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Effortful control mediates relations between children's attachment security and their regard for rules of conduct

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Abstract

Although attachment security has been associated with children's rule-compatible conduct, the mechanism through which attachment influences early regard for rules is not well established. We hypothesized that effortful control would mediate the link between security and indicators of children's emerging regard for rules (discomfort following rule violations, internalization of parents' and experimenter's rules, few externalizing behaviors). In a longitudinal study, the Attachment Q-Set was completed by parents, effortful control was observed, and Regard for Rules was observed and rated by parents. The proposed model fit the data well: Children's security to mothers predicted their effortful control, which in turn had a direct link to a greater Regard for Rules. Children's security with fathers did not predict effortful control. The mother-child relationship appears particularly important for positive developmental cascades of self-regulation and socialization.

Keywords

attachment; effortful control; internalization; moral development

The quality of the parent-child relationship has long been considered key for the development of multiple aspects of children's socialized and rule-compatible conduct (Emde, 1992; Feldman & Klein, 2003; Kochanska, 1991; Kochanska, Aksan, & Carlson, 2005; van IJzendoorn, 1997). In positive parent-child relationships, young children are likely to embrace parents as socializing agents and show increased ability and willingness to follow rules and comply with parents' requests (e.g., Kochanska, Woodard, Kim, Koenig, Yoon, & Barry, 2010; Stayton, Hogan, & Ainsworth, 1971; Zahn-Waxler & Radke-Yarrow, 1990). The child's secure attachment is often considered key. Parents who provide warmth, support, and comfort instill a sense of security, rendering the child receptive and eager to embrace socialization pressures and promoting the internalization and adoption of parental values (Waters, Hay, & Richters, 1986).

Many researchers have concurred that attachment security has substantial implications for early morality (van IJzendoorn, 1997). Children who are securely attached are more likely to obey adults, embrace rules, and develop internalized controls (Bretherton, Golby, & Cho, 1997; Laible & Thompson, 2000; Londerville & Main, 1981; Matas, Arend, & Sroufe, 1978; van IJzendoorn, 1997). Recently, Kok and colleagues (2013) found that higher security scores in children were associated with less active resistance during a compliance task.

Complementary research has shown that attachment insecurity is a precursor to maladaptive outcomes. Bowlby (1944), in his work on juvenile thieves, suggested that a compromised attachment relationship played a large role in the origins of deviant behavior. Voluminous research that followed suggests that early insecurity has significant associations with a broad range of maladaptive outcomes (e.g., Erickson, Sroufe, & Egeland, 1985; Fearon & Belsky, 2011; Roelofs, Meesters, ter Huurne, Bamelis, & Muris, 2006; Thompson, 2006).

Van IJzendoorn (1997) posed a conceptual framework for the development of antisocial behavior. Children with insecure attachment relationships are more likely to have poor moral internalization and lack confidence in others and themselves. Lower confidence, coupled with poor emotion regulation, has detrimental effects on moral reasoning and leads to antisocial behaviors. Secure children, conversely, do not have deficits in self-confidence or emotion regulation, and antisocial behaviors are not likely to develop. It should be noted that a secure attachment does not guarantee positive outcomes; rather, attachment security has been considered a protective factor against maladaptive outcomes (Sameroff, 2000; Sroufe, 2005).

There is considerable support for a link between security to parents and children's early regard for rules. However, a better understanding of the *mechanism* through which attachment promotes rule-compatible conduct and emotions is needed. Toward that goal, we propose a model in which attachment security promotes the development of effortful control, which in turn fosters a greater regard for rules (Figure 1).

Bowlby (1969/1982) originally presented attachment as a motivational system; however, attachment is also inherently a *regulatory* system, through which biological regulation is maintained and emotion regulation is promoted (Hofer, 1994; 2006). In rat models, Hofer (2006) showed that mothers' warmth helped regulate their pups' activity level and mothers' milk helped maintain the pups' heart rate – when mothers were removed from their pups, the pups showed decreased behavior and a lowered heart rate. These findings suggest that very early on, regulation can be facilitated by the caregiver.

