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The Relations of Effortful Control and Impulsivity to Children's Sympathy: A Longitudinal Study

Nancy Eisenberg, **Nicole Michalik**, **Tracy L. Spinrad**, **Claire Hofer**, **Anne Kupfer**, **Carlos Valiente**, **Jeffrey Liew**[1], **Amanda Cumberland**, and **Mark Reiser**
Arizona State University

Abstract

The relations of children's (n = 214 at Time 1; M age = 6 years at Time 1) dispositional sympathy to adult-reported and behavioral measures of effortful control (EC) and impulsivity were examined in a longitudinal study including five assessments, each two years apart. Especially for boys, relatively high levels of EC and growth in EC were related to high sympathy. Teacher-reported impulsivity was generally modestly negatively related to measures of teacher-reported sympathy for boys, and a decline in impulsivity was linked to boys' sympathy. Some findings suggested a positive association between impulsivity and children's self-reported sympathy. EC, especially when reported by teachers, was more often a unique predictor of sympathy than was impulsivity. Results generally support the argument that sympathetic individuals, especially boys, are high in EC and that EC is a more consistent predictor of sympathy than impulsivity.

One of the core constructs in Rothbart's theory of temperament is effortful control (EC), defined as "the efficiency of executive attention--including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors" (Rothbart & Bates, 2006, p. 129). Executive attention, including the abilities to willfully shift or focus attention as required and to integrate incoming information, is central to EC and is believed to affect inhibitory control (the capacity to suppress approach tendencies as needed), activation control (the capacity to perform an action when there is a strong tendency to avoid it), planning, and integrating information. EC is a temperamentally based set of characteristics or skills that are involved in individual differences in the regulation of reactivity, including emotions and behavioral reactivity (e.g., Rothbart & Bates, 2006). Areas of the midfrontal lobe, including the anterior cingulate gyrus, in combination with lateral prefrontal areas, appear to underlie the executive attentional network and EC (Posner & Rothbart, 2007; Vogt, Finch, & Olson, 1992).

The construct of EC overlaps with that of executive functioning, especially executive attention (Eisenberg, Hofer, & Vaughan, 2007; Rueda, Posner, & Rothbart, 2005). Executive functioning, like EC, is a broad construct encompassing a number of attentional and cognitive processes that are integral to self-regulation and goal-directed activities (e.g., working memory,

Correspondence should be directed to Nancy Eisenberg at nancy.eisenberg@asu.edu.
[1]Now in Education at Texas A & M University.

[2]In additional growth curves using T1 to T4 sympathy, we found that teacher-reported sympathy did not change with age; parent-reported sympathy increased significantly with age; and the slope for child-reported sympathy was quadratic (U-shaped). However, when we tried growth curve to growth curve models to predict sympathy from EC or impulsivity, some models would not run correctly and there were few findings in which the slope of EC or impulsivity predicted the slope of sympathy.

inhibition of prepotent responding, planning, and shifting and sustaining attention) (Blair, Zelazo, & Greenberg, 2005). Both EC and executive functioning are superordinate terms that refer to an array of overlapping and related skills, although executive functioning includes some skills (e.g., working memory) that are not emphasized in theory and research on EC.

The skills involved in EC have been operationalized in a variety of ways, some of them overlapping with typical assessments of executive control. The most common way of measuring EC has been with Rothbart's various adult-, adolescent-, or child-report temperament scales (e.g., Capaldi & Rothbart, 1992; Putnam, Gartstein, & Rothbart, 2006; Putnam & Rothbart, 2006; Rothbart, Ahadi, Hershey, Fisher, 2001). Questionnaire items pertaining to EC tap (depending on the age of the person) the abilities to willfully shift attention, focus attention, inhibit behavior, and activate behavior. Sometimes indices of these aspects of EC group in factor analyses with perceptual sensitivity (detection of slight, low intensity stimuli from the external environment) and low intensity pleasure (i.e., the amount of pleasure or enjoyment related to situations involving low stimulus intensity, rate, complexity, novelty and incongruity), likely because of the role of attention in perceptual processes. In addition, researchers have increasingly designed or adapted behavioral measures to assess EC. Measures of EC used for school-aged children or adolescents include tasks that tap delay of gratification, persistence on boring tasks, and tasks that require voluntary inhibition or activation of behavior (Eisenberg et al., 2004; see Kochanska, Coy, & Murray, 2001; Kochanska, Murray, & Harlan, 2000, for a battery of such measures).

Control is usually defined as constraint, and it can be voluntary--based on EC--or less voluntary and effortful. Thus, Eisenberg and colleagues (Eisenberg & Morris, 2002; Eisenberg et al., 2007) have built on Rothbart's (e.g., Derryberry & Rothbart, 1997) distinction between effortful and reactive processes in an attempt to differentiate EC from other constructs that may seem effortfully self-regulated but are minimally so. Specifically, there are aspects of control, or the lack thereof, which seem to be involuntary or so automatic that they often are not under voluntary control; we label these reactive control. *Reactive control* processes pertain to relatively involuntary motivational approach and avoidance systems of response reactivity that, at extreme levels, result in impulsive undercontrol and rigid overcontrol. Measures typically tap, but are not confined to: (a) impulsivity: pertains to speed of response initiation and surgent approach behaviors, and (b) overcontrol--rigid, constrained behavior or behavioral inhibition (i.e., slow or inhibited approach in situations involving novelty or uncertainty; note that this is a different construct than inhibitory control) (Derryberry & Rothbart, 1997; Kagan & Fox, 2006). Pickering and Gray (1999) and others (Cacioppo, Gardner, & Berntson, 1999) have argued that motivational systems related to undercontrolled/impulsive and overly inhibited behaviors are associated with subcortical brain systems. One conceptualization of such systems includes Gray's Behavioral Inhibition System (BIS), which is activated in situations involving novelty and stimuli signaling punishment or frustrative nonreward, and Gray's Behavioral Activation System (BAS; which involves sensitivity to cues of reward or cessation of punishment). These systems are heuristic frameworks and there is some debate about the neurological bases of motivational systems.

EC and reactive control are statistically negatively related. Nonetheless, in children aged 5 and older, we obtained a good fit in models when EC and reactive control were separate but correlated latent constructs—better than if they were combined (e.g., Eisenberg et al., 2004).

EC has proved to be a powerful construct for predicting children's adjustment and other aspects of the socioemotional functioning. EC has predicted, often across time, children's externalizing problems (Eisenberg et al., 2000, 2004; Kochanska & Knaack, 2003; Lemery, Essex, & Snyder, 2002; Lengua, West, & Sandler, 1998; see Muris & Ollendick, 2005) and social and academic competence (e.g., Eisenberg et al. 2000; NICHD, 2003; Spinrad et al., 2006). In some of these studies, such prediction has been obtained across time when controlling for earlier levels of the developmental outcome being examined (e.g., Eisenberg et al., 2002, 2004). In addition, impulsivity and behavioral overcontrol--aspects of reactive control--have sometimes been linked to maladjustment (e.g., Huey & Weisz, 1997; Krueger, Caspi, Moffitt, White, Stouthamer-Loeber, 1996; Lemery et al., 2002; Lengua et al., 1998), although there is some evidence that reactive control and EC do not relate in identical ways to externalizing and internalizing problems. For example, children with non-comorbid internalizing problems, in comparison to nondisordered children, are low in impulsivity and in attentional control (Eisenberg, Cumberland et al., 2001). Indeed, EC and reactive control appear to provide some unique prediction of adjustment (Eisenberg et al., 2004).

In a more limited set of studies, high EC (e.g., attentional control) has been associated with children's sympathy (e.g., Eisenberg, Fabes, Murphy et al., 1996; Eisenberg et al., 1998; Murphy et al., 1999) and prosocial behavior (Eisenberg, Fabes, Karbon et al., 1996). Sympathy is defined as an emotional response stemming from the apprehension of another's emotional state or condition that is not the same as the other's state or condition but consists of feelings of sorrow or concern for the other. Thus, if a child feels concern for a sad peer, he or she is experiencing sympathy. Sympathy probably often stems from empathy, defined as an affective response that stems from the apprehension or comprehension of another's emotional state or condition and is similar to what the other person is feeling or would be expected to feel in the given situation (Eisenberg, Fabes, Murphy et al., 1996). In addition, it commonly is believed that sympathy often can be evoked by cognitive perspective taking or accessing information from memory that is relevant to the other's experience (Eisenberg, Fabes, & Spinrad, 2006).

It is important to distinguish between sympathy and personal distress. P*ersonal distress* has been defined as a self-focused, aversive affective reaction to the apprehension of another's emotion (e.g., discomfort, anxiety; Batson, 1991). Personal distress often may stem from empathic overarousal—that is, high levels of vicariously induced aversive emotion (see Eisenberg, Fabes, Murphy et al., 1996; Hoffman, 2000), although it is possible that it sometimes stems from other emotion-related processes such as shame, accessing relevant information from memory, or taking the perspective of others, which can induce an aversive emotional state.

