's social information processing patterns: Correlations with aggressive behavior problems. *Psychological Assessment*, *14*(1), 60-73.

Dodge, K. A., Pettit, G.S., McClaskey, C.L., Brown, M.M. (1986). A social information processing model of social competence in children. *Monographs of the Society for Research in Child Development, 51*(2), 77-125.

Feindler, E. L., Marriott, S. A., & Iwata, M. (1984). Group anger control training for junior high school delinquents. *Cognitive Therapy and Research*, *8*(3), 299-311.

Finkelhor, D., Ormrod, R., & Turner, H. A. (2009). Lifetime assessment of poly-victimization in a national sample of chil- dren and youth. *Child Abuse & Neglect, 33*, 403-411.

Ford, J. D. (2005). Treatment implications of altered neurobiology, affect regulation and information processing following child maltreatment. *Psychiatric Annals, 35*, 410-419.

Ford, J. D., Chapman, J., Connor, D. F., & Cruise, K. R. (2012). Complex trauma and aggression in secure juvenile justice settings. *Criminal Justice and Behavior*, *39*(6), 694-724.

Frick, P. J. (2004). Developmental pathways to conduct disorder: Implications for serving youth who show severe aggressive and antisocial behavior. *Psychology in the Schools*, *41*(8), 823-834.

Frick, R. W. (1995). Accepting the null hypothesis. *Memory & Cognition*, *23*(1), 132-138.

Girls, Incorporated (1996). *Prevention and Parity: Girls in Juvenile Justice*. Indianapolis, IN.

Glick, B., & Goldstein, A. P. (1987). Aggression replacement training. *Journal of Counseling & Development 65*, 356-362.

Goldstein, A. P., & Glick, B. (1994). Aggression replacement training: Curriculum and evaluation. *Simulation & Gaming*, *25*(1), 9-26.

Goldstein, A. P., Glick, B., Reiner, S., Zimmerman, D., Coultry, T. M., & Gold, D. (1986). Aggression Replacement Training: A comprehensive intervention for the acting-out delinquent. *Journal of Correctional Education*, *37*(3), 120-126.

Goldstein, N. E., Serico, J. M., Romaine, C. L. R., Zelechoski, A. D., Kalbeitzer, R., Kemp, K., & Lane, C. (2013). Development of the juvenile justice anger management treatment for girls. *Cognitive and Behavioral Practice*, *20*(2), 171-188.

Gouze, K. R. (1987). Attention and social problem solving as correlates of aggression in preschool males. *Journal of Abnormal Child Psychology*, *15*(2), 181-197.

Guerra, N. G., Rowell Huesmann, L., & Spindler, A. (2003). Community violence exposure, social cognition, and aggression among urban elementary school children. *Child Development, 74*(5), 1561-1576.

Guerra, N. G., & Slaby, R. G. (1990). Cognitive mediators of aggression in adolescent offenders: II. Intervention. *Developmental Psychology*, *26*(2), 269-277.

Henry, D., Guerra, N., Huesmann, R., Tolan, P., VanAcker, R., & Eron, L. (2000). Normative influences on aggression in urban elementary school classrooms. *American Journal of Community Psychology, 28*(1), 59-81.

Hoeve, M., McReynolds, L. S., Wasserman, G. A., & McMillan, C. (2013). The influence of mental health disorders on severity of reoffending in juveniles. *Criminal Justice and Behavior*, *40*(3), 289-301.

Hoyt, S., & Scherer, D. G. (1998). Female juvenile delinquency: Misunderstood by the juvenile justice system, neglected by social science. *Law and Human Behavior*, *22*(1), 81-107.

Huesmann, L. R., & Guerra, N. G. (1997). Children's normative beliefs about aggression and aggressive behavior. *Journal of Personality and Social Psychology, 72*(2), 408-419.

Huizinga, D., Miller, S., & Conduct Problems Prevention Group (2013). *Girls study group: Understanding and responding to girls' delinquency.* Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

Ingram, R. E. (1984). Toward an information-processing analysis of depression. *Cognitive Therapy and Research*, *8*(5), 443-477.

Karnik, N., Soller, M., Redlich, A., Silverman, M., Kraemer, H., Haapanen, R., & Steiner, H. (2009). Prevalence of and gender differences in psychiatric disorders among juvenile delinquents incarcerated for nine months. *Psychiatric Services*, *60*(6), 838-841.