Effortful control, a type of self-regulation, begins to develop in the second year of life (Kochanska, Murray, & Harlan, 2000; Posner & Rothbart, 2000; Rothbart & Bates, 2006), when children gradually gain the ability to suppress predominant behavior (often attractive but prohibited by caregivers) and to engage instead in a subdominant behavior (often mundane or unattractive), if asked to do so (Derryberry & Rothbart, 1997; Rothbart & Bates, 2006). Children vary considerably in effortful control, and those individual differences have been linked to many aspects of adaptation (e.g., Eisenberg, Smith, Sadovsky, & Spinrad, 2004a). In related work, effortful control has been linked to aspects of future conscience

(Kochanska, Coy, & Murray, 2001; Kochanska & Kim, 2013; Kochanska & Knaack, 2003; Kochanska, Murray, & Coy, 1997). Conversely, deficits in effortful control have been linked to behavior problems (Eisenberg et al., 2000; Eisenberg et al., 2004b; Gartstein, Putnam, & Rothbart, 2012; Kim, Nordling, Yoon, Boldt, & Kochanska, 2012; Kochanska & Knaack, 2003; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005; Valiente, Lemery-Chalfant, Reiser, 2007). Thus, effortful control has clear implications for a developing regard for rules.

Although many factors have been implicated as contributors to the variability in effortful control, a large literature has emphasized the importance of the parent-child relationship (Spinrad et al., 2007). The context of a secure parent-child attachment has been particularly stressed. Caregivers act as external regulators for children's affect and behavior, facilitating and encouraging the child's capacity to self-regulate (e.g., Cicchetti et al., 1991; Grossmann & Grossmann, 1991; Spangler, Schieche, Ilg, Maier, & Ackermann, 1994). More specifically, Sroufe (1989; 1996) has noted that emotional regulation develops from co-regulation with a caregiver during the first year of life to the emergence of autonomous self-regulation during toddlerhood when the caregiver gives assistance as needed. The child eventually internalizes emotional control during the preschool years. As described above, many researchers (e.g., Hofer, 1994; Thompson, 2006; van IJzendoorn, 1997) have suggested that positive attachment experiences promote a range of adaptive self-regulatory skills. We have included a path from security to effortful control in our model consistent with these findings (Figure 1).

Spinrad and colleagues (2007) found that effortful control mediated the relations between maternal behavior and three socialization outcomes: externalizing behaviors, separation distress, and social competence. Furthermore, Spinrad and colleagues (2012) found that effortful control mediated the relation between parental sensitivity and future committed compliance. Although similar to our proposed model, Spinrad and colleagues' (2007 (2012) work did not employ attachment theory as a framework, did not include father-child relationships, and did not include multiple aspects of rule-compliance. We expand their work in three main ways.

One, we explicitly situate our research within attachment theory, and examine security with mothers and fathers as predictors of effortful control. Attachment is a broad construct that has implications for many areas of future development (e.g., Thompson, 2008). Given that attachment has a key role in the development of self-regulation, it is important to examine security as precursor to effortful control and an early regard for rules.

Two, we include both mother-child and father-child relationships. Despite a growing consensus that understanding both relationships is critical (Cabrera, Tamis-LeMonda, Bradley, Hofferth, & Lamb, 2000; Lamb & Lewis, 2004), research including fathers is uncommon (Phares, Fields, Kamboukos, & Lopez, 2005).

Three, we consider children's regard for rules as a multidimensional construct. One aspect, diminished discomfort, or lessened guilt proneness, has been shown to predict higher levels of callousness, unemotionality, and antisocial outcomes (Frick & Morris, 2004; Frick & White, 2008), and is likely to be related to a more general emergence of a regard for rules.

We also included behavioral data on children's internalization of parents' rules, because socialization first starts in the home, and internalization of other adults' rules (an experimenter), because socialized conduct soon generalizes to adults outside of the family (Feldman & Klein, 2003). In a pertinent study, Callender and colleagues (2010) found that children who did not follow the experimenter's rules showed more behavior problems and less inhibitory control. Finally, we included a parent-rated measure of externalizing behavior problems. Externalizing symptomatology has significant associations with attachment insecurity, as described earlier (e.g., Erickson, Sroufe, & Egeland, 1985; Thompson, 2006).