Eisenberg et al. (e.g., 1994, 2006)) have argued that individual differences in the tendency to experience sympathy versus personal distress vary as a function of dispositional differences in individuals' abilities to regulate their emotions, that is, in their EC and related capacities. Well-regulated people who have control over their ability to focus and shift attention are hypothesized to be relatively prone to sympathy regardless of their emotional reactivity. This is because they can modulate their negative vicarious emotion to maintain an optimal level of emotional arousal--one that has emotional force and enhances attention, but is not so aversive and physiologically arousing that it promotes a self-focus. In contrast, people who are unable to regulate their emotion, especially if they are dispositionally prone to intense negative emotions, are hypothesized to be low in dispositional sympathy and prone to personal distress.

In support of Eisenberg's ideas, personal distress appears to be linked with higher levels of physiological arousal than is sympathy (see Eisenberg et al., 2006, for a review; also Eisenberg, Fabes, Murphy et al., 1996). Individual differences in adult-reported EC also have been correlated with high sympathy and low personal distress in childhood and adolescence (e.g., Eisenberg, Fabes, Murphy et al., 1996; Murphy et al., 1999; Valiente et al., 2004). During early adolescence, sympathy has been related with personality conscientiousness (Del Barrio, Aluja, & Garcia, 2004), which is believed to partly reflect EC (Rothbart & Bates, 2006), as well as constructive modes of coping (McWhirter, Besett-Alesch, Horibata, & Gat, 2002) and self-reported efficacy in regard to behavioral self-regulation and managing negative emotions (Bandura et al., 2003).

Based on Eisenberg's aforementioned discussion of sympathy and the apparent role of EC (or self-regulation) in moral development more generally (e.g., Eisenberg et al., 2006; Kochanska & Knaack, 2003), one would expect EC to be positively related to children's sympathy. As already noted, such relations have been found. However, studies on the relations of EC to sympathy have mostly involved only adults' reports of children's EC and have not included longitudinal analyses. In addition, to our knowledge, researchers have not examined the prediction of sympathy from measures of change in EC over time, although such analyses provide a better test of causal relations than simple direct correlations. Moreover, the relation of impulsivity to sympathy seldom has been examined. If EC and reactive control are different constructs, their positive and negative relations, respectively, with sympathy would not be expected to be of equal strength. Rather, based on Eisenberg's discussion of the role of regulation in sympathy, we would expect EC to be more consistently related to sympathy than impulsivity. Nonetheless, because impulsivity, especially when controlling for EC, has been positively related to resiliency and contributes to the experiencing of emotion, it seemed possible that relatively impulsive, spontaneous children might be likely to experience and express vicariously induced emotion.

In the present study, we examined the relations of various measures of EC (or highly related processes) to children's sympathy across the childhood years into adolescence. Children were initially studied at age 4.5 to just turning eight years old and then four additional times, two years apart. Dispositional sympathy was measured with children's, parents', and/or teachers' reports at all five assessments. EC was assessed with parents' and teachers' reports at the first four assessments. In addition, we measured children's ability to sit still when asked to do so—a measure of inhibitory control—at three assessments. At the same sessions, we assessed persistence on a challenging task (rather than giving up or cheating), a task that likely taps aspects of EC such as attentional control and the ability to inhibit inappropriate behavior. In addition, to assess reactive undercontrol, we obtained teachers' and parents' reports of children's impulsivity and a measure of the ability to stop when losing points after a winning streak. The latter behavioral measure likely taps impulsive approach to rewards (reward dominance), although it may also involve, to a lesser degree perhaps, aspects of executive functioning and EC such as integrating information. We examined within and across time relations of our indices of effortful and reactive control to sympathy, as well as prediction of sympathy from growth curves for EC and impulsivity. Because of sex differences in perceptions of children's sympathy (Eisenberg et al., 2006) and in children's self-regulation (including EC; see Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006), we examined sex differences in these patterns of relations. Finally, we examined the unique contributions of EC and impulsivity to sympathy to determine if either construct was a stronger unique predictor.

Methods

Participants

Participants were initially recruited through newspaper ads, letters sent to parents through schools, and flyers posted at local schools (as part of an eight-year longitudinal study of socioemotional development; e.g., Eisenberg, Cumberland, et al., 2001; Eisenberg et al., 2004; Valiente et al., 2004). The primary caregiving parent in families that initially expressed interest in participating was administered the Child Behavior Checklist (CBCL; Achenbach, 1991) over the phone, and this information was used to obtain a diverse sample, including some with borderline and clinical problem behaviors (see Eisenberg, Gershoff et al., 2001; Valiente et al., 2004). Thus, children who scored at least 60—borderline level—on internalizing or externalizing were selected from the larger pool and then children who scored below 60 on both scales were matched (whenever possible) with regard to sex, race, age, and social class (identified by self-reports of parent education and occupation) to children. This procedure resulted in children with all levels of scores on the CBCL (both above and below 60), but with more children with at least borderline levels of problem behaviors than might have occurred by chance.

The final sample consisted of 214 children who were 4.5 to just turning 8 years old at Time 1 (T1; *N* = 96 girls, 118 boys, *M* age = 6.08 years, *SD* = 9.59 months). To maintain consistency across time, only data from parents who identified themselves as the primary parent were used at each data collection (T1 – T5). Therefore, the total number of parents included in T1 analyses was 207 (203 mothers, 4 fathers). Child self-reported data were retained for all 214 children and there were 195 teacher reports. The majority of children were of white/non-Hispanic origin (77%); the rest were Hispanic (12%), Native American (5%), African American (3%), of mixed origin (3%), and Asian/Pacific Islander (< 1%). Mean parental educational level was 3.54 (3 = some college, 4 = 2 year college degree) for mothers (*SD* = 1.58) and 3.51 for fathers (*SD* = 1.70). Family income ranged from less than $20,000 to greater than $100,000 (*M*=2.59, *SD* = 1.28; 2 = $20–40,000, 3 = $40–60,000).

Approximately every two years thereafter, data were collected from this sample (final data collection was approximately 8 years after the initial data collection). At T2, 176 parents, 180 teachers, and 175 children provided questionnaire data (9 parent reports were dropped from analyses because they were not the child's primary parent; original parent *N* = 185). At T3, 167 parents', 165 teachers', and 159 children's questionnaires were used in the analyses (2 parents' questionnaires were not used in analyses because the parent filling out the questionnaire was not the primary parent; original parent *N* = 169). At T4 (158 mothers, 3 fathers, and 4 grandmothers) and T5 (123 mothers, 2 grandmothers) all of the parent respondents were the primary parent so no parent data were excluded from analyses. In addition, there were 151 and 101 teacher reports (T4 and T5, respectively) and 165 and 122 child reports. Because the number of participants dropped considerably at T5, we chose not to use T5 as a separate time point. Moreover, because the growth curve for predictors sometimes did not work well by averaging the T4 and T5 predictors and we did not have any behavioral measures at T5, we did not use the T5 data to assess EC and impulsivity. We averaged across T4 and T5 only for the outcome variables, that is, for measures of sympathy. Such aggregating usually enhances the reliability of measures and also increased the *N* for the outcome variable in this study.

At each of the subsequent assessments at T1, participants were primarily white/non-Hispanic (T2 - 75%, T3 – 78%, T4 – 75%, T5 – 82%); most mothers (T2 *M* = 3.80, T3 *M* = 3.86, T4 *M* = 3.93, T5 *M* = 4.00) and fathers (T2 *M* = 3.84, T3 *M* = 3.82, T4 *M* = 3.90, T5 *M* = 4.13) had some college education (2 = high school diploma; 3 = some college; 4 = 2 year degree; 5 - = college degree). Family income ranged from less than $20,000 to greater than $100,000 (T2 *M* = 2.96, T3 *M* = 3.40, T4 *M* = 3.70, T5 *M* = 3.79; see codes above). According to *t*-tests, families that continued to participate in the study after T1 had higher income levels than those who did not participate at T3 (*M* nonattrited = 2.68, *M* attrited = 2.00, $t(192) = -2.58$, $p < .05$), T4 (*M* nonattrited = 2.69, *M* attrited = 2.20, $t(192) = -2.21$, $p < .05$), and T5 (*M* nonattrited = 2.79, *M* attrited = 2.30, $t(192) = -2.72$, $p < .01$). Similarly, fathers completed more education in families that continued to participate after T1 than did not participate at T3 (*M* nonattrited = 3.63, *M* attrited = 2.74, $t(204) = -2.58$, $p < .05$), T4 (*M* nonattrited = 3.69, *M* attrited = 2.94, $t(204) = -2.73$, $p < .01$), and T5 (*M* nonattrited = 3.79, *M* attrited = 3.16, $t(204) = -2.68$, $p < .01$).

