Helping Yourself Help Others: Linking Emotion Regulation to Prosocial Behavior through Sympathy and Trust

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Abstract

While emotionally well-regulated children are more likely to behave prosocially, the psychological processes that connect their emotion regulation abilities and prosocial behavior are less clear. We tested if other-oriented sympathy and trust mediated the links between emotion regulation capacities (i.e., resting respiratory sinus arrhythmia [RSA], negative emotional intensity, and sadness regulation) and prosocial behavior in an ethnically-diverse sample of 4- and 8-year-olds (N = 131; 49% girls). Resting RSA was calculated from children's electrocardiogram and respiration data in response to a nondescript video. Sympathy was child and caregiver reported, whereas negative emotional intensity, sadness regulation, trust, and prosocial behavior were caregiver reported. Regardless of age, higher resting RSA was linked to higher sympathy, which was associated with higher prosocial behavior. The positive link between sadness regulation and prosocial behavior was mediated by higher sympathy and trust. Children's other-oriented psychological processes may play important roles in translating certain emotion regulation capacities into prosocial behavior.

Keywords: prosocial behavior; emotion regulation; sympathy; trust; respiratory sinus arrhythmia

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Prosocial behaviors—actions taken to promote others' well-being (Hastings, Miller, & Troxel, 2015)—have been linked to a host of adaptive outcomes across the lifespan, including peer acceptance (Bukowski & Sippola, 1996), quality friendships (Markiewicz, Doyle, & Brendgen, 2001), and higher self-esteem and subjective well-being (Weinstein & Ryan, 2010). There has been growing interest in promoting the development of prosocial behavior (Davidov, Vaish, Hastings, & Knafo-Noam, 2016) and—given its multidimensional and stable nature across the lifespan—understanding its early biological, emotional, and cognitive roots (Malti et al., 2016c; Padilla-Walker & Carlo, 2014).

A large body of research has centered on emotion regulation capacities and how they factor into the development of prosocial behavior (for reviews, see Eisenberg, Spinrad, & Knafo-Noam, 2015, Eisenberg, Spinrad, & Eggum, 2010; Liew et al., 2011) because the ability to down regulate one's own distress is a likely precondition of maintaining personal calm, orienting to others' needs, and helping them accordingly (Hastings, Miller, Kahle, & Zahn-Waxler, 2014). However, the specific psychological mechanisms through which regulatory capacities promote prosocial behavior have not been empirically tested (Malti, Dys, Colasante, & Peplak, in press; Paulus & Moore, 2012). We argue that other-oriented psychological processes may serve as mediating mechanisms that translate emotion regulation capacities into prosocial behavior. To test this hypothesis, we investigated sympathy and trust as potential psychological processes linking various emotion regulation capacities and prosocial behavior. These two processes were chosen because sympathy has been inextricably linked to both emotion regulation and prosocial behavior (Eisenberg, Spinrad, & Morris, 2014), and trust is theorized to be an important

psychological platform for developing and maintaining prosocial attitudes toward others (Carlo, Randall, Rotenberg, & Armenta, 2010).

We studied this question in 4- and 8-year-old children because the transition from early to middle childhood is characterized by significant increases in effective emotion regulation strategies (Eisenberg et al., 2010) and sympathy (Kienbaum, 2014), and—by virtue of increased contact with peers (Rubin et al., 2015)—the extension of trust from familial to non-familial targets (Rotenberg, 2015).

Sympathy and Trust: Relations to Prosocial Behavior

Sympathy is a feeling of concern for another's distress or misfortune that often stems from the comprehension and empathic sharing of their negative affective state (Eisenberg, 2000). Whereas sympathy is associated with other-oriented prosocial behavior, empathy-induced personal distress has been linked to self-focused avoidant behavior (for a review, see Eisenberg et al., 2014). The other-oriented concern of sympathy—facilitated by competent down regulation of empathic arousal—is thought to play a critical role in motivating prosocial behavior towards others in distress/need (Hoffman, 2000).

In a broad sense, interpersonal trust is a belief that others are reliable and honest, which may serve as a foundation for the development of prosocial behavior (see Erikson, 1963). One's attributions about another's behavior/intent and corresponding behavior toward them likely depend on their level of trust for that other (Betts & Rotenberg, 2008). Although scarce, developmental studies on early and middle childhood support this theorizing: children with trusting orientations are rated as more helpful by their peers (Rotenberg, Boulton, & Fox, 2005) and have more friends (Berndt, 1981; Betts & Rotenberg, 2008), whereas less trusting children are less likely to engage in shared activities and have fewer friends (Chin, 2014). The concepts of

reciprocity and deservingness may explain the positive link between trust and prosocial behavior. Prosocial, trustful children may have strong expectations for others to reciprocate. Children who trust others are also more likely to see good and genuine intentions in them (Rotenberg, 2010), which may extend to viewing others as more deserving of help and other prosocial deeds.

In sum, the role of emotion regulation in prosocial behavior is well documented. In addition, there are strong theoretical and some empirical reasons to believe that both sympathy and trust facilitate prosocial behavior in the early years, with some of this research tying these orientations to successful emotion regulation. However, researchers have yet to consider links between emotion regulation, sympathy, trust, and prosocial behavior.