The pathways in our model substantially involve the ability to regulate emotion. Children who have secure parent-child relationships are more likely to have better self-regulation (Sroufe, 1996; Thompson, 2006). As well, effortful control is closely related to multiple aspects of children's regard for rules - following rules may require one to do something they do not want to do, a task that enlists considerable emotional and behavioral regulation skills. Thus, we specifically used "hot" effortful control tasks based on earlier work that found that such tasks had clear links with behavioral problems (Kim et al., 2012). Generally, "hot" tasks include a salient emotional component (affectively positive, hedonic element, e.g., candy, gift), whereas "cool" tasks involve more cognitive, abstract forms of self-regulation (Brock et al., 2009; Hongwanishkul, Happaney, Lee, & Zelazo, 2005).

Individual differences in attachment are proposed to be the source of differences in effortful control and rule-compliance. However, because temperament traits (e.g., anger proneness) have been associated with several constructs depicted in Figure 1 (e.g., security, Belsky & Rovine, 1987; Kochanska, 2001; effortful control, Mittal, Russell, Britner, & Peake, 2013; rule-compliance, Braungart-Rieker, Garwood, & Stifter, 1997), in an alternate model, we controlled for early difficult temperament to boost confidence that our pathway from attachment to internalization of rules was mediated by effortful control.

Using a longitudinal design from toddlerhood to kindergarten age, we hypothesized that (a) greater attachment security to mothers and to fathers would predict greater effortful control, (b) greater effortful control would predict a greater regard for rules, and (c) effortful control would mediate the relation between attachment security and a greater regard for rules. Children who developed secure attachment relationships would be more likely to develop better self-regulatory skills, and these skills would foster multiple aspects of morality.

Method

Participants and Design

Two-parent families responded to advertisements in areas surrounding a college town in the Midwest. In 20% of the families, at least one parent was non-White. Among mothers, 90% classified themselves as European American, 3% as Latin American, 2% as African American, 1% as Asian American, 1% as Pacific Islander, and 3% as other non-White. Among fathers, 84% were European American, 8% Latin American, 3% African American, 3% Asian American, and 2% other non-White. Parents reported a range of education (high school diploma, approximately 25% of mothers and 30% of fathers; postgraduate education, 21% of mothers and 20% of fathers) and family income (8% made less than \$20,000; 49%

made over \$60,000). The data reported here come from three assessments when children were 25 months ($N = 100$, 50 girls), 38 months ($N = 100$, 50 girls), and 67 months ($N = 92$, 45 girls). Families were paid for participation and children received small gifts after the sessions. The research team also stayed in touch with the families by sending cards and small gifts for birthdays between assessments.

Two- to three-hour sessions were conducted in the home and laboratory by female experimenters (Es). There were two laboratory sessions, one with each parent, at 25 and 67 months, and one home and one laboratory session, with each parent taking part in half of each, at 38 months. All sessions were videotaped for coding. Attachment security was assessed when children were 25 months. Children's effortful control was observed at 38 months. At 67 months, children's outcomes were observed and parent-reported. Multiple coding teams used at least 20% of cases for reliability and frequently "realigned" to prevent coder drift. Variables were aggregated across coded segments, contexts, and assessments to yield robust constructs (Rushton, Brainerd, & Pressley, 1983).

Measures

Attachment (25 months)—Mothers and fathers completed the Attachment Q-Set (AQS; Waters & Deane, 1985) in the laboratory. Prior to starting, parents were given detailed instruction by E. Parents were given a set of 90 cards to sort into three piles (characteristic, somewhat characteristic, uncharacteristic of their child) to become familiar with the cards. Parents were asked to further divide the three piles into nine equal piles of ten cards based on how they saw their child. E was consistently available to answer questions. The mother-reported AQS has been widely used to assess children's security, and it has been shown to have predictive validity (Laible & Thompson, 1998; van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). To calculate security, sorts are correlated with a criterion sort that represents the most secure child, converted r-to-z; thus, higher scores indicate a more secure child. Security scores ranged from $-.20$ to $.80$ ($M = .37$, $SD = .21$) for mothers and from $-.13$ to $.76$ ($M = .34$, $SD = .20$) for fathers.