Univariate tests were conducted to assess the differences between ratings on the study variables (see Measures) for children that did not participate after T1 and those that continued to participate at T2 – T5. Children who continued participation in the study were rated higher in

EC than attrited children by both parents and teachers; T2 (*M* nonattrited = 4.47 and 4.96, *M* attrited = 4.16 and 4.56, *t*s(202 and 193) = -2.28 and −2.09, *p*s < .05), T3 (*M* nonattrited = 4.46 and 4.96, *M* attrited = 4.09 and 4.42, *t*s(202 and 193) = -2.32 and −2.55, *p*s < .05), and T5 (parent-reported only; *M* nonattrited = 4.50, *M* attrited = 4.23, *t*(202) = -2.05, *p* < .05). In addition, children who attrited were less persistent and able to sit still on the behavioral measures of EC at T2 (*M*s for nonattrited and attrited = .59 and .39 for persistence, and 2.96 and 2.01 for sitting still (reversed), *t*s(210, 212) = -3.77 and -4.02, *p*s < .001. Scores on T1 persistence and sitting still also were lower for children who attrited, in comparison to those who did not, by T3, *t*s(210, 212) = -3.15 and -2.78, *p*s < .01, by T4, *t*s(210,212) = -2.80 and -1.92, *p*s < .01 and .06, and at T5, but only for persistence, *t*(210) = -2.97, *p* < .001. T1 sympathy measures did not differ for attrited and nonattrited children.

Procedures

For the first four data collections (T1, T2, T3, and T4), the child and one parent (usually the mother) came to the university. During the laboratory session, the parent and the child (with the experimenter) filled out a series of questionnaires and were led through a number of tasks by an experimenter of the same sex as the child. At T1, T2, and T3, the child was told he or she would be watching a short video about dolphins swimming out at sea. The experimenter pretended to start the video, asked the child to remain still so as not to disturb the electrodes, and left the room. The children's movements were taped during this period. Later in the visit (T1, T2, and T3), the child worked on a mildly stressful puzzle task to measure persistence. At T3 and T4, the child also played a short computer game designed to tap reward dominance.

Parents and children who did not participate in the on-campus visit at T2, T3, or T4 were sent the questionnaires via mail. At T5, questionnaire data were collected from parents and children by mail or, occasionally, phone. At all times, with parental permission, questionnaires were sent to the child's teacher. Parents, children, and teachers were paid for participating.

Measures

Effortful Control and Impulsivity

Reported EC—Parents and teachers completed several subscales (attention shifting, attention focusing, and inhibitory control) from the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, & Hershey, 1994; Rothbart et al., 2001) as measures of children's EC (T1-T5; 7-point scale; 1 = *extremely untrue*; 7 = *extremely true*; items reversed and averaged to create subscale scores). For the teacher-report subscales, some items deemed inappropriate for teachers were dropped or reworded to capture school rather than home activities (i.e., “Has an easy time leaving a leisure activity to *do school work*”). The scales demonstrated good internal consistency for both parents and teachers reports: attention shifting (11 items each, e.g., “Can easily shift from one activity to another”; parent alphas = .82, .82, .85, .8; teacher alphas = .88, .91, .88, .88), attention focusing (9 and 8 items, respectively; e.g., “Will move from one task to another without completing any of them” [reverse coded]; parent alphas = .74, .69, .69, .73, teacher alphas = .85, .82, .81, .80), and inhibitory control (13 items, e.g., “Has a hard time following instructions” [reverse coded]; parent alphas = .84, .81, .85, .85, teacher alphas = .88, .90, .84, .86). One additional item was dropped from the teachers' and parents' scales of attention shifting and focusing at all assessments because the item lowered at least some alphas substantially. The attention shifting, attention focusing, and inhibitory control subscales were significantly correlated for both parents and teachers (*r*s within all five assessments ranged from .68 to .80 for teachers and from .37 to .71 for parents, all *p*s < .001). Thus, these subscales were averaged within reporter to form composite measures of EC for both parents and for teachers at each assessment.

At T4, adolescents completed the attention (7 items; "It is easy for me to really concentrate on homework problems"; T4 = .54) and inhibitory control (11 items; "When I'm excited, it's hard for me to wait my turn to talk" [reverse coded]; alphas = .70) subscales from the Revised EATQ (Capaldi & Rothbart, 1992; updated on Mary Rothbart's website). Items were rated on a 5-point scale (1 = *almost always untrue*; 5 = *almost always true*). These two subscales were correlated, $r(162) = .64$, $p < .01$, and were combined to create an EC composite (alpha = .70). Items were reversed where applicable before averaging the subscales.

Impulsivity—Parents and teachers also completed the impulsivity subscale from the CBQ (T1 to T4; i.e., "Often rushes into new situations"; 7-point scale; 1 = *extremely untrue*; 7 = *extremely true*; items reversed and averaged to create scale scores). The parent subscale included 13 items and the teacher subscale included 12 items (1 item was dropped because it substantially lowered the scale alpha; alphas for parents and teachers, respectively = .81 and .89 at T1, .79 and .84 at T2, .82 and .84 at T3, .83 and .73 at T4).

Sitting still/movement—Movements were coded from the videotaped data (T1-T3) in the portion of the visit when the child was left alone after being hooked up to physiological equipment for one minute waiting for a film to begin. The children had been asked to sit still so the physiological equipment would not be disturbed. Children were rated on movement of both the hand connected to the electrodes and overall body (i.e., arms, legs, feet) on a 4-point scale (1 = *no movement*; 4 = *extreme movement/movement more than half the time*). Interrater reliabilities for hand (*r*s = .94, .77, and .75) and body movement (.99, .77, and .74) codes were based on 22%, 44%, and 45% of the sample at T1, T2, and T3, respectively. The hand and body ratings were significantly correlated, *r*s = .54, .61, and .41 at T1, T2, and T3, *p*s< .01, and were averaged and reversed to create a composite with high scores indicating less movement.

Persistence - proportion of time spent on task (puzzle)—A puzzle was placed in a large wooden box that obstructed the child's view of the puzzle (T1 – T3). The side facing away from the child was made of clear Plexiglass (for videotaping with a hidden camera) whereas the side facing the child was covered with a cloth with armholes through which the child could manipulate the puzzle pieces in the box. After briefly viewing the puzzle, children were instructed to try to finish it in the time allotted (4 or 5 minutes) and that they would earn points towards a prize for its completion. The time spent persisting (actively working) on the task was recorded from videotape (interrater reliabilities based on codes for 46%, 48%, and 37% of the sample; *r*s = .99, .95, and .92, *p*s < .01). The amount of time the child spent working on the puzzle was divided by total task time to create a proportion of time persisting on the task.

Reward dominance/executive functioning—At T3 and T4, reward dominance (a measure of reward-related impulsivity and/or executive functioning) was assessed with a computer game (the fishing game; O'Brien & Frick, 1996). At both times, the children were told that on the screen they would see a man fishing and that they could manipulate the fishing pole by pressing the space bar on the keyboard. The man would drop his fishing line when the key was pressed and would either catch a fish (to earn a point) or not (to lose a point). Whether or not the man caught a fish was pre-programmed in an increasing ratio of punished to rewarded responses and, if a child continued to play the game, they would eventually lose all of the points they earned. To motivate the children to play the game, they were told that the points they earned would be used to determine the type of prize they would receive at the end of the visit. The children had the option to quit at any point during the game before it automatically ended when all of the points had been lost. Whether or not children quit the game early (0 = *did not quit*, 1 = *quit*) was coded from videotape (interrater reliabilities (*r*s) based on 26% and 21% of sample = 1.00 and .83, T3 and T4, respectively). The number of points was not used because the rate of losing points was not identical across children (this variable appeared to be balanced across four games and we used only one).

Sympathy

Children's/adolescents' dispositional sympathy was measured at all time points by obtaining parents' (T1 – T5), teachers' (T2 – T5), and/or children's (T1 – T5) reports. Parents and teachers completed an eight-item scale from Eisenberg, Fabes, Murphy et al. (1996) (e.g., “My child (this student) usually feels sympathy for others), scored on a scale from 1 (*really false*) to 4 (*really true*). Alphas for parents from T1 to T5 were .82, .77, .83, .87, and .86; alphas for teachers from T2 to T5 were .89, .88, .85, and .86. Children completed five items from a version of Eisenberg, Fabes, Murphy, et al.'s (1996) sympathy scale (e.g., “I feel sorry for other people who don't have the things I have”; 1 = *really like you*; 3 = *not like you*; see Valiente et al., 2004). Alphas from T1 to T5 were .76, .75, .79, .82, and .86.