Emotion Regulation: A Precondition for Sympathy- and Trust-Related Prosocial Behavior

An age- and context-appropriate expression of sympathy likely requires children to regulate vicariously-induced emotions. Unchecked empathic concern can lead to personal distress in the form of fear, nervousness, and anxiety instead of sympathetic concern, sadness, and sorrow for others (Eisenberg, 2000). Personal distress is thought to narrow one's mental focus from the self and other to the self only, which may hamper constructive responses to others' needs (Paulus & Moore, 2012). Well-regulated children, on the other hand, are more likely to experience sympathy in empathy-inducing situations and show prosocial responses to empathy-inducing targets (Murphy, Shepard, Eisenberg, Fabes, & Guthrie, 1999; Valiente et al., 2004).

A similar argument may apply to interpersonal trust: a preoccupation with personally distressing negative affect is thought to narrow cognitive and affective processes linking the self to others and the world around them, whereas positive emotions are thought to broaden interpersonal thinking and promote social bonds (Fredrickson, 2004). For example, Davis (2016)

found that 6- to 13-years-olds who were successful at regulating their sadness after viewing a sad movie clip were more likely to engage in global—as opposed to local—cognitive processing during an attention task (i.e., shape recognition), focusing on the "bigger picture" instead of the specific aspects of the targets. Although this study examined how children's sadness regulation facilitates their global information processing in a cognitive domain, regulating sadness and experiencing more positive emotions may also broaden individuals' thought–action repertoires. According to the broaden-and-build theory (Fredrickson, 2004), the broadening effect of positive emotions on thoughts and actions contrasts with that of negative emotions, which narrows momentary thought–action tendencies by urging relatively primal and restricted behavioral patterns (e.g., those related to the fight-and-flight system). Positive emotions, on the other hand, prompt the use of personal (e.g., creativity, self-insight) and social (e.g., social bonds) resources (Fredrickson, 2004) and, by extension, thinking about relationship building in a more contextualized and trust-conducive manner. The inverse of this argument has some more direct empirical support, as internalized maladjustment—namely loneliness, depression, and anxiety—in elementary school children has been linked to low levels of interpersonal trust (Rotenberg et al., 2005).

To date, emotion regulation has not been tested in this likely foundational role, setting the stage for sympathy- and trust-related prosocial behavior. Related research has also yet to distinguish the distinct components of emotion regulation (see Eisenberg et al., 2010; Kim-Spoon, Cicchetti, & Rogosch, 2013; Zeman, Shipman, & Penza-Clyve, 2001) in these links to better understand which aspect(s) are more or less foundational.

Unpacking the Components of Emotion Regulation

Here, we focused on three central markers of emotion regulation—respiratory sinus arrhythmia (RSA), negative emotional intensity, and sadness regulation—each of which may reflect a regulatory capacity or process with distinct relevance to other-oriented responses of sympathy and trust, and related prosocial behavior.

Resting parasympathetic nervous system functioning—indexed by resting RSA—reflects an individual's temperamental physiological regulatory capacities heading into affectively charged social situations (i.e., regardless of their sensitivity to negative emotions and the emotion regulation strategies they employ; Beauchaine, 2012). Higher resting RSA denotes a greater capacity for parasympathetic top-down modulation of emotional arousal. In this case, it represents a dispositional biological tendency to respond to others' distress with heart rate deceleration, which may help one regulate their own distress and sustain an other-oriented focus on reducing others' distress (Hastings et al., 2014). Not surprisingly then, high resting RSA has been linked to greater sympathy and prosocial behavior, respectively, in childhood (Fabes, Eisenberg, Karbon, Troyer, & Switzer, 1994; Liew et al., 2011).

A high level of expressed negative emotionality reflects inflexible and excessive reactivity in negative mood under challenge (Kim-Spoon et al., 2013), whereas well-regulated emotionality reflects situationally appropriate and socially competent display of affect (Shields & Cicchetti, 1997). Although expressed emotionality and regulation are often moderately and negatively correlated (Kim-Spoon et al., 2013), both are considered central components of the emotion regulation process. For example, children's level of dispositional emotionality may dictate the ease or difficulty with which they employ regulatory strategies—including the frequency, type, and effectiveness of such strategies (Eisenberg et al., 2010).

We conceptualize sadness regulation as reflecting the extent to which children use adaptive strategies to regulate their sadness expressivity—a less-studied component of their negative emotionality compared to anger or fear (Zeman et al., 2001). Sadness regulation is particularly relevant in the context of prosocial behavior because managing sadness-related distress induced by others' misfortune and sadness is a common emotional challenge for children to overcome before engaging in prosocial responses to others' needs (Hastings et al., 2014). The use of adaptive strategies is important because less adaptive strategies, such as dysregulated expression, may feed into high negative emotionality and detract from an other-oriented prosocial focus.