Kataoka, S. H., Zima, B. T., Dupre, D. A., Moreno, K. A., Yang, X., & McCracken, J. T. (2001). Mental health problems and service use among female juvenile offenders: Their relationship to criminal history. *Journal of the American Academy of Child & Adolescent Psychiatry*, *40*(5), 549-555.

Kempes, M., Matthys, W., De Vries, H., & Van Engeland, H. (2005). Reactive and proactive aggression in children: A review of theory, findings and the relevance for child and adolescent psychiatry. *European Child & Adolescent Psychiatry*, *14*(1), 11-19.

King, S. M., Iacono, W. G., & McGue, M. (2004). Childhood externalizing and internalizing psychopathology in the prediction of early substance use. *Addiction, 99*(12), 1548-1559.

Lagerspetz, K. M., Björkqvist, K., & Peltonen, T. (1988). Is indirect aggression typical of females? Gender differences in aggressiveness in 11-to 12-year-old children. *Aggressive Behavior*, *14*(6), 403-414.

Lahey, B. B., Applegate, B., Barkley, R. A., Garfinkel, B., McBurnett, K., Kerdyk, L., ... & Biederman, J. (1994). DSM-IV field trials for oppositional defiant disorder and conduct disorder in children and adolescents. *American Journal of Psychiatry, 151*(8), 1163-1171.

Leeman, L. W., Gibbs, J. C., & Fuller, D. (1993). Evaluation of a multi-component group treatment program for juvenile delinquents. *Aggressive Behavior*, *19*(4), 281-292.

Leff, S. S., Waasdorp, T. E., Paskewich, B., Gullan, R. L., Jawad, A. F., MacEvoy, J. P., ... & Power, T. J. (2010). The preventing relational aggression in schools everyday program: A preliminary evaluation of acceptability and impact. *School Psychology Review*, *39*(4), 569-587.

Loukas, A., Paulos, S. K., & Robinson, S. (2005). Early adolescent social and overt aggression: Examining the roles of social anxiety and maternal psychological control. *Journal of Youth and Adolescence*, *34*(4), 335-345.

MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology*, *95*(1), 15-20.

Marsee, M. A. (2008). Reactive aggression and posttraumatic stress in adolescents affected by Hurricane Katrina. *Journal of Clinical Child & Adolescent Psychology*, *37*(3), 519-529.

Marsee, M. A., & Frick, P. J. (2007). Exploring the cognitive and emotional correlates to proactive and reactive aggression in a sample of detained girls. *Journal of Abnormal Child Psychology*, *35*(6), 969-981.

Marsee, M. A., Weems, C. F., & Taylor, L. K. (2008). Exploring the association between aggression and anxiety in youth: A look at aggressive subtypes, gender, and social cognition. *Journal of Child and Family Studies*, *17*(1), 154-168.

Matthys, W., Cuperus, J. M., & Van Engeland, H. (1999). Deficient social problem-solving in boys with ODD/CD, with ADHD, and with both disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*, *38*(3), 311-321.

McReynolds, L. S., Wasserman, G. A., Fisher, P., & Lucas, C. P. (2007). Diagnostic screening with incarcerated youth: Comparing the DPS and voice DISC. *Criminal Justice and Behavior*, 34(6), 830-845.

Millan, M. J. (2003). The neurobiology and control of anxious states. *Progress in Neurobiology*, *70*(2), 83-244.

Neumann, I. D., Veenema, A. H., & Beiderbeck, D. I. (2010). Aggression and anxiety: social context and neurobiological links. *Frontiers in Behavioral Neuroscience*, *4*(12), 1-16.

Odgers, C. L., & Moretti, M. M. (2002). Aggressive and antisocial girls: Research update and challenges. *International Journal of Forensic Mental Health*, *1*(2), 103-119.

Olweus, D. (1978). *Aggression in the schools: Bullies and whipping boys*. Hemisphere.

Perry, D. G., Perry, L. C., & Rasmussen, P. (1986). Cognitive social learning mediators of aggression. *Child Development*, 57(3), 700-711.