We averaged measures of sympathy (within reporter) across T4 and T5 to increase the sample size and reliability through aggregation. Reports of sympathy by parents and by children were substantially related across T4 and T5, *r*s(111, 108) = .76 and .51, *p*s < .001. Although teachers' reports were only modestly positively related, *r*(79) = .20, p < .08, combining teachers' reports across T4 and T5 did not substantially change the outcome of the analyses.

Results

Preliminary Analyses

Relations with child sex—A series of MANOVAs (and ANOVAs where appropriate) were conducted within each time to test the relations between sex and the study variables. At each assessment, separate MANOVAs were computed for parent-, teacher-, and child-reported variables (EC, impulsivity, and sympathy). In addition, similar analyses were computed for the observed measures at each assessment.

Significant differences were found for parents' and teachers' reports; all multivariate *F*s (Pillais) were significant at *p* < .01. In terms of univariate analyses, at T1, parents rated girls higher in both EC and sympathy, univariate *F*s(1,201) = 9.61 and 12.56, *p*s < .01, *eta* squared = .05 and .06, respectively. At T1, teachers rated girls higher in EC, as well as lower in impulsivity, univariate *F*s(1,192) = 5.54 and 10.82, *p*s < .02 and .01, partial *eta*s squared = .03 and .05. At T2, parents rated girls higher in sympathy and lower in impulsivity, *F*s(1,172) = 10.81 and 6.86, *p*s < .01, *eta*s squared = .06 and .04; teachers also rated girls as higher in sympathy and lower in impulsivity, *F*s(1,168) = 9.85 and 5.77, *p*s < .01 and .02, *eta*s squared = .05 and .04, as well as higher in EC, 20.85, *p* < .001, *eta* squared = .11. At T3, parents and teachers rated girls as higher in sympathy and EC and lower in impulsivity: for parents, *F*s(1,165) = 7.31, 8.17, and 5.54, *p*s < .01, .01, and .02, *eta*s squared = .04, .05, and .03, and for teachers, *F*s (1,147) = 16.98, 15.29, and 12.70, *p*s < .01, *eta*s squared = .10, .09, and .08. At T4/5, parents and teachers again reported that girls were higher in sympathy: *F*s(1,175; 1,159) = 6.73 and 20.41, *p*s < .01, *eta*s squared = .04 and .11, respectively.

Girls reported being higher in sympathy at T1, *F*(1,212) = 3.41, p < .04, *eta* squared = .02, but not at older ages (although sometimes the sex difference was nearly significant). At T1 but not T2, girls were also higher in observed persistence and (nearly significant) sitting still, multivariate *F*(2,209) = 5.81, *p* < .01, *eta* squared = .053, univariate *F*s (1,211) = 9.93 and 3.54, *p*s < .01 and .07, *eta* squared = .05 and .02, respectively. There were no significant sex differences in the behavioral measures at T3 or T4.

Relations of key variables with age—Age at T1 was correlated with the central variables (age varied by up to a few months from one assessment to the next). Parents rated younger children higher in impulsivity and lower in EC at T1, *r*s (201; 202) = -.20 and .15, *p*s < .01 and .04. In addition, older children were rated by observers as exhibiting less movement during the sitting still task at T1, *r*(212) = .14, *p* < .04, and persisted on the puzzle longer at T2, *r* (173) = .16, *p* < .04, and at T3, *r*(155) = .21, *p* < .01. Finally, older children were rated as higher in parent- and child-reported sympathy at T1, *r*s(203, 212) = .18 and .34, *p*s < .02 and .01, and in child-reported sympathy at T2, *r*(173) = .16, *p* < .04. There were no relations with age for variables at T4 or T4/5 (for sympathy).

Correlations of EC with Impulsivity within Reporter within Time

EC and impulsivity tended to be negatively related within time and reporter. Correlations ranged from *r*(201) = -.48 at T1 to *r*(172) = -.54 at T2, *p*s < .01, for parents' reports and from *r*(148) = -.29 at T4 to *r*(192) = -.53 at T1, *p*s < .01, for teachers' reports.

Relations of Measures of EC and Impulsivity to Children's Sympathy: Correlations

Correlations of measures of EC and impulsivity to children's sympathy were computed. Because conceptually EC or impulsivity is more likely to affect sympathy than vice versa, and to reduce the number of correlations, only correlations of EC and impulsivity with indices of concurrent or future sympathy are presented. Although age was related to some measures, especially indices of EC, partialling age had little effect on the correlations. Thus, zero-order correlations are presented. Means and *SD*s for the central variables are presented in Table 1.

Relations of reported EC to children's sympathy—Indices of children's EC often were significantly related to reports of children's sympathy, within and across time (see Table 2). This pattern of relations tended to hold for the total sample and most often for boys. Indeed, 25 of 61 possible correlations for boys were significant, and these relations generally were not confined to particular reporters of sympathy or EC, although there were few findings for boys' self-reported sympathy. For girls, there were no significant relations for parents' reports or self-reports of children's sympathy; however, 6 of 9 concurrent and across-time correlations between teacher reports of sympathy and teacher reports of EC were positive and significant. Self-reported sympathy in early to mid-adolescence, but not at earlier assessments, was frequently related to EC for the total sample.

Relations of reported impulsivity to children's sympathy—Correlations of impulsivity with sympathy were somewhat less consistent than for EC (see Table 3). Teachers' reports of sympathy frequently were negatively related to parents' or teachers' reports of impulsivity, but the pattern held primarily for boys, for whom 7 of 38 correlations with parent- or teacher-reported EC were negative and significant (whereas fewer than 2 would be expected by chance). There were few significant correlations between impulsivity and parent-reported sympathy, and they were not very consistent. Child-reported sympathy tended to be positively related to adult-reported impulsivity. Although this relation was found for boys at T2, at T3 all the positive relations between impulsivity and child-reported sympathy were for girls. Thus, although teacher-reported sympathetic boys were relatively low in adult-reported impulsivity, children who reported being sympathetic tended to be viewed as impulsive at the middle assessments.[1]

[1]Children's reported concern with social desirability was assessed with 14 items from Crandall, Crandall, and Katkovsky (1965; alphas at T1, T2, and T3 = .59,.77, and .79). Controlling for social desirability when correlating child-reported sympathy with measures of EC and impulsivity did not have a substantial effect on the results.

Relations of behavioral measures of EC and impulsivity to children's sympathy—T1 persistence generally was positively related to adults' reports of children's sympathy at T1 through T2; T2 persistence predicted T2 teacher- and self-reported sympathy; and T3 persistence predicted adult-reported T3 sympathy. Sitting still at T1 was positively related to child-reported sympathy at T2 and adult-reported sympathy at T3; T2 sitting still was related to child-reported T2 sympathy, especially for boys; and T3 sitting still was related to boys' sympathy on multiple measures at T3 and T4/5. Thus, persistence was generally positively related to sympathy, concurrently or over a few years, whereas sitting still was a more frequent correlate of sympathy when the former was assessed at a young age or for boys at older ages.

Stopping during the reward dominance computer game at T3 and T4 was positively related to teachers' reports of boys' sympathy within and across time. However, self-reported sympathy at T3 was negatively related to stopping on this game at T3 (with a similar near significant finding at T5 for girls), suggesting that children who were somewhat more impulsive reported more sympathy. However, this pattern was weak and could be due to chance.

Growth Curves Analyses

In the next set of analyses we computed growth curves for the major predictors and then used them to predict sympathy at T4/5. Growth curves for EC and impulsivity were computed using the data from T1 to T4, separately for parents and teachers. Growth curves were also computed for observed persistence and sitting still using T1 to T3 data. These analyses included tests of whether change in the slope over time was significant and if there was significant variability among individuals in the intercept (T1 value) and the slope. Because age was correlated with some variables, especially at T1, it was included in all the models predicting both the intercept and slope. Thus, the estimates for the slopes were only approximate, as were intercepts (the slope for age = 0), and they should be viewed as indicating the approximate degree and direction of any change over time, especially if age was related to the slope.

Next we predicted parent-, teacher-, or child-reported sympathy simultaneously from each of the growth curves for EC and impulsivity. The three indices of sympathy were allowed to correlate in these models and were significantly positively related in many of the models. In addition, in order to assess gender differences in the path coefficients, multiple group models were computed. A given model was estimated once with all path coefficients to T4/5 parent-, teacher-, and child-reported sympathy constrained to be equal across girls and boys and once with these path coefficients freed. In all these multiple group models, the means and variances of the intercept and slope were unconstrained across boys and girls. A chi-square difference test was used to determine whether freeing the paths significantly improved the fit of the model. If the unconstrained model fit better than the constrained model, there was a gender difference in the path to one or more measures of sympathy.