Developmental Differences in Emotion Regulation and Other-Oriented Responses

Children's emotional and behavioral control improve dramatically during the preschool and kindergarten years as they shift from external (e.g., parental) to internal sources of regulation, and they adopt more effective cognitive strategies to regulate their emotions into middle childhood (Eisenberg et al., 2010). Studies have also reported increases in self- and parent-reported sympathy from early to middle childhood (e.g., Kienbaum, 2014; Malti, Eisenberg, Kim, & Buchmann, 2013a), which aligns with developmental theorizing that sympathy arises from the interplay of basic empathic concerns and advancements in social cognitive abilities, such as perspective taking (Eisenberg et al., 2014). The targets of trust and prosocial orientations shift from predominantly caregivers and family members in infancy and toddlerhood to a growing network of peers and teachers into middle childhood (Rotenberg, 2015). This transition is also characterized by an increased motivation to cultivate positive peer relationships (Rubin et al., 2015), which are bi-directionally related to more frequent prosocial behavior (Wentzel, 2014). Our sample of 4- and 8-year-olds reflects the developmental window

in which these personal (e.g., perspective taking, effective emotion regulation) as well as relational changes (e.g., peer relationship) are likely to occur.

Present Study

We tested the extent to which sympathy and trust linked distinct components of children's emotion regulation repertoire to their prosocial behavior. We hypothesized that sympathy and trust—affective and cognitive other-oriented processes, respectively, with close ties to prosociality (Eisenberg et al., 2014; Hoffman, 2000; Rotenberg et al., 2005)—would mediate the link between emotion regulation and prosocial behavior (Carlo et al., 2010). Given emotion regulation's status as a likely precondition for sympathy- and trust-related prosocial behavior (i.e., down-regulating one's own distress is an important first step before orienting to and constructively coping with the distress of others; Fredrickson, 2004; Liew et al., 2011; Valiente et al., 2004), we expected the latter to mediate rather than moderate the path from emotion regulation to prosocial behavior. We examined the effects of multiple emotion regulation components—resting RSA, negative emotionality, and sadness regulation—each with distinct regulatory relevance to other-oriented and prosocial tendencies (Hastings et al., 2014; Taylor, Eisenberg, & Spinrad, 2015).

We tested 4- and 8-year-olds with a multiple group approach to capture developmental differences in regulatory and other-oriented responses reflecting the transition from early to middle childhood. Despite expecting mean-level age differences—specifically heightened emotion regulation, sympathy, trust, and prosocial behavior in 8- versus 4-year-olds (Eisenberg et al., 2010; Malti et al., 2013a; Rothenberg, 2015)—we predicted that relations among these variables would be similar for both age groups. Albeit less common in early childhood (Eisenberg et al., 2010), it is likely that emotion regulation—when present—plays a similar role

in laying the groundwork for sympathy- and trust-related prosocial behavior in early and middle childhood. Nonetheless, we hypothesized that resting RSA would be a more significant regulatory predictor for 4- versus 8-year-olds because younger children have less sophisticated emotion management strategies and may rely more on their temperamental biological preparedness.

Finally, in light of children's socio-economic status (SES) being positively associated with their emotion regulation (Miller, Nuselovici, & Hastings, 2016) and prosocial behavior (Malti et al., 2016a), and girls showing heightened trust (Rotenberg et al., 2005), prosocial behavior (Fabes, Hanish, Martin, Moss, & Reesing, 2012), and emotion regulation (Eisenberg et al., 2015), we controlled for primary caregivers' highest level of education—one of the "big three" components of SES that is considered more stable than parents' occupation or income—as a proxy of SES (National Center for Education Statistics, 2012) and children's gender in our main analyses.

Method

Participants

A sample of 4- (n = 55; M_{age} = 4.68, SD = 0.26, 23 girls; 42%) and 8-year-olds (n = 76; M_{age} = 8.50, SD = 0.31, 41 girls; 54%) participated (N = 131; 64 girls; 49%). They were recruited from community centers, events, and summer camps in an ethnically diverse large Canadian city. Children were able to communicate in English and their caregivers were fluent in English speaking, comprehension, and writing. Caregivers reported their highest level of education as 2% no diploma, 9% high school, 5% vocational, 57% bachelor's, and 17% master's/doctoral level (10% chose not to report). The breakdown of the highest education degree categories was equally distributed between the two age groups, $\chi^2(6, 131) = 10.66$, $p = .10$. Participants

identified themselves as 39% Middle Eastern, 17% more than one ethnicity, 12% South/Southeast Asian, 7% European, 7% East Asian, 5% Central/South American, 2% African, and 5% other (6% chose not to report). The sample was highly diverse which is consistent with population data on ethnic origin of the region from which the sample was drawn (Statistics Canada, 2013).

Procedure

The study was approved by the Office of Research Ethics at the researchers' institution. Verbal assent and written informed consent were obtained from children and caregivers, respectively. Children were interviewed in a designated room at the laboratory for approximately 30 to 40 minutes while their caregiver remained in a waiting area and completed a questionnaire on their child's social-emotional development and pertinent demographics. Children's RSA was measured first followed by other interview tasks. After the interview, caregivers were debriefed while their child was given an age-appropriate book as a gift.