Plattner, B., Steiner, H., The, S. S., Kraemer, H. C., Bauer, S. M., Kindler, J., ... & Feucht, M. (2009). Sex-specific predictors of criminal recidivism in a representative sample of incarcerated youth. *Comprehensive Psychiatry*, *50*(5), 400-407.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, & Computers*, *36*(4), 717-731.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, *40*(3), 879-891.

Puzzanchera, C. (2010). *Juvenile offenders and victims: National report series.* Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

Puzzanchera, C., & Kang, W. (2011). Easy access to juvenile court statistics: 1985–2009. Available at www.ojjdp.gov/ojstatbb/ezajcs/.

Quiggle, N. L., Garber, J., Panak, W. F., & Dodge, K. A. (1992). Social information processing in aggressive and depressed children. *Child Development*, *63*(6), 1305-1320.

Schlichter, K. J., & Horan, J. J. (1981). Effects of stress inoculation on the anger and aggression management skills of institutionalized juvenile delinquents. *Cognitive Therapy and Research*, *5*(4), 359-365.

Schwab-Stone, M. E., Shaffer, D., Dulcan, M. K., Jensen, P. S., Fisher, P., Bird, H. R., ... & Rae, D. S. (1996). Criterion validity of the NIMH Diagnostic Interview Schedule for Children version 2.3 (DISC-2.3). *Journal of the American Academy of Child & Adolescent Psychiatry*, *35*(7), 878-888.

Shaffer, D. (1991). *Diagnostic interview for children (DISC 2.3)—child version (Version 2.3— Child) [Computer software]*. New York: Columbia University.

Shaffer, D., Fisher, P., Lucas, C. P., Dulcan, M. K., & Schwab-Stone, M. E. (2000). NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child & Adolescent Psychiatry, 39*(1), 28-38.

Sherman, F. T., Mendel, R. A., Irvine, A., Annie E. Casey Foundation, United States of America. (2013). *Guide to juvenile justice reform: Making detention reform work for girls.*

Snyder, H.N., & Sickmund, M. (2006). *Juvenile offenders and victims: 2006 national report*. Washington, DC: U.S. Department of Justice, Office of Justice Programs, Office of Juvenile Justice and Delinquency Prevention.

Sullivan, T. N., Farrell, A. D., & Kliewer, W. (2006). Peer victimization in early adolescence: Association between physical and relational victimization and drug use, aggression, and delinquent behaviors among urban middle school students. *Development and Psychopathology*, *18*(01), 119-137.

Talbott, E., Celinska, D., Simpson, J., & Coe, M. G. (2002). "Somebody else making somebody else fight": Aggression and the social context among urban adolescent girls. *Exceptionality*, *10*(3), 203-220.

Tate, D. C., Reppucci, N. D., & Mulvey, E. P. (1995). Violent juvenile delinquents: Treatment effectiveness and implications for future action. *American Psychologist*, *50*(9), 777-781.

Teplin, L. A., Abram, K. M., McClelland, G. M., Dulcan, M. K., & Mericle, A. A. (2002). Psychiatric disorders in youth in juvenile detention. *Archives of General Psychiatry*, *59*(12), 1133-1143.

Timmons-Mitchel, J., Brown, C., Schulz, S. C., Webster, S. E., Underwood, L. A., & Semple, W. E. (1997). Comparing the mental health needs of female and male incarcerated juvenile delinquents. *Behavioral Sciences and the Law*, *15*, 195-202.

Trupin, E. W., Stewart, D. G., Beach, B., & Boesky, L. (2002). Effectiveness of a dialectical behaviour therapy program for incarcerated female juvenile offenders. *Child and Adolescent Mental Health*, *7*(3), 121-127.

Vitaro, F., Gendreau, P. L., Tremblay, R. E., & Oligny, P. (1998). Reactive and proactive aggression differentially predict later conduct problems. *Journal of Child Psychology and Psychiatry*, *39*(03), 377-385.

Waschbusch, D. A., & Willoughby, M. T. (1998). Criterion validity and the utility of reactive and proactive aggression: Comparisons to attention deficit hyperactivity disorder, oppositional defiant disorder, conduct disorder, and other measures of functioning. *Journal of Clinical Child Psychology, 27*(4), 396-405.