All models were computed with M-Plus 4.12. In cases where data were missing, M-Plus determines a maximum likelihood estimation of the model.

Parent-reported EC—The linear growth curve model for parent EC fit fairly well, $\chi^2(7)$ = 14.59, $p < .05$, *CFI* = .984, *RMSEA* = .071 (*CI* = .013 -.123), *SRMR* = .036. Age predicted the intercept (the estimated value of parent-reported EC at T1), $\beta = .01$, $p < .05$, but not the slope. The intercept for the slope (henceforth labeled the slope) was significant and positive, $\eta = .27$, $p < .05$. There was significant variability in the intercept and slope, $s_{int}^2 = .44$ and $s_{slp}^2 = .02$, *p*s < .01. When this growth curve was used to predict the three T4/5 measures of sympathy, the model fit well, χ^2 (16) = 22.56, *ns*, CFI = .988, *RMSEA* = .044 (*CI*s= .00 - .082), *SRMR* = .036. The intercept (i.e., the value at T1) predicted higher parent- and teacher- (but not child-) reported sympathy at T4/5, and teacher-reported sympathy was also positively predicted by the slope of EC, *β*s = .61, .24, and .87, *p*s < .05, .01, and .05. Thus, a relative increase in EC from T1 to T4 was associated with higher teacher-reported sympathy at T4/5.

When testing for sex differences, the unconstrained model fit significantly better than the constrained model, $\Delta\chi^2$ (6)= 13.57, *p* <.05. The fit of the unconstrained model was marginal, $\chi^2(34) = 64.04$, *p* < .001, *CFI* = .941, *RMSEA* = .091 (*CI* = .056 - .125), *SRMR* = .105. However, it is of interest that the slope of parent-reported EC positively predicted higher parent-reported sympathy for girls, *β* = .73, *p* < .05. For boys, the intercept of EC positively predicted both parent- and teacher-reported T4/5 sympathy, *β*s = .20 and .27, *p*s < .05 and .01, and the slope, which was nearly significant, positively predicted teacher-reported sympathy, *β = .53*, *p* = .10. Thus, when girls increased more in parent-reported EC over time, they were rated by mothers as relatively high in sympathy at T4/5. Boys' sympathy at T4/5 was predicted by their EC years earlier, and a relatively positive change in parent-reported EC was weakly, marginally positively associated with higher teacher-reported sympathy at T4/5.

Teacher-reported EC—For teacher-reported EC, the linear growth curve model did not fit, but the quadratic model fit well, $\chi^2(2) = .79$, *ns*, *CFI* = 1.00, *RMSEA* = .00 (*CI* = .00 - .10), *SRMR* = .01. In this model, the linear slope was negative and the quadratic slope was positive, ηs = -1.84 and .56, *p*s < .01. The mean was highest at T1, dropped at T2 and T3, and rose somewhat at T4 (model-estimated means = 5.57, 4.30, 4.14, and 5.12). There was variability in the intercept, $s_{int}^2 = .61$, *p* < .05, but not the slope.

The teacher-reported EC model predicting the outcomes (sympathy) would not run without a critical error message; thus, we could not predict sympathy with that model.

Parent-reported impulsivity—The linear growth curve model for parent-reported impulsivity fit the data well, χ^2 (7) = 7.62, *ns*, *CFI* = .999, *RMSEA* = .02 (*CI* = .00-.09), *SRMR* = .042. Age at T1 was negatively related to the intercept (but not the slope), *β*s = -.02, *p* < .01, indicating that children who were younger at the first assessment were higher in impulsivity. The slope was negative, indicating that impulsivity declined with age, η = -.30, *p* < .05. There was significant individual variability in both the intercept and the slope, $s_{int}^2 = .55$ and $s_{slp}^2 = .04$, *p*s < .01. Although the model in which this growth curve was used to predict T4/5 sympathy fit well, $\chi^2(16) = 15.60$, *ns*, *CFI* = 1.00, *RMSEA* = .00 (*CI* = .00 to .06), *SRMR* = .036, neither the initial value of parent-reported impulsivity nor the slope predicted any of the three measures of T4/5 sympathy. In addition, there was no evidence of sex differences in the pattern of relations.

Teacher-reported impulsivity—The growth curve model for teacher-reported impulsivity fit well, $\chi^2(7) = 11.62$, *ns*, *CFI* = .97, *RMSEA* = .056 (*CI* = .00 - .11), *SRMR* = .059. The slope was not significant and was not related to age at T1, although there was significant individual variation in estimates of both the intercept and the slope, $s_{int}^2 = .88$ and $s_{slp}^2 = .10$, *p*s < .01. When this growth curve was used to predict T4/5 sympathy, the fit was good, $\chi^2(16) = 19.84$, *ns*, *CFI* = .981, *RMSEA* = .033 (*CI*s = .000 - .075), *SRMR* = .043. Impulsivity at T1 (the intercept) predicted lower teacher-reported sympathy at T4/5, and the slope for impulsivity, which was approaching significance, positively predicted parent-reported sympathy and predicted lower teacher-reported sympathy, *β*s = -.17, .50 and -.51, *p*s < .05, .08, and .06. Thus, a relative increase in teacher-reported impulsivity was related to higher parent-reported sympathy at T4/5 but somewhat lower teacher-reported sympathy at T4/5. Moreover, children who were initially low in teacher-reported impulsivity tended to be low in teacher-reported sympathy at T4/5.

The multigroup model that was unconstrained fit the data better than the constrained model, $\Delta\chi^2$ (6) =16.34, *p*<.05. The unconstrained model fit adequately on most indices, $\chi^2(32) = 46.88$,

$p < .05$, *CFI* = .924, *RMSEA* = .066 (*CI* = .01-.10), *SRMR* = .103. For girls, the intercept was approaching significance and positively predicted both parent- and teacher-reported sympathy, whereas the slope, also approaching significance, predicted parent-reported sympathy, *β*s = .20, .18, and 1.06, *p*s < .09, .08, and .06 (and the slope and intercept were again negatively related). However, for boys, both the slope and intercept negatively predicted teacher-reported sympathy, βs = -30 and -.92, *p*s < .01 and .05. Thus, for girls, there was a weak positive relation between initial level of impulsivity or an increase in impulsivity and adults' reports of sympathy (although the finding for the slope held only for parent-reported sympathy), whereas for boys, both a low initial level and a decline vs. increase in teachers' reports of impulsivity were related to higher teacher-reported sympathy at T4/5.

Observed persistence—Persistence was observed at T1, T2, and T3. A growth model did not fit very well on some indices but was adequate on others, χ^2 (2) = 8.58, $p = .01$, *CFI* = .932, *RMSEA* = .124 (*CI* = .05 - .21), *SRMR* = .053. The slope was not significant and was not related to age, although there was significant variability in both the intercept and the slope, $s_{int}^2 = .04$ and $s_{slp}^2 = .01$, *p*s < .01. However, the model predicting sympathy fit better, $\chi^2(8)$ = 13.27, *ns*, *CFI* = .964, *RMSEA* = .055 (*CI* = .00 - .11), *SRMR* = .042. The intercept for persistence was near significantly, positively related to teacher-reported sympathy at T4/5, β = .50, $p < .053$. In the multigroup models, there was no evidence of sex differences in the prediction of sympathy.

Sitting still—Observed sitting still was assessed at T1, T2, and T3. The growth curve fit fairly well, χ^2 (2) = 2.39, *ns*, *CFI* = .971, *RMSEA* = .03 (*CI* = .00 - .14), *SRMR* = .024. The slope for sitting still increased over time, η = .82, $p < .05$, and was not related to age at T1. There also were at least marginally significant levels of variability in both the intercept and slope, $s_{int}^2 = .41$ and $s_{slp}^2 = .16$, *p*s < .05 and .06.

The model predicting sympathy also fit well, χ^2 (8) = 8.45, *ns*, *CFI* = .99, *RMSEA* = .016 (*CI* = .00 - .08), *SRMR* = .036. Parent-reported sympathy was positively predicted by the intercept of sitting still, β = .28, $p < .05$; child-reported sympathy was positively predicted by the intercept of sitting still and near significantly predicted by the slope, βs = .23 and .33, *p*s = .05 and .08. Teacher-reported sympathy was nearly significant and positively predicted by the intercept, β = .25, $p < .06$. In the multiple group models testing sex differences in the prediction of sympathy, the constrained model would not run without a critical error. However, the unconstrained model fit well, χ^2 (16) = 17.04, *ns*, *CFI* = .983, *RMSEA* = .025 (*CI* = .00 - .09), *SRMR* = .052. For boys, the intercept approached significance and positively predicted teacher-reported sympathy at T4/5, and the slope, also approaching significance, positively predicted child-reported T4/5 sympathy, β = .22 and η = .51, *p*s < .08 and .06. The intercept and slope did not predict sympathy for girls. Thus, there was evidence that T4/5 sympathy was predicted from the initial level of sitting still and that children who improved in sitting still were somewhat more sympathetic at T4/5, but these findings sometimes only approached significance and only for boys.