Measures

Prosocial behavior. Caregivers rated five items from the Prosocial Behavior subscale of the Strengths and Difficulties Questionnaire (Goodman, 1997) on a 7-point scale (0 = *never*; 3 = *about half of the time*; 6 = *always*; $\alpha = .83$; e.g., "Helpful if someone is hurt, upset, or feeling ill").

Resting RSA. Three-lead electrocardiogram and respiration data were recorded from children at a sampling rate of 2 kHz using a Biopac MP150 data acquisition system and BioNomadix modules (Biopac Systems, Goleta, CA, USA). Children were instructed to sit still while they viewed a 120-second nondescript video depicting aquatic scenery. Monitoring electrodes were secured slightly below the right clavicle and below the ribs on both sides. Leads

from each electrode were connected to a module fastened around the midsection that, alongside a respiration transducer, communicated wirelessly via the MP150 with a computer in an adjacent room running AcqKnowledge 4.2 data acquisition software. Data were imported to Mindware HRV 3.0.25 (Mindware Technologies, Gahanna, OH, USA) for visual inspection, cleaning, and RSA calculation. Specifically, RSA was calculated in line with the recommendations of the Society for Psychophysiological Research committee on heart rate variability (Berntson et al., 1997; SPR Committee Report; respiration data served solely as a visual aid for cleaning). Data during the 120-second video was cleaned in 30-second intervals to facilitate ease of processing. If more than 20% of an interval required editing, it was excluded from further analysis (overall rejection rate = 14%).

Sadness regulation. Caregivers rated five items from the Emotion Regulation Coping subscale of the Children's Sadness Management Scale (Zeman et al., 2001) on a 7-point scale (0 = *never*; 3 = *about half of the time*; 6 = *always*). The items reflected adaptive strategies for controlling sadness ($\alpha = .76$; e.g., "When feeling sad, he does something totally different until he calms down").

Negative emotional intensity. Caregivers rated six items from an emotional intensity questionnaire (Eisenberg et al., 1993) on a 7-point scale (0 = *never*; 3 = *about half of the time*; 6 = *always*). The items reflected the expression of negative emotions ($\alpha = .67$; e.g., "When my child experiences anxiety, it is normally very strong").

Sympathy. Children responded to five items from a well-validated sympathy scale (Eisenberg et al., 1996) on a 3-point scale (0 = *not like me*; 1 = *sort of like me*; 2 = *really like me*). Caregivers rated the same items on a 7-point-scale (0 = *never*; 3 = *about half of the time*; 6 = *always*). The items reflected concern for needy others (e.g., "When I/my child sees someone

being picked on, I/he/she feels sorry for them"). The correlation between the child-reported and parent-reported sympathy was $r = .35$, $p < .01$. We computed a multi-informant composite of sympathy to reduce single reporter bias (Rushton, Brainerd, & Pressley, 1983) and maintain model parsimony. Specifically, we estimated the factor score of sympathy after performing a principal component factor analysis of all child- and caregiver-reported items with sympathy as a single dimension (44% of variance explained, $\alpha = .85$).

Trust. Caregivers rated three items from the Trust subscale of The Holistic Student Assessment (HSA; an assessment of children's social-emotional competencies; citation withheld for peer review) on a 4-point scale (0 = *almost never*; 1 = *sometimes*; 2 = *often*; 3 = *almost always*; $\alpha = .74$; e.g., "Trusts other people"). The psychometric properties of the HSA have been validated in other large-scale studies, showing good reliability across different age groups and construct validity through its associations with social-emotional adjustment and maladjustment markers in the expected directions (citation withheld for blind review).

Analysis Strategy

Using *Mplus* 7.4, we tested a path model that encompassed resting RSA, sadness regulation, negative emotional intensity, sympathy, and trust as predictors of prosocial behavior (*Figure 1*). Covariance coverage ranged from .86 to 1.00 (i.e., 14% missing to no missing data). Data were missing completely at random, χ^2 (27) = 29.28, $p = .35$ (Little, 1988) and were therefore handled with full information maximum likelihood estimation (Enders, 2010).

Indirect effects of the different markers of emotion regulation on prosocial behavior through sympathy and trust were tested with bootstrapping, which increases power and control for Type 1 errors compared to the traditional Sobel's test (Preacher & Hayes, 2008). We conducted bootstrapping analyses with 5000 re-samples. We rejected the null hypothesis at the *p*

value of .05 (i.e., concluded no indirect effect) if the 95% confidence interval (CI) of an estimate did not include zero.

Results

Preliminary Analyses

Descriptive statistics and bivariate correlations among study variables are shown in Table 1. As expected, older children were higher in sadness regulation, sympathy, and prosocial behavior. Children with higher SES were lower in sympathy. Child gender was not related to any of the focal variables. In a preliminary analysis, we examined age differences in the path model (Figure 1; i.e., a multiple group analysis with age group [0 = 4-year-olds; 1 = 8-year-olds] as a grouping variable). First, we ran the model with all paths constrained to be equal for 4- and 8-year-olds. We then ran a χ^2 difference test on the constrained and unconstrained models, which was not significant, $\Delta\chi^2$ (21) = 13.94, p = .87, suggesting that our model did not differ significantly across the two age groups. Despite these preliminary non-findings for age, we included age along with gender and SES as control variables in the final path model to align with related literature (e.g., Malti et al., 2016a; Miller et al., 2016; Rotenberg et al., 2005).