Effortful Control (38 months)—Three effortful control tasks were used. In Wrapped Gift, E brought a gift and wrapping supplies into the laboratory; she asked the child to sit with his or her back to the E and not to peek while the gift was wrapped (60 s). In Gift Delay, E set the wrapped gift on a table in front of the child; she asked the child to wait without touching the gift while she went to look for a bow (180 s). In Snack Delay, children were asked to keep their hands on a placemat and wait until E rang a bell before the child could retrieve candy from under a transparent cup (four trials, varying in delay, 10–30 s).

Coding and preliminary aggregation: In Wrapped Gift, coders rated children's peeking, turning around, and latencies to peek and to turn (interrater reliability: kappas = $.84 - 1.00$, alphas = $.99 - 1.00$). An overall score was created by averaging the standardized latency to peek, latency to turn around, and total peek score (1 ["C turns around, doesn't return fully forward"] to 5 ["C does not try to peek"]) ($Range = -1.29 - 1.57$, $M = .00$, $SD = 1.00$). In Gift Delay, touching gift, opening gift, and staying in seat during the wait time were coded (kappas = $.71 - 1.00$). The latencies for each of those behaviors were also recorded (alphas

= .81 – 1.00). An overall score was created from aggregating the standardized latency to touch, latency to lift gift, latency to open gift, latency to leave seat, total touch score (1 [“C opens gift”] to 4 [“C never touches gift”]), and total leaving seat score (1 [“C in in seat for a total time of less than 30 sec”] to 4 [“C is in seat more than 2 min”]) (*Range* = -3.82 – 1.15, *M* = .00, *SD* = 1.00). In Snack Delay, coders rated if children touched the bell or cup, ate candy early, or waited until the bell rang and gave one score for each trial (0 [“C eats snack before E lifts the bell”] to 4 [“C waits until bell is rung”]). An aggregate score was created across the four trials for those standardized totals (*kappa* = 1.00; *Range* = -3.32 – .51, *M* = .00, *SD* = 1.00).

Overall aggregation: The tasks were correlated (*r*s *Range*: .25 - .39, *p*s *Range*: .00- .02) and aggregated into one overall effortful control score (*M* = .00, *SD* = .74). A higher score reflected greater effortful control.

Outcome measures (67 months)

Discomfort following rule violations

Observed contexts: Discomfort was assessed using two “mishap paradigms”. E showed the child a “special object” (eyeglasses, car) and asked the child to be very careful while handling it. The object was rigged such that as soon as the child handled it, it fell apart in a dramatic fashion. Once that happened, E expressed some regret and sat quietly for one minute (Epoch 1). The child was then asked some questions regarding the mishap (e.g., “What happened?”; Epoch 2). E then left the room to supposedly fix the object (30 s; Epoch 3) and returned with an undamaged replica. The child was reassured that the damage was not his or her fault (Epoch 4).

Coding and aggregation: Codes indicating discomfort (e.g., child's avoidance of E's gaze [looking downward, away]; body and facial tension [squirming, hunching shoulders, covering face with hands]) were examined in 5 s segments across four Epochs. Global ratings of distress were coded on a 4-point scale (1 = child not distressed/affected by the mishap; 2 = child appears briefly, mildly distressed/affected; 3 = child is distressed/affected; 4 = child is strongly distressed/affected, freezes, cries, seems very uncomfortable or uneasy) and were assigned to an entire epoch (Epochs 1-3). The child's affect was coded as negative, positive, or neutral for Epochs 1 through 4 (interrater reliability across multiple coding teams: *kappas* ranged from .59 to .79, *alphas* ranged from .97 - .99, and *ICCs* were all .99).

A weighting system was applied during aggregation: instances of gaze avoidance that lasted throughout the segment, strong positive affect, and strong negative affect were multiplied by two. For each mishap, scores for gaze avoidance, facial tension, and body tension were created by adding all instances from all four Epochs and dividing by the number of segments. Global distress score was computed by summing the scores for the first three epochs. Negative and positive affect scores were computed by summing those values from all four epochs. For each mishap, all the above scores were standardized and a score of discomfort following rule violation was created by obtaining a mean of gaze avoidance, facial tension, body tension, global distress, negative affect, and (reversed) positive affect (eyeglasses: $\alpha = .76$; car: $\alpha = .71$).