Prediction of T4/5 Sympathy from Both EC and Impulsivity: Unique Prediction

Growth curves—In another set of growth curve analyses, our goal was to assess the unique prediction of T4/5 sympathy from children's EC and impulsivity. Thus, we tried to predict T4/5 sympathy (parent-, teacher-, and child-reported) from the growth curves for parent- and teacher-reported EC and impulsivity (using only one growth curve for EC and one for impulsivity in a single model). We computed these models using only adult-report data so the indices of EC and impulsivity would be relatively comparable. The model including parent-reported EC and parent-reported impulsivity fit well, $\chi^2(41) = 62.54$, $p < .02$, *CFI* = .980, *RMSEA* = .05 (*CI* = .02 - .07), *SRMR* = .035. The intercept of EC predicted both parent- and teacher-reported T4/5 sympathy, whereas the intercept of impulsivity positively predicted parent-reported sympathy and near significantly predicted child-reported sympathy, βs = .24, .31,.16, and .11, *p*s < .01, .01, .05, and .08. In addition, the slope for EC positively predicted teacher-reported sympathy, $\beta = 1.03$, $p < .05$. The findings for the intercept of impulsivity may have been suppression effects because they were not obtained in the model including only parent-reported impulsivity.

The model with parent-reported EC and teacher-reported impulsivity also fit fairly well, χ^2 (41) = 58.66, $p < .04$, *CFI* = .976, *RMSEA* = .045 (*CI* = .01-.07), *SRMR* = .045. Parent-reported sympathy at T4/5 was nearly significant and positively predicted by both the intercept and slope of EC, and significantly positively predicted by the slope of impulsivity, βs = .13, .80, and .56, *p*s < .07, .07, and .05. Teacher-reported sympathy was positively predicted by the intercept of EC and near significantly predicted by the slope of EC, βs = .22 and .79, *p*s < .01 and .06.

Thus, in these two models, teacher-reported sympathy at T4/5 was most consistently predicted by the intercept and slope (albeit approaching significance in one model) of EC. However, there was evidence that impulsivity at T1, and an increase in impulsivity, predicted higher parent-reported sympathy, although some of the findings for impulsivity may have been suppression effects due to the correlation between EC and impulsivity.

Recall the growth curve model for teacher-reported EC predicting outcomes could not be computed without error messages. We also could not compute models with it and impulsivity predicting sympathy without error messages indicating that they should not be interpreted.

Regression analyses—Because we could not test the unique effects of teacher-reported EC with impulsivity in growth curve analyses, we computed regressions in which teacher-reported EC at T1, T2, T3, or T4 and either teacher- or parent-reported impulsivity within the same assessment were used to predict a given T4/5 measure of sympathy (i.e., 8 regressions each were computed for parent-, teacher-, and child-reported T4/5 sympathy: one with parent EC and parent impulsivity within each assessment point predicting T4/5 sympathy, and one with parent EC and teacher impulsivity within each assessment point predicting T4/5 sympathy). Because of the number of analyses, we summarize the pattern of results to save space.

In analyses in which T4/5 sympathy was predicted by teacher-reported EC and teacher-reported impulsivity, parent-reported sympathy at T4/5 was not significantly, uniquely predicted by either teacher-reported variable. In contrast, in similar regressions, teacher-reported T4/5 sympathy was significantly predicted by teacher-reported EC, but not teacher-reported impulsivity, at T2, T3, and T4 (neither was a significant unique predictor at T1). Child-reported T4/5 sympathy was predicted by EC, but not impulsivity, at T1, T2, and T3 (but not T4). Thus, in these analyses, EC was clearly the stronger unique predictor.

Similarly, in analyses in which teacher-reported EC and parent-reported impulsivity were used to predict T4/5 sympathy, EC predicted parent-reported T4/5 sympathy at T1, but neither EC nor impulsivity uniquely predicted parent-reported sympathy at T2-T4. When predicting teacher-reported sympathy at T4/5, teacher-reported EC was a significant unique predictor at T2, T3, and T4, whereas parent-reported impulsivity was not. When predicting child-reported sympathy at T4/5, teacher-reported EC was a unique predictor at T1, T2, and T3 (but not T4), whereas parent-reported impulsivity was never a significant unique predictor. Thus, for teacher- and child-reported EC at T4/5, teacher-reported EC was clearly a stronger unique predictor than either teacher- or parent-reported impulsivity.

For comparability with the regressions for teacher-reported EC, we also computed analogous regressions in which parent-reported EC and either parent- or teacher-reported impulsivity at each of the four assessments were tested as unique predictors on T4/5 sympathy. At all four assessments, and for both parent- and teacher-reported impulsivity with parent-reported EC, parent-reported EC was a significant predictor of teacher-reported T4/5 sympathy whereas impulsivity was not. When parent-reported EC and parent-reported impulsivity were used to predict parent-reported sympathy, EC was a unique predictor at all assessments, whereas impulsivity was also a unique predictor only at T2. When parent-reported EC and teacher-reported impulsivity within each assessment were used to predict T4/5 teacher-reported sympathy, EC was a significant unique predictor only at T3 and impulsivity was a near significant predictor, $p < .058$, at T4. When parent-reported EC and either parent- or teacher-reported impulsivity were used to predict T4/5 child-reported sympathy, neither variable was a unique predictor in any of the regressions.

Thus, when EC and impulsivity at each assessment were used to simultaneously predict T4/5 sympathy, impulsivity was very seldom a unique predictor of sympathy. In contrast, EC usually was a unique predictor of teacher-reported sympathy, regardless of whether impulsivity was reported by the parent or teacher. Parent-reported EC also was uniquely related to parent-reported sympathy at three of four assessments when parents also reported on children's impulsivity. In addition, EC generally was a unique predictor of child-reported sympathy when teachers reported on EC and either parents or teachers reported on children's impulsivity. In brief, EC was much more frequently a unique predictor of T4/5 sympathy than was impulsivity.

Discussion

The results of this study generally support the view that individual differences in effortful control (EC) are related to, and sometimes predict across time, individual differences in children's sympathy. Although these relations generally were modest, children viewed as sympathetic by adults, especially boys, were likely to be viewed by teachers, parents, and the children themselves in early to mid-adolescence as high in EC. For girls, similar positive relations were found primarily for teacher-reported EC and sympathy, although sometimes across teachers reporting years apart. In addition, children who scored higher on the behavioral measures of EC that were administered at the first three assessments were rated by adults as relatively sympathetic, especially at younger ages, perhaps because the behavioral measures were more effective and/or age-appropriate at younger ages, as well as closer in time to the assessment of sympathy.

Growth curves for EC were also used to predict children's sympathy at T4/5 (early to mid adolescence). Relations of the intercept of EC at T1 with parent- and teacher-reported sympathy for boys at T4/5 are consistent with the pattern of correlations. In addition, parent-reported EC increased with age and children who exhibited more of an increase were rated as higher in sympathy by teachers at T4/5. This pattern appeared to be somewhat stronger for boys than for girls: Prediction by the slope was significant for the total sample and nearly significant for boys. In addition, girls who increased more in parent-reported EC were relatively likely to be high in parent-reported sympathy at T4/5.

Unfortunately, growth curve models could not be used to predict T4/5 sympathy, probably because the growth curve for teacher-reported EC was quadratic, which, with our sample size, led to the estimation of too many parameters to run properly. However, as already noted, both girls' and boys' sympathy tended to be related to teacher-reported EC.

The pattern of findings, especially for boys, is consistent with the view that people who can effortfully modulate their emotions are relatively likely to experience sympathy. The findings also suggest that individual differences in the development of EC predict sympathy in early to mid adolescence. Individuals who respond with emotion to others' plight but cannot modulate their emotional arousal are believed, and have been found, to experience personal distress, at least in evocative situations in which empathic individuals would be expected to experience relatively high levels of vicariously induced negative emotion (Eisenberg et al., 1994, 1996).