Testing Sympathy and Trust as Mediators of the Emotion Regulation-Prosocial Behavior Link

To test our hypotheses on the mediating effects of sympathy and trust linking emotion regulation and prosocial behavior, we ran a path model. The model had a good fit to the data, $\chi^2(8)$ =6.13, p=.63; CFI=1.00; TLI=1.00, RMSEA=.00; SRMR=.04 (Figure 1). The total variances explained in prosocial behavior, sympathy, and trust were 52%, 42%, and 19%, respectively.

Sympathy and trust were positively, yet weakly, interrelated and both were positively linked to prosocial behavior. Partially supporting our mediation hypotheses, resting RSA and sadness regulation differentially predicted the other-oriented processes in our model. First, resting RSA positively predicted sympathy, but not prosocial behavior directly. We found an indirect, positive effect of resting RSA on prosocial behavior through high levels of sympathy (β = .10, p = .05, 95% CI: 0.00, 0.20), granting evidence for sympathy as a mediator of the link between children's biological regulatory capacities and prosocial behavior. Trust, however, did not mediate the link between RSA and prosocial behavior (β = .01, p = .40, 95% CI: -0.01, 0.06). Second, sadness regulation positively predicted sympathy and trust, but was not directly linked to prosocial behavior. The indirect effects of sadness regulation on prosocial behavior through sympathy (β = .22, p < .001, 95% CI: 0.11, 0.35) and trust (β = .06, p < .05, 95% CI: 0.02, 0.13) were also significant. In other words, high levels of sympathy and trust distinctly and fully mediated the link between adaptive sadness regulation strategies and heightened prosocial behavior. Finally, the indirect effects of negative emotional intensity on prosocial behaviour through sympathy (β = .03, p = .59, 95% CI: -0.08, 0.15) and trust (β = -.03, p = .25, 95% CI: -0.09, 0.003) were not significant.

Discussion

An abundance of evidence suggests that emotion regulation lays the foundation for engaging in prosocial behavior across the lifespan (e.g., Carlo, Crockett, Wolff, & Beal, 2012; Laible, Carlo, Panfile, Eye, & Parker, 2010; Randall & Wenner, 2014), but we argue that other-oriented psychological processes facilitate the connection between emotion regulation and prosociality. Few, if any, studies have tested other-oriented processes, such as sympathy and trust, as mediators of the emotion regulation–prosocial behavior link in childhood. We found

evidence to support this claim. However, the extent of their mediating effects depended on the components of emotion regulation that we considered—which included biological capacities, regulatory strategy use, and overt emotional expressions—thus traversing the multifaceted construct of emotion regulation and unpacking its components' relations to prosocial behavior.

In line with our hypotheses, sympathy and trust uniquely mediated links between select emotion regulation capacities and prosocial behavior. Importantly, none of the direct links between emotion regulation capacities and prosocial behavior was significant when sympathy and trust were accounted for in the model as other-oriented mediators. Specifically, better emotion regulation was indirectly related to higher prosocial behavior through higher sympathy. This supports the notion that emotion regulation may be necessary, but not sufficient, for engagement in prosocial behavior, and that sympathy triggers prosocial behavior on the basis of well-regulated affective arousal. This finding is consistent with the notion that down-regulating one's own negative emotions in the presence of a distressed other is important for orienting to that other's needs rather than excessively focusing on one's own vicariously-induced distress (Eisenberg et al., 2014; Hoffman, 2000). The positive link between our composite child- and caregiver-reported assessment of sympathy and prosocial behavior was robust, which corroborates previous work highlighting sympathy as a core other-oriented motivational process (Hoffman, 2000). However, our current results suggest a refinement of sympathy's conceptualization—namely as a psychological mechanism through which emotion regulation fosters prosocial behavior.

In line with our theorizing, we also found evidence for the mediating role of trust in the link between emotion regulation and prosocial behavior. The abilities to regulate negative emotion and maintain a positive mood may free up the requisite affective and cognitive resources