The mishaps paradigms were correlated ($r[90] = .38, p .001$) and scores were averaged to create discomfort following rule violation ($M=.00, SD=.83$), with higher scores reflecting greater discomfort.

Internalization of parents' rules

Observed context: The laboratory contained a low shelf with very attractive toys that were designated as off-limits. Parents were asked to issue the prohibition after entering the room and to enforce the rule throughout the session. At the end of the session, the child was left alone in the room and asked to work on a sorting task (8 min). Prior to the task, the child's parent reminded the child that the toys were off-limits and left the room. Coders recorded rule violations in 5 s segments. The latencies to first exhibit a rule violation (ICCs range .97 - .98) and the total number of rule violations (90% agreement) were standardized and aggregated to form two scores (mother rule, $M=.04, SD=.13$; father rule, $M=.05, SD=.15$). They were correlated, $r(86) = .84, p .001$, and an aggregate of the child's scores across both parents was created, $M=.05, SD=.14$. A low score reflects higher internalization of parents' rules.

Internalization of E's rules

Observed contexts: Children played two games in which E explained the rules, stressed the importance of not cheating, and promised a prize if the child won. E told the child that she had to leave for a while, and the child was then left alone for 3 minutes to play the game. The prizes were attractively wrapped and kept in the child's view. Each game was rigged such that winning was impossible if all rules were followed. E then returned, "discovered" that the game had been set up incorrectly, and each child played the game again and won a prize.

Coding and aggregation: In Ring Toss, the child was asked to toss a ring onto a post while standing behind a line, without retrieving rings, and only tossing each ring once. In Bull's Eye, the child was asked to throw a Velcro ball onto a target while standing backwards and behind a line, and throwing each ball once. For both games, coders noted the latencies to the first rule violation and recorded those violations in 3-s segments (ICCs range: .90 to 1.00, kappas: .96 - .99). The scores were standardized and aggregated for each game, and scores for both games ($r[91] = .67, p .001$) were aggregated into one internalization of E's rules score, $M=.00, SD=.91$. Low scores reflect greater internalization of E's rules.

Parents' reports of externalizing behavior problems: Mothers and fathers each rated the child using the Child Symptom Inventory (CSI-4; Gadow, Sprafkin, & Nolan, 2001; Sprafkin, Gadow, Salisbury, Schneider, & Loney, 2002). Each item was rated on a 4-point scale, from 0 (never) to 3 (very often). We used Oppositional Defiant Disorder (8 items) and Conduct Disorder (15 items) scores. Externalizing behavior scores were created for each parent by summing total symptoms (mothers, $M = 8.33, SD = 5.26$; fathers, $M = 7.34, SD = 4.38$). Parents' scores correlated, $r(88) = .39, p .001$, and an overall externalizing behavior problems score was computed by averaging mothers' and fathers' scores, $M = 7.89, SD = 4.15$.

Results

Overview

Data analysis was completed in three steps. First, correlations among the measures were examined (Table 1). Second, a confirmatory factor analysis was conducted to determine the fit of the measurement model. Third, the measurement and structural models were tested simultaneously, and the fit statistics were examined to evaluate if the model fit the data well. All data were analyzed using Maximum Likelihood estimation in Structural Equation Modeling using M-Plus 4.0 (Muthén & Muthén, 2006).

Correlations among the Measures

As seen in Table 1, AQS security scores for mother-child and father-child dyads were positively related, and both were associated with children's effortful control. Security with mothers, but not with fathers, was associated with more discomfort following violations, more internalization of parents' and E's rules, and fewer externalizing behaviors. Effortful control was positively associated with all outcomes. Finally, all outcome measures were inter-related.