It is unclear why many of the relations between sympathy and EC were more consistent for boys than girls, especially for parent-reported EC and sympathy. There were no consistent sex differences in the variability of ratings of EC or sympathy that could explain this pattern of findings; indeed, there was significantly greater variability for teachers' ratings of girls', in comparison to boys', sympathy at T4/5, as well as in self-reported sympathy at T2. Girls were consistently rated as higher than boys in sympathy; perhaps, due to socialization for gender roles, most girls had developed the minimal level of EC needed for sympathy in most contexts prior to the age at which this study began. Or perhaps parents are motivated to view their daughters as relatively sympathetic because sympathy is normatively expected for girls, regardless of daughters' actual levels of sympathy. However, the finding that an increase in parent-reported EC predicts T4/5 parent-reported sympathy for daughters is not consistent with this argument. Because sympathy is often viewed as a feminine trait and, for girls, may be associated with emotionality, perhaps adults tend to view sympathetic girls as not especially regulated. There was some evidence that self-reported sympathy by children was associated with adults' reports of impulsivity, especially for girls by T3. In any case, the facts that teacher-reported EC was positively related to girls' teacher-reported sympathy, within and across time, and that change in parent-reported EC predicted sympathy for girls, support the view that sympathy is relevant to the development of EC in girls, at least in some contexts.

The pattern of relations between children's sympathy and adult-reported impulsivity was somewhat less consistent than for adult-reported EC. Teachers' reports of sympathy frequently were negatively related to parents' or teachers' reports of boys' impulsivity; in addition, low reward dominance predicted teacher-reported sympathy for boys but not girls. Furthermore, a relative decline versus increase in teacher-reported (but not parent-reported) impulsivity with age predicted greater sympathy at T4/5 for boys. Thus, sympathetic boys tended to be viewed as low in impulsivity as well as high in EC, although the pattern of findings for impulsivity was somewhat weaker than for EC.

In contrast to boys, girls' impulsivity was infrequently and inconsistently related to sympathy. Although only approaching statistical significance, it is interesting that the growth curve for teacher-reported impulsivity positively predicted parent-reported T4/5 sympathy, especially for girls. This finding is somewhat consistent with the finding that child-reported sympathy at T4/5 tended to be positively related to adult-reported impulsivity. Given that child-reported sympathy was infrequently positively related to impulsivity when sympathy was measured at younger ages, it is unclear if this pattern of findings is reliable. It is possible that children who are impulsive are less inhibited about reporting sympathy and/or more likely to acknowledge their emotional experience. Adults who are somewhat emotional, even if they are well regulated, are relatively likely to experience or report sympathy (e.g., Eisenberg et al., 1994). However, this explanation is speculative and should be tested further.

As for EC, the pattern of findings for impulsivity was most consistent for boys and in the school setting. Teachers, due to the need for them to maintain order in the classroom, may be especially attuned to individual differences in children's EC and impulsivity, and this may be especially true for more impulsive children, including boys. In addition, teachers are exposed to a range of children and may be better judges than some parents of individual differences in children's EC and impulsivity, and perhaps sympathy. Furthermore, it is possible that displays of sympathy with peers are more consistently related to high EC and low impulsivity than is

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sympathy with family members, perhaps because children are more attentionally attuned to family members' emotions. In any case, it appears that the control-related correlates and precursors of sympathy may differ somewhat depending on the context and target of sympathy.

We also examined the unique contributions of EC and impulsivity to the prediction of sympathy. Growth curves for parent-reported EC and either parent- or teacher-reported impulsivity were computed; comparable analyses for teacher-reported EC would not run correctly. In these analyses, there was some evidence of unique effects of the intercepts of both EC and impulsivity when predicting parent-reported sympathy at T4/5, indicating that T1 levels of both variables provided some prediction of sympathy years later. In addition to the findings for parent-reported sympathy, teacher-reported sympathy was uniquely predicted by the intercept of EC but not impulsivity. Moreover, in the model including teacher-reported impulsivity and parent-reported EC, a relatively positive versus negative trajectory for impulsivity was uniquely related to higher parent-reported sympathy. In contrast, individual differences in the trajectory for parent-reported EC significantly or near significantly predicted higher T4/5 sympathy in both analyses, especially for teacher-reported sympathy (prediction of parent-reported sympathy was near significant in one analysis).

Thus, EC appeared to be a stronger unique predictor of teacher-reported sympathy at T4/5, whereas both EC and impulsivity tended to provide some unique prediction of parent-reported sympathy. This pattern of findings again suggests that the degree to which EC and impulsivity predict sympathy may vary somewhat with the context or reporter. In addition, differences in the overall patterns of findings are consistent with the view that EC and impulsivity are separate, albeit correlated, constructs. It is possible that some of the findings for parent-reported impulsivity were suppression effects because they were not obtained when only parent-reported impulsivity was used to predict T4/5 sympathy. Although suppression may have occurred due to the negative relation between EC and impulsivity, it is also possible that impulsivity reflects spontaneity to some degree when its overlapping variance with low EC is pulled out of the relation with sympathy.

In regressions used to assess the unique contributions of teacher-reported EC and parent- or teacher-reported impulsivity when predicting T4/5 sympathy (because we could not use the growth curve for teacher-reported EC as a predictor), EC was clearly the stronger unique predictor of sympathy than impulsivity. Because EC apparently is involved in effortfully managing emotion (Rothbart & Bates, 2006), it would be expected to be involved in modulating vicariously induced emotion so children can experience sympathy rather than personal distress. The fact that impulsivity generally did not uniquely predict sympathy when the effects of EC were taken into account might be viewed as evidence that EC and impulsivity are overlapping constructs. Although they were substantially negatively correlated, the lack of much evidence of unique prediction by impulsivity may be due to its relatively weak and inconsistent relation to children's sympathy.

Strengths of the present study include its longitudinal design, as well as the use of multiple reporters and behavioral measures. Weaknesses include the degree of attrition in the sample, and the fact that the most unregulated children were most likely to drop from the study. Moreover, the sample was obviously less diverse in SES and more regulated in later assessments, limiting the generalizability of the findings to some degree. Moreover, if the range of scores and variability in EC and SES were reduced over time, correlations involving variables at the later assessments may have been attenuated (recall that missing data were estimated in the growth curve analyses); Moreover, it is impossible to determine causal relations from the data, even with the growth curve analyses, because change in EC (or impulsivity) and in sympathy may affect one another over time. For example children who are regulated may be more likely to experience sympathy, which results in positive interactions with peers and adults (Eisenberg, Fabes, Murphy et al., 1996) and more opportunities to development empathy and sympathy.

In future work, it would be productive to include a larger battery of behavioral measures over the school years and to obtain behavioral as well as reported measures of sympathy. In addition, because most of the participants in this study were from working and middle-class Euro-American families, the results may not generalize to lower socioeconomic or minority samples. Finally, to establish causal relations, it is important to conduct experimental prevention studies in which the effects of teaching children ways to self-regulate their attention and behavior are used to predict change in children's sympathy.

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Table 1

Mean and Standard Deviations for the Key Variables (Prior to Aggregating T4 and T5 Reports)

	Girls		Boys	
Measure	**Mean**	***SD***	**Mean**	***SD***
Sympathy				
T1 (P)	3.29	.44	3.04	.53
T1 (C)	2.17	.59	2.00	.62
T2 (P)	3.28	.44	3.05	.50
T2 (T)	3.00	.57	2.72	.60
T2 (C)	2.42	.46	2.34	.55
T3 (P)	3.38	.41	3.18	.51
T3 (T)	3.10	.56	2.72	.54
T3 (C)	2.62	.41	2.54	.47
T4 (P)	3.38	.44	3.20	.58
T4 (T)	3.11	.44	2.83	.60
T4 (C)	2.72	.34	2.47	.47
T5 (P)	3.29	.54	3.03	.60
T5 (T)	2.97	.46	2.59	.59
T5 (C)	2.54	.46	2.39	.44
Reported EC				
T1 EC (P)	4.59	.60	4.27	.82
T1 EC (T)	5.13	.95	4.67	1.03
T2 EC (P)	4.60	.65	4.48	.80
T2 EC (T)	5.14	.94	4.51	1.05
T3 EC (P)	4.89	.64	4.56	.81
T3 EC (T)	5.20	.92	4.54	1.04
T4 EC (P)	4.85	.63	4.46	.85
T4 EC (T)	5.25	.72	4.54	.84
T4 EC (C)	3.46	.53	3.34	.57
Reported Impulsivity				
T1 Imp (P)	4.43	.89	4.63	.80
T1 Imp (T)	3.91	1.04	4.30	1.24
T2 Imp (P)	4.25	.83	4.58	.80
T2 Imp (T)	3.94	1.02	4.32	1.00
T3 Imp (P)	4.16	.93	4.48	.82
T3 Imp (T)	3.75	.84	4.32	.91
T4 Imp (P)	4.02	.92	4.36	.86
T4 Imp (T)	3.72	.67	3.95	.81
Behavioral measures				
T1 sitting still	2.98	1.13	2.70	1.07
T1 persistence	.62	.28	.49	.31
T2 sitting still	3.22	1.01	3.23	.90
T2 persistence	.72	.28	.66	.30
T3 sitting still	3.73	.81	3.68	.90
T3 persistence	.74	.28	.65	.33
T3 use of stop key on game	.80	.40	.85	.36
T4 use of stop key on game	.81	.39	.87	.34

Note: P = parent-reported; T = teacher-reported; C = child-reported. T1 = Time 1; T2 = Time 2; T3 = Time 3; T4 = Time 4; T5 = Time 5.