to orient toward and build trust in others. On the other hand, poorly regulated negative emotional experiences may bias children's reasoning about others' intentions and interfere with building positive beliefs about their trustworthiness. This is consistent with the perspective that emotion regulation is fundamental to individual differences in cognitive and social problem solving in both intra- and inter-personal settings (Carlson & Wang, 2007; Rothbart & Bates, 1998). Our results corroborate a few studies supporting the link between emotional experiences and trust. For example, children's depressive emotions and loneliness have been linked to low trust in peers (Rotenberg et al., 2005). Positive emotions or less negative emotions may motivate constructive and positive social interactions (Fredrickson, 2004) through which individuals learn to build positive schemas of others' behaviors and strong trust in others based on cooperation and the mutual disclosure of personal information (Carlo et al., 2010). Moreover, a proneness to positive emotions may increase the flexibility of thoughts and the range of the cognitive repertoire that children employ in social decision-making or cognitive tasks (Fredrickson, 2004). Also, people who are successful at regulating negative emotion tend to have high flexibility in both suppressing and expressing emotion (Bonanno, Papa, Lalande, Westpahl, & Coifman, 2004), which could transfer to their flexibility in social information processing. Canfield, Saudino, and Ganea (2015) found that 2- to 3-years-olds with high positive emotionality and high extraversion were more likely to engage selective trust—an adaptive ability to rely on information provided by someone who was reliable in the past. Also, Davis (2016) showed that 6- to 13-year-olds who showed better sadness regulation employed more global (i.e., focusing on the "big picture") rather than local information processing, which predicted better memory task performance. These results support the idea that effective emotion regulation increases the scope of what can be attended to and the modulating of attention to achieve higher-order goals. In the

same vein, the broaden-and-build theory proposes that positive moods expand our cognitive scope and motivate us to gain a more comprehensive understanding of ourselves and our relationships with others. In the domain of social relationships, therefore, positive affective tendencies (or less negative emotionality in the current study) may motivate children to form trusting bonds (Fredrickson, 2004).

Part and parcel of our mediation, trust was positively associated with prosocial behavior. In a longitudinal study, children's self-reported trustfulness predicted a low-stable trajectory of aggressive behavior—as opposed to increasing or high-decreasing trajectories—from age 8 to 12 (Malti, Averdijk, Ribeaud, Rotenberg, & Eisner, 2013b). Children who trust others less may attribute hostile intentions to them and thus deem them more deserving of harm (Farrington, 2005). In support of this idea, a study on early adolescence found that having low trust and being too naïve (i.e., having very high trust) were associated with a greater intention to aggressively retaliate after being provoked by a hypothetical peer (Rotenberg, Betts, & Moore, 2013). The positive association between trust and prosociality in the present study may be driven by a similar, yet opposite mechanism: children with healthy, high levels of trust may perceive positive intentions in others and thereby deem them worthy of help (Rotenberg, 2010) and potential candidates to reciprocate prosocial behaviors. Studies have shown that even infants make prosocial behavioral decisions based on their expectations of others' likelihood of returning the favor (e.g., Olson & Spelke, 2008) and elementary school children with higher trust beliefs in peers were more likely to engage in reciprocal cooperation with them in an age-appropriate version of the Prisoner's Dilemma game (Rotenberg, MacDonald, & King, 2004). Finally, trustful children are more likely to perceive genuineness in the distress or suffering of others

(Carlo et al., 2010), which may increase their likelihood of helping individuals in need by decreasing their motivational threshold for doing so.

We tested and confirmed the mediating effects of sympathy and trust while considering their overlap. Although both of these other-oriented constructs have affective and cognitive components, sympathy is thought to be triggered by vicarious *feelings* and a degree of distancing between the self and other (Eisenberg, 2000), whereas trust is characterized, in part, by interpersonal closeness built on *beliefs* about others' dependability, responsibility, and commitment to confidentiality (Rotenberg et al., 2005). Therefore, the relatively distanced, affective interpersonal components of sympathy and the relatively intertwined, cognitive interpersonal components of trust may have contributed to their unique mediating roles in the emotion regulation–prosocial behavior links that we observed.

In summary, our results are consistent with the longstanding literature on the importance of emotion regulation capacities for prosocial orientations (Eisenberg et al., 2010), but we expanded this work by unpacking the differential links between multiple components of emotion regulation and prosocial behavior through sympathy and trust. Specifically, we found that resting RSA and sadness regulation, but not negative emotional intensity, were positively related to sympathy. It may suggest that children's emotional reactivity may not be as a critical determinant of sympathy, trust, or prosocial behavior, as the capacity to modulate one's emotions, through either physiological or psychological means. This finding emphasizes the utility of facilitating emotion regulation skills in promoting prosociality for children regardless of their levels of emotional reactivity. High resting RSA, which reflects children's temperamental biological capacity to regulate vicarious emotional arousal (Taylor et al., 2015), may be important for focusing attention away from their own distress and towards others in need (i.e.,

sympathy; Eisenberg et al., 2014). A physiologically calm state facilitated by greater parasympathetic functioning promotes cognitive awareness and attentional engagement (Beauchaine, 2001; Porges, 2011). Our findings suggest that in the context of sympathy, it could enhance attention to, and cognitive understanding of, others' distress. In the current study, higher resting RSA was also indirectly related to prosocial behavior through higher sympathy. Previous studies have documented links between resting RSA and sympathy (e.g., Fabes, Eisenberg, & Eisenbud, 1993; Taylor et al., 2015), and resting RSA and prosocial behavior (e.g., Eisenberg et al., 1996; Scrimgeour, Davis, & Buss, 2016), respectively. However, our findings suggest that these associations may in fact be different parts of a unified process involving a psychophysiological regulatory foundation, an other-oriented psychological process, and related prosocial behavioral outcomes.