Measurement Model

To specify the measurement model, we used multiple indicators to create a latent variable of the child's Regard for Rules. These indicators included discomfort following rule violations, internalization of parents' rules, internalization of E's rules, and externalizing behavior problems. A confirmatory factor analysis revealed satisfactory global fit: $\chi^2 = .48$, $df = 2$, $p = .79$; CFI = 1.00 (acceptable fit .95; Bentler, 1990); TLI = 1.08 (acceptable fit .95; Hu & Bentler, 1999); RMSEA = .00 (acceptable fit .08; Steiger & Lind, 1980); and SRMR = .01 (acceptable fit .08; Hu & Bentler, 1999).

The component fit was also examined. All standardized parameter estimates were in the expected direction, and each path was statistically significant: discomfort following rule violations ($\lambda = .42$, $SE = .11$, $p = .001$), internalization of parents' rules ($\lambda = -.88$, $SE = .10$, $p = .001$), internalization of E's rules ($\lambda = -.56$, $SE = .09$, $p = .001$), and externalizing problems ($\lambda = -.51$, $SE = .10$, $p = .001$). All R-Square values were statistically significant. The Regard for Rules model explained 18% of the variance in discomfort following violations ($p = .05$), 77% of the variance in internalization of parents' rules ($p = .001$), 31% of the variance in internalization of E's rules ($p = .01$), and 26% of the variance in externalizing behaviors ($p = .01$).

Testing Mediation Pathways from Attachment Security to Effortful Control to Regard for Rules

A bootstrap approach was used to test the proposed mediation; this approach maximizes power and minimizes Type I error and is especially useful with a small sample size (Shrout & Bolger, 2002). The model was estimated based on maximum likelihood estimation and 10,000 bootstrap draws. Sex was added as a covariate in the model (see Table 2 for gender differences).

Estimation of the model yielded satisfactory fit, $\chi^2 = 13.68$, $df = 15$, $p = .55$; CFI = 1.00, TLI = 1.02, RMSEA = .00, SRMR = .04. Bootstrapping analyses revealed a significant indirect effect from security of attachment to mothers to Regard for Rules ($B = .26$, $SE = .09$, 95% CI [.20, 1.04], $p = .002$). The indirect pathway from attachment to fathers to Regard for Rules was not significant, $B = .12$, $SE = .09$, 95% CI [-.10, .76], $p = .19$. Thus, effortful control mediates the link between attachment security to mothers and Regard for Rules in childhood (see Figure 2).

As mentioned in the Introduction, we additionally examined our model covarying early child difficulty since temperament has been often associated with attachment, effortful control, compliance, and internalization. When children were 7 months old, child difficulty was assessed by aggregating parents' reports on the Distress to Limitations scale (e.g., baby shows distress during caretaking, while confined, or when prevented from performing a desired action) from the Infant Behavior Questionnaire (Rothbart, 1981). The same pattern of findings emerged: Effortful control mediated the link between attachment security to mothers and Regard for Rules. This substantially bolsters our confidence in the proposed pathway.

Discussion

Prior research has examined links between attachment security and aspects of morality, but the mechanism for this pathway was not well established. The main goal of this study was to elucidate the mechanism through which security affects the development of rule-compatible behavior and emotions. We proposed that security to both parents would promote the development of effortful control, which in turn would predict a greater regard for rules. The results suggest that our proposed pathway was significant within the mother-child relationship: Effortful control mediated the pathway from attachment security to mothers to the child's regard for rules.

One of the most important functions of attachment may be the promotion of regulatory abilities (Fonagy & Target, 2002). Our results highlight the role of the mother-child relationship in the development of self-regulation (Kopp, 1982) and emphasize the importance of attachment security. Security likely frees up children's resources to develop self-regulation skills because children are confident in their attachment figure's effective protection when threatened or distressed (Sroufe, 1996).

Hofer's (2006) biopsychological model also can help explain why children who have insecure attachment relationships are less likely to be well-regulated. With consistent caregiving and maintained proximity, an infant's behavior and physiology move from external regulation to eventual self-regulation (e.g., Sroufe, 1989; 1996). However, when caregiving is absent, infants lose that external regulation. This loss results in widespread dysregulation of physiological systems that are not necessarily visible by observation, but can create lifelong vulnerabilities (Hofer, 2006; Polan & Hofer, 2008).

The way we have examined Regard for Rules as a latent variable encompassing multiple aspects of children's rule-compliant behavior and emotions is a contribution of this study.