Wasserman, G. A., McReynolds, L. S., Schwalbe, C. S., Keating, J. M., & Jones, S. A. (2010). Psychiatric disorder, comorbidity, and suicidal behavior in juvenile justice youth. *Criminal Justice and Behavior*, *37*(12), 1361-1376.

Zalecki, C. A., & Hinshaw, S. P. (2004). Overt and relational aggression in girls with attention deficit hyperactivity disorder. *Journal of Clinical Child and Adolescent Psychology*, *33*(1), 125-137.

Table 1.
Descriptive Statistics

	N	Mean	Std. Deviation
Proactive Aggression (PCS)	**60**	**9.63**	**10.65**
Relational Proactive Aggression	60	4.28	5.07
Overt Proactive Aggression	60	5.35	6.16
Reactive Aggression (PCS)	**60**	**18.68**	**12.07**
Relational Reactive Aggression	60	6.20	5.54
Overt Reactive Aggression	60	12.48	7.89
Internalizing Symptoms (C-DISC)	**65**	**28.71**	**24.21**
Generalized Anxiety Disorder	65	3.32	3.29
Major Depressive Disorder	65	6.54	5.39
Externalizing Symptoms (C-DISC)	**64**	**29.85**	**18.98**
Conduct Disorder	65	10.06	6.01
Oppositional Defiant Disorder	64	3.70	3.22
Attention Deficit Hyperactivity Disorder	65	4.97	5.20
Hostile Attribution Bias (HAB)	**60**	**32.82**	**9.10**
Outcome Expectations (OEQ)	**70**	**1.30**	**0.55**
Anger (AQ)	**69**	**58.22**	**8.77**

Table 2.
Multiple Regression Predicting Reactive Aggression

	b	***SE*$_b$**	***p***
GAD Symptoms	1.68	0.70	0.02*
MDD Symptoms	-0.46	0.42	0.27
ADHD Symptoms	0.08	0.40	0.84
ODD Symptoms	0.31	0.62	0.62
CD Symptoms	0.18	0.30	0.55

* = Statistically significant at $p < 0.05$

Table 3.
Multiple Regression Predicting Relational Reactive Aggression

	b	***SE*$_b$**	***p***
GAD Symptoms	0.86	0.31	0.007**
MDD Symptoms	-0.20	0.18	0.29
ADHD Symptoms	0.08	0.17	0.66
ODD Symptoms	0.11	0.27	0.70
CD Symptoms	-0.07	0.13	0.56

** = Statistically significant at $p < 0.01$

Table 4.
Multiple Regression Predicting Proactive Aggression

	b	***SE_b***	***p***
GAD Symptoms	1.22	0.54	0.03*
MDD Symptoms	-0.33	0.32	0.31
ADHD Symptoms	-0.20	0.31	0.52
ODD Symptoms	0.08	0.48	0.88
CD Symptoms	0.13	0.23	0.59

* = Statistically significant at $p < 0.05$

Table 5.
Multiple Regression Predicting Overt Proactive Aggression

	b	***SE_b***	***p***
GAD Symptoms	0.68	0.31	0.04*
MDD Symptoms	-0.25	0.19	0.18
ADHD Symptoms	-0.05	0.18	0.78
ODD Symptoms	0.13	0.28	0.64
CD Symptoms	0.09	0.13	0.52

* = Statistically significant at $p < 0.05$

Table 6.
Multiple Regression Predicting Relational Proactive Aggression

	b	***SE*$_b$**	***p***
GAD Symptoms	0.54	0.26	0.04*
MDD Symptoms	-0.07	0.15	0.63
ADHD Symptoms	-0.15	0.15	0.32
ODD Symptoms	-0.05	0.23	0.82
CD Symptoms	0.04	0.11	0.72

* = Statistically significant at $p < 0.05$

Table 7.
Potential Mediators between Internalizing and Externalizing Symptoms and ***Reactive*** *Aggression: 95% Bias Corrected and Accelerated Confidence Intervals*

	Hostile Attribution Bias	Outcome Expectations	Anger
Internalizing Symptoms	[-.0079, .0443]	[-.0347, .0635]	[.0035, .1543]*
GAD Symptoms	[-.1316, .1995]	[-.2520, .4373]	[.2823, 1.3550]*
Externalizing Symptoms	[-.0584, .0084]	[-.0199, .0688]	[.0172, .2369]*