Table 2

Correlations of Measures of Reported Effortful Control with Reports of Children's Sympathy.

		Time of Assessment								
		T1		T2		T3		T4-T5		
		P	C	P	T	P	T	P	T	C
Measure of Effortful Control										
T1 (P)	Total	.32**	.13+	.15*[b]	.31**	.14+	.28**	.16*[a]	.26**	.07
	Girls	.16	.04	-.12	.18	-.08	.18	-.14	.06	-.12
	Boys	.34**	.14	.25*	.35**	.19+	.26*	.28*	.29**	.08
T1 (T)	Total	.23**	.16*	.11	.31**	.16*	.38**	.14+	.14+	.18*
	Girls	.16	.11	-.04	.22*	.01	.35**	-.04	-.03	.05
	Boys	.20*	.16+	.18	.33**	.21+	.33**	.22*	.17	.18+
T2 (P)	Total			.14+[b]	.20**	.11	.16+	.09[b]	.19*[b]	.00
	Girls			-.11	.24*	-.02	.05	-.13	-.07	-.08
	Boys			.27**	.15	.14	.20+	.20+	.32**	.00
T2 (T)	Total			.04	.47**	.10[b]	.41**	.09	.28**	.16*
	Girls			-.17	.51**	-.22+	.27*	-.02	.03	.15
	Boys			.08	.38**	.20+	.40**	.08	.32*	.02
T3 (P)	Total					.30**	.21**	.18*[b]	.27**[a]	.09
	Boys					.16	.15	-.06	-.09	-.02
	Girls					.32**	.15	.27*	.37**	.07
T3 (T)	Total					.28**	.56**	.14+	.41**[a]	.22**
	Girls					.13	.46**	.07	-.07	.14
	Boys					.28**	.54**	.09	.56**	.16
T4 (P)	Total							.19*	.33**	.07
	Girls							.12	.07	-.04
	Boys							.17	.36**	.02
T4 (T)	Total							-.01	.59**	.00
	Girls							-.09	.41**	-.03
	Boys							-.09	.59**	-.19+
T4 (C)	Total							.16*	.22**	.16*
	Girls							.16	.09	-.02
	Boys							.13	.29**	.23*

Note: P = parent-reported; T = teacher-reported; C = child-reported. T1 = Time 1; T2 = Time 2; T3 = Time 3; and T4/5 = Time 4 and 5 combined. There were no significant correlations for child-reported sympathy at T2 and T3.

** $p < .01$.

* $p <$ or = .05.

+ $p < .10$.

[a] The sex difference was significant at p < .01.

[b] The sex difference was significant at $p < .05$.

Table 3

Correlations of Reported Child Impulsivity with Reports of Child Sympathy

		Time of Assessment										
		T1		T2			T3			T4/5		
		Reporter of sympathy										
Measure of impulsivity		**P**	**C**	**P**	**T**	**C**	**P**	**T**	**C**	**P**	**T**	**C**
T1 (P)	Total	-.07	-.11	.04	$-.21^{**}$	.06	.03	$-.15^{+}$	.11	.04	$-.11^{a}$	.07
	Girls	-.06	-.09	$.22^{+}$	-.14	.05	.12	-.06	.12	.13	.17	.04
	Boys	-.04	-.09	-.06	$-.24^{*}$	.07	-.01	$-.22^{*}$	.11	.00	$-.27^{*}$	.15
T1 (T)	Total	$-.13^{+}$	.02	-.10	$-.20^{**}$	.13	$-.10^{b}$	$-.16^{+}$	$.17^{*}$	$-.19^{*}$	-.09	.01
	Girls	-.14	-.01	.03	-.13	.13	.14	-.18	$.24^{*}$	-.03	.06	.02
	Boys	-.06	.07	-.14	$-.21^{+}$	.14	$-.21^{+}$	-.10	.15	$-.25^{*}$	-.09	.08
T2 (P)	Total			.06	-.04	$.16^{*}$	.03	$-.18^{*}$	$.18^{*}$	.10	-.06	.08
	Girls			.18	-.03	.14	.19	-.15	$.28^{*}$	$.25^{*}$	.16	.11
	Boys			.07	.01	$.19^{+}$	.00	-.12	.14	.06	-.14	.18
T2 (T)	Total			-.06	$-.16^{*}$	$.14^{+}$	$-.16^{+}$	$-.24^{**}$	.12	-.08	$-.11^{b}$	-.03
	Girls			.01	-.03	.06	-.04	-.14	$.27^{*}$	-.03	.13	.00
	Boys			-.04	$-.20^{+}$	$.24^{*}$	$-.21^{+}$	$-.30^{*}$	.02	-.05	$-.23^{*}$	.03
T3 (P)	Total						-.04	$-.16^{+}$	.11	-.03	$-.12^{b}$	.02
	Girls						.11	-.09	.16	.16	.13	.07
	Boys						-.10	-.12	.10	-.14	$-.22^{+}$	.07
T3 (T)	Total						.00	$-.18^{*}$	$.08^{b}$	.09	$-.12^{b}$	.02
	Girls						.10	-.02	$.31^{*}$	.16	$.22^{+}$	-.05
	Boys						.07	-.16	-.03	.15	$-.17^{**}$	.18
T4 (P)	Total									-.03	-.13	.07
	Girls									.08	.04	.13
	Boys									-.05	-.14	.14
T4 (T)	Total									.13	$-.20^{*b}$	.11
	Girls									$.22^{+}$	.11	.06
	Boys									.13	$-.30^{**}$	$.22^{+}$

Note: P = parent-reported; T = teacher-reported; C = child-reported. T1 = Time 1; T2 = Time 2; T3 = Time 3; and T4/5 = Time 4 and Time 5 combined.

$^{**}p < .01$.

$^{*}p <$ or $= .05$.

$^{+}p < .10$.

[a] The sex difference was significant at $p < .01$.

[b] The sex difference was significant at $p < .05$.

Relations of Behavioral Measures of EC and Impulsivity with Reports of Children's Sympathy

		T1		T2			T3			T4/5		
		P	C	P	T	C	P	T	C	P	T	C
T1 persistence	Total	.22**	.12+	.18*	.18*	.11	.11	.13	-.04	.03	.22**	.08
	Girls	.24*	.00	.21+	.02	.16	.22+	.08	.09	.09	.04	.04
	Boys	.14	.15	.08	.22*	.06	-.03	.07	-.15	-.07	.23*	.01
T1 sitting still	Total	.06	.13+	.09	.09	.26**	.20**	.22**	-.02	.16*	.12	.11
	Girls	.08	.15	.09	.01	.27*	.30**	.23+	.08	.15	-.01	.18+
	Boys	-.01	.09	.03	.10	.24*	.09	.14	-.11	.12	.11	-.02
T2 persistence	Total			.08	.19*	.20*	-.01	-.06	-.04	.07	.03	.06
	Girls			.01	.10	.27*	-.14	-.10	.01	.06	-.09	.05
	Boys			.11	.23*	.13	.06	-.09	-.10	.06	.05	.02
T2 sitting still	Total			.03	.05	.15*	.03	.00	-.01	.05	.03	.00
	Girls			.06	.05	.10	-.04	.08	.05	.16	-.07	.01
	Boys			.01	.04	.20*	.11	-.03	-.06	-.03	.10	.00
T3 persistence	Total						.17*	.18*	.00	.07	.02	.08
	Girls						.13	.01	-.05	.09	-.15	.08
	Boys						.15	.24*	.02	.01	.07	.04
T3 sitting still (movement)	Total						.11b	.15+	.05	.13	.12	.20*b
	Girls						-.11	.01	.04	-.02	.04	.03
	Boys						.25*	.30**	.05	.25*	.16	.32**
T3 low reward dominance	Total						-.02	.15+	-.17*	-.01	.12	-.14
	Girls						-.09	.14	-.15	-.03	-.05	-.23+
	Boys						.06	.24*	-.18	.03	.28*	-.06
T4 low reward dominance	Total									.11	.09b	.03
	Girls									.05	-.09	.03
	Boys									.21+	.29*	.08

Note: P = parent-reported; T = teacher-reported; C = child-reported. T1 = Time 1; T2 = Time 2; T3 = Time 3; and T4 = Time 4, and T5 = Time 5.

** $p < .01$.

* $p <$ or $= .05$.

+ $p < .10$.

[a] The sex difference was significant at $p < .01$.

[b] The sex difference was significant at $p < .05$.