We used multiple methodologies and utilized more than one informant. It is interesting in and of itself that already at preschool age, various aspects of an early concern for rules -- discomfort following rule violations (a moral emotion), internalization of parents' and experimenter's rules (moral conduct), and externalizing behaviors -- all cohered to form a latent emerging core of morality.

It would be informative to examine Regard for Rules as a predictor of outcomes later in life, as several of its indicators have been considered influential predictors of future trajectories. For example, discomfort following transgression has been associated with increased empathy and perspective taking (Kochanska et al., 1994; Tangney & Dearing, 2002) and enhanced interpersonal relationships (Baumeister, Stillwell, & Heatherton, 1994). Conversely, children with externalizing problems are more likely to have depression in adolescence (Nilsen, Gustavson, Roysamb, Kjeldsen, & Karevold, 2013) and to suffer from peer victimization and academic underachievement (van Lier et al., 2012).

Another contribution of this study is the consideration of the father-child relationship. Although both relationships are critical for development, research including fathers is uncommon (Phares et al., 2005). In a recent meta-analysis of the effects of attachment security on externalizing behaviors, Fearon and colleagues (2010) reported that so few studies had examined father-child relationships that they were unable to include them in the analysis.

As an exception, Kochanska, Aksan, Prisco, and Adams (2008) found that fathers' mutually responsive orientation (MRO) with their children predicted later effortful control; further, greater effortful control was associated with internalization of fathers' rules. Kochanska et al. (2008) assessed MRO as an indicator of the quality of the father-child relationship, whereas we assessed attachment security through the parent-reported AQS. We did not find support for the direct link between security to fathers and effortful control or an indirect link from security to fathers and regard for rules in the current study. As a possible explanation, there are qualitative and quantitative differences in mother-child and father-child relationships. For example, a mother's role entails more low-key routine caregiving whereas a father's role involves more play (Parke & Buriel, 2006), and mothers spend more time in interaction and caregiving (Lamb, 1997; Parke & Buriel, 2006). Accordingly, the mother-child relationship may be more influential to many developmental outcomes (Berlin, Cassidy, & Appleyard, 2008). In particular, of the limited studies that have compared mother-child and father-child relationships and conscience development, mother-child interactions tend to show stronger associations and predictions (Thompson, in press). Perhaps at this age, the low-key interaction with mothers is particularly conducive to self-regulation development (Maccoby, 1990; Parke & Buriel, 2006). Note, however, that father-child interaction and play are also important for self-regulation (Lindsey & Mize, 2000; MacDonald & Parke, 1984; McDowell & Parke, 2009). Many empirical questions remain regarding the differences between mother-child and father-child relationships, and their implications for effortful control and rule-compliance.

We increasingly recognize that attachment security has to be conceptualized not as a source of simple direct effects, but rather, as a factor that sets in motion indirect developmental

trajectories (Sroufe, 2005). This research illustrates such understanding. Although attachment security predicted adaptive functioning, the link was indirect, and its effects were due to the mediating mechanism -- effortful control. Longer-term designs may reveal increased complexity in the paths from early security to regulatory competencies to socialized conduct.

Parents' reports of attachment, including the parent-reported AQS, have been widely used; however, we acknowledge their limitations. First, some evidence suggests that sensitive mothers may understand their child's behaviors better, and accordingly, their ideas of their children's behaviors are more likely to converge with outside observers of these behaviors (Tarabulsy et al., 1997); however, the convergence between outside observers and insensitive mothers is not as strong. Other research has found that, when compared to observer ratings, mothers of secure children tend to give lower security scores for their children, but mothers of insecure children tend to give inflated scores (Stevenson-Hinde & Shouldice, 1990). Second, as suggested by van IJzendoorn and colleagues' (2004) meta-analysis, there is a strong negative association between children's reactivity and mother-reported AQS, suggesting that the mother-reported AQS does not have strong discriminant validity. In our study, we chose to control for child temperament; thus, we have accounted for that association. It should be noted, however, that that measure of child temperament was also a parent report.