* = statistically significant; the 95% bias corrected and accelerated confidence interval is not estimated to include zero

Table 8.
Potential Mediators between Internalizing and Externalizing Symptoms and ***Proactive*** *Aggression: 95% Bias Corrected and Accelerated Confidence Intervals*

	Hostile Attribution Bias	Outcome Expectations	Anger
Internalizing Symptoms	[-.0253, .0109]	[-.0468, .0295]	[.0025, .0933]*
GAD Symptoms	[-.1334, .0718]	[-.3154, .1974]	[.1416, .8061]*
Externalizing Symptoms	[-.0184, .0360]	[-.0418, .0268]	[.0102, .1487]*

* = statistically significant; the 95% bias corrected and accelerated confidence interval is not estimated to include zero

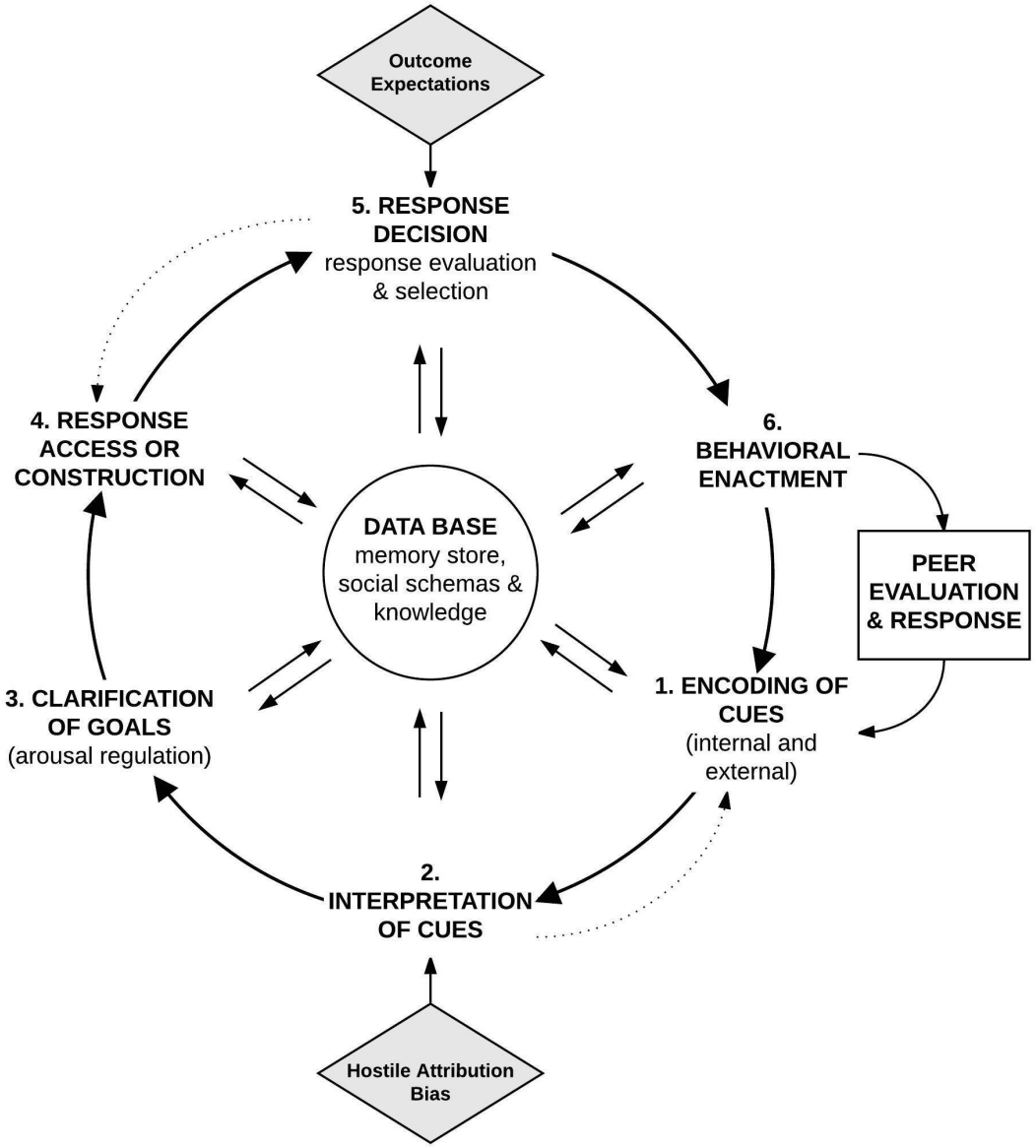

Figure 1. Visual representation of Crick & Dodge (1994) Social Information Processing model, plus proposed mediators (shown in gray).