While our finding on sadness regulation reaffirms theorizing on the importance of regulating vicarious affective arousal (Hastings et al., 2014), one still might expect negative emotional intensity to be inversely linked to sympathy and prosociality. However, our findings do not fully support this idea, as the inverse relation with prosocial behavior was only supported by our bivariate correlation results, and there was no significant relation between negative emotion intensity and sympathy. In a sample of young adolescents, Carlo et al. (2012) found a curvilinear relation between general emotional reactivity at age 11 and prosocial behavior at age 15, with disproportionately low and high reactivity relating to less prosocial behavior. Future research should investigate the possibility of non-linear associations between negative emotional intensity, sympathy, and related prosocial behavior in children, given that a moderate degree of negative emotional intensity may reflect the requisite emotional sensitivity to feel sympathy for others' plight (e.g., Young, Fox, & Zahn-Waxler, 1999). Along this line, negative emotional

intensity encompasses the intensity of negative emotional experiences in general, whereas sadness regulation specifically refers to sadness—a hallmark of sympathetic feelings. Our differential findings with these components underscore the importance of specifying the types of negative emotions being regulated to gain a better understanding of their relevance to prosocial orientations. Resting RSA and negative emotional intensity were also unrelated to trust. This may be due to resting RSA indicating a dispositional potential or threshold for down-regulating affective stressors, whereas trust in our study was relatively cognitively loaded, reflecting general beliefs and feelings about others' intentions and behavior. We did, however, expect negative emotionality to be related to low trust (by virtue of narrowing children's interpersonal processing; Fredrickson, 2004). This was supported by our bivariate correlational results, but not when the association between sadness regulation and trust was accounted for in the same model, suggesting that children's regulatory strategy use to manage negative emotions is a more important indicator of their trust in others than their expression of negative emotions per se. Collectively, these findings point to the importance of considering multiple aspects of emotion regulation, as they are differentially related to other-oriented social-emotional and social-cognitive processes, and thereby prosocial behavior.

We did not find developmental differences between 4- and 8-year-olds in the associations between emotion regulation components and prosocial orientations. This suggests that, although emotion regulation skills and prosocial tendencies increase with age (Eisenberg et al., 2010; 2015; Malti et al., 2013a; 2016b; also corroborated in the present study), the relations between these factors are consistent between early and middle childhood. This group-invariance bolsters the practical breadth of our findings, although future studies should consider social-contextual

factors that are known to vary between early and middle childhood, such as peer relationships (Rubin et al., 2015), to further probe developmental differences in these associations.

Several limitations and future directions of our study should be considered. First, given the correlational nature of the data, we could not make causal inferences about the direction of effects. Bidirectional associations among trust, sympathy, and prosocial behavior are also plausible. We did, however, include two age groups to compensate for the limitations of a cross-sectional design and maintain the ability to investigate *age-related differences*. Future studies may benefit from having a longitudinal design to learn more about age-graded changes in the development of emotion regulation and other-oriented behaviors. Second, our measures of sadness regulation, negative emotional intensity, trust, and prosocial behavior were mother-reported. Although we included a physiological measure of regulation (i.e., resting RSA) and child-reported sympathy, future studies should attempt to replicate our findings with older children's assessments of emotion regulation strategies and trust to understand how their self-perceptions of these constructs are related to other- (e.g., peer-, teacher-) rated or observed prosocial behavior. Previous studies with adult samples reported that individual differences in the use of different type emotion regulation strategies have long-term consequences in social and emotional domains in everyday life, including interpersonal functioning (e.g., Gross & John, 2003). Thus, future studies may benefit from distinguishing the subtypes of emotion regulation processes (e.g., reappraisal, suppression) and examining their implications for prosocial other-orientations using youth self-report of emotion regulation strategy use. Despite its limitations, this study was the first to assess the mediating roles of sympathy and trust in this context while considering multiple components of emotion regulation. The results contribute new information to the literature by suggesting that distinct components of emotion regulation may promote

prosocial behavior through sympathy and trust as translational, psychological mechanisms. Practitioners may wish to target regulatory and other-oriented capacities in early and middle childhood with particular emphasis on establishing a solid foundation of various emotion regulation skills which may, in turn, set the stage for sympathy and trust to flourish as core motivators of prosocial conduct.

Table 1

Descriptive Statistics and Bivariate Correlations between Study Variables (N = 131)

	1	2	3	4	5	6	7	8	*M*	*SD*
1 ER - Resting RSA	-								6.82	1.22
2 ER - Sadness R	.14	-							2.65	1.05
3 ER - Negative EI	-.17†	-.49***	-						2.72	1.00
4 Sympathy	.24*	.46***	-.14	-					0	1.00
5 Trust	.14	.39***	-.32***	.22*	-				2.17	0.57
6 Prosocial	.10	.41***	-.22*	.65***	.36***	-			4.50	1.03
7 Age	.08	.30**	-.01	.53***	.01	.25**	-		6.90	1.91
8 Sex	.04	.04	-.07	-.05	.14	-.16†	-.12	-	-	-
9 SES	-.02	-.09	.10	-.21*	-.02	-.11	-.13	.09	-	-

Note. The correlation analysis was performed using the combined group of 4- and 8-year-olds. ER = Emotion regulation. RSA = Respiratory sinus arrhythmia. R = Regulation. EI = Emotional intensity. Scale ranges: RSA (4.2-11.1), Sadness ER, Negative EI, Prosocial behavior (0-6), Sympathy (-2.88-1.52), Trust (0-3), Sex (0 = Girl, 1 = boy), SES (1-7).