Despite these limitations, van IJzendoorn et al. (2004) found that parent-reported AQS' predictive validity is similar to that of the observer-reported AQS. Namely, AQS – as measured by mothers and observers – was related to socioemotional development. van IJzendoorn and colleagues (2004) explicitly stated that “it did not make a difference whether the observer or self-reported AQS had been used” (p. 1202). Other studies have also found good predictive validity of maternal-reported AQS (Laible, Panfile, & Makariev, 2008; Laible & Thompson, 1998; Thompson, 1999). Thus, given that the goal of this project was to predict later effortful control and rule-compatible behavior from attachment security, and the predictive validity of the parent-report AQS is not under question, we believe that the measure holds up.

We studied a largely homogenous group of parents whose children were typically well functioning. Research with more diverse and at-risk samples would help further elucidate pathways from security to rule-compatible conduct. Additionally, the sample size prevented us from using more complex statistical methods, such as a full self-regressive design that would examine continuity of the variables over time (see Spinrad et al., 2012 for an example of the approach).

We were also unable to examine our model separately for boys and girls. We did covary gender in our model – girls tend to show higher effortful control and exhibit more rule-compatible behavior (Kochanska, Aksan, & Koenig, 1995; Kochanska, Coy, & Murray, 2001; Kochanska & Kim, 2013) – however, future work should consider examining models separately by gender. Further, future studies can lend insight into the developmental of rule-compatible behavior by disentangling possible child gender by parent gender effects.

To our knowledge, this is the first attempt to assess children's regard for rules as a multi-dimensional, latent variable, using observational and reported measures, and to demonstrate the link to attachment security. We have examined these questions longitudinally, from age two to 5½, when many trajectories that lead to maladaptive outcomes are launched (Campbell, 1995). The findings elucidate the role of attachment security in promoting adaptive trajectories and may inform future intervention and prevention efforts.

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Figure 1. Theoretical structural equation model of the pathways from attachment to mothers and fathers to Regard for Rules through effortful control as a mediator (M=Mother; F=Father, E=Experimenter)

Figure 2.

Effortful control mediates the relation between attachment security to mothers and a Regard for Rules. (M=Mother; F=Father; + $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$)

Table 1

Correlations among all variables: Children's security to mothers and fathers at 25 months, effortful control at 38 months, and indicators of Regard for Rules at 67 months

	1.	2.	3.	4.	5.	6.
1. Security to M	--					
2. Security to F	.28**	--				
3. Effortful Control	.40***	.31**	--			
4. Discomfort following Rule Violations	.25*	.07	.46***	--		
5. Internalization of P Rules	-.30**	-.20 ⁺	-.61***	-.36***	--	
6. Internalization of E Rules	-.26*	-.06	-.54***	-.25*	.49***	--
7. Externalizing Behaviors	-.31**	-.15	-.45***	-.25*	.46***	.25*

⁺ *p* .10;
 * *p* .05;
 ** *p* .01;
 *** *p* .001

Note. M=Mother; F=Father; P=Parents; E=Experimenter. Lower scores for Internalization of P Rules, Internalization of E Rules, and Externalizing Behavior Problems reflect stronger internalization.

Table 2
Gender differences in attachment security at 25 months, effortful control at 38 months, and rule-compatible behaviors at 67 months

Variables	Girls			Boys			t	df	p
	M	SD	N	M	SD	N			
Security to M	.41	.21	50	.33	.19	50	1.91	98	.06 ⁺
Security to F	.41	.20	50	.28	.19	50	3.46	98	.00 ^{**}
Effortful Control	.24	.61	50	-.24	.79	50	3.47	98	.00 ^{**}
Discomfort following Rule Violations	.17	.77	45	.17	.86	46	2.00	89	.05 [*]
Internalization of P's Rules	.01	.04	45	.08	.18	46	-2.63	89	.01 [*]
Internalization of E's Rules	-.26	.75	45	.25	1.00	46	-2.73	89	.01 ^{**}
Externalizing Behaviors	6.66	2.50	45	9.07	5.01	47	-2.91	90	.01 ^{**}

⁺ *p* .10;

^{*} *p* .05;

^{**} *p* .01

Note. M=Mother; F=Father; P=Parents; E=Experimenter