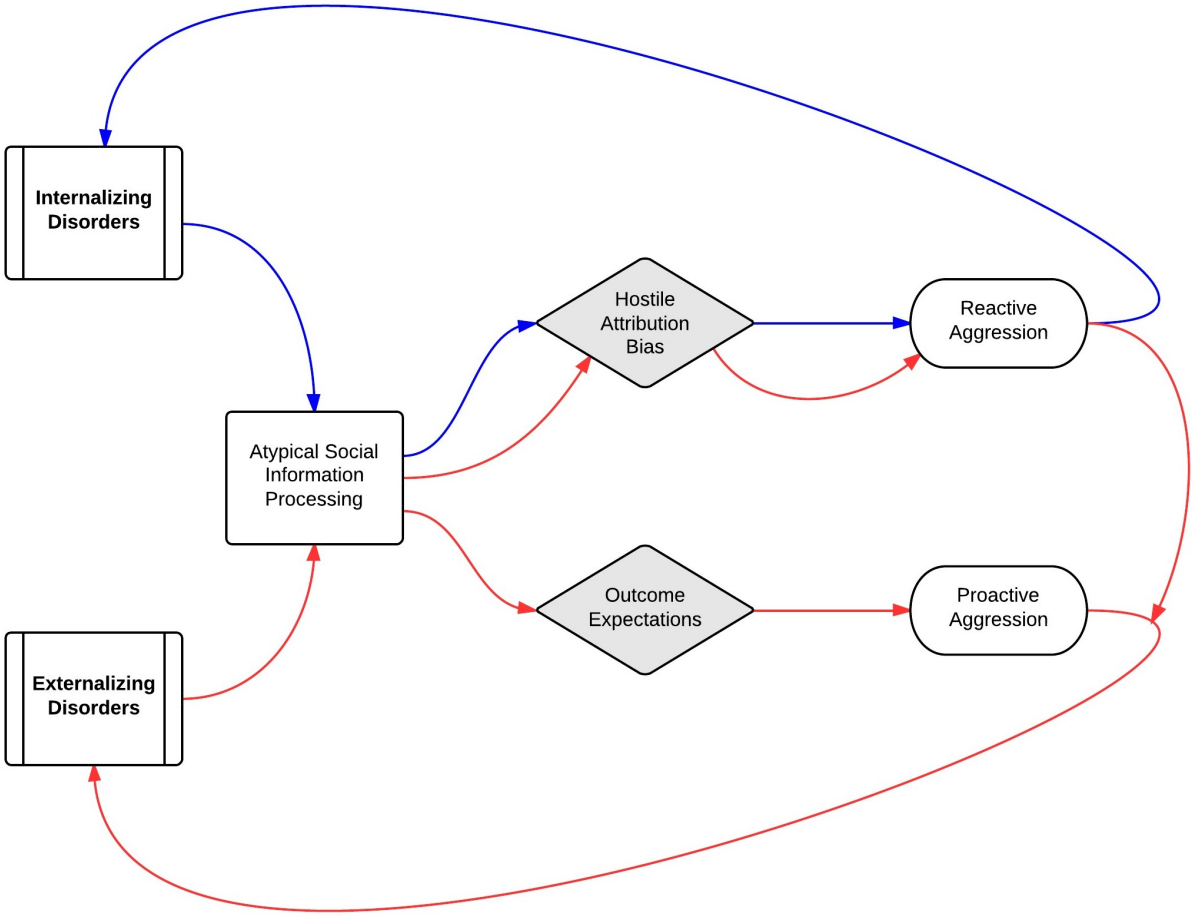

Figure 2. Hypothesized relationships among mental health symptoms, hostile attribution bias, outcome expectations, and reactive and proactive aggression.