$^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

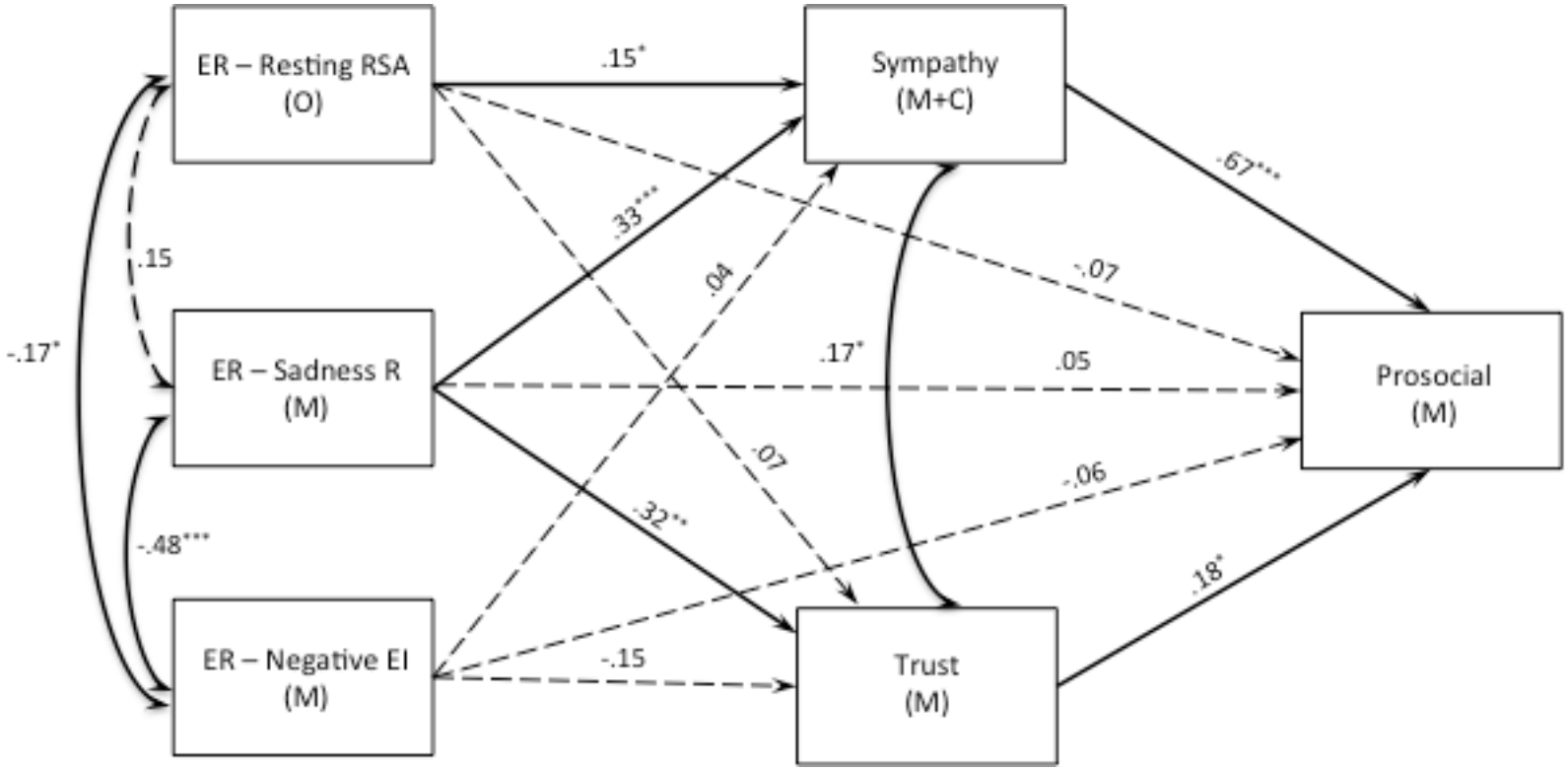

Figure 1. A path model examining psychological correlates of prosocial behavior. Numbers are standardized path coefficients. Dotted lines indicate non-significant paths. Children's age, gender, and SES are included as control variables but not displayed in the figure. $\chi^2(8) = 6.13$, $p = .63$; CFI=1.00; TLI=1.00, RMSEA=.00 (CI: .00-.08); SRMR=.04.

$^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

Note. ER = Emotion regulation. RSA = Respiratory sinus arrhythmia. R = Regulation. EI = Emotional intensity. O = Observed. C = Child-reported. M = Mother-reported.

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