



# Parenting

## Science and Practice


ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/hpar20>

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To cite this article: Leigha A. MacNeill, Elizabeth A. Shewark, Koraly Pérez-Edgar & Alysia Y. Blandon (2021) Sharing in the Family System: Contributions of Parental Emotional Expressiveness and Children's Physiological Regulation, *Parenting*, 21:4, 332-356, DOI: 10.1080/15295192.2020.1843358

To link to this article: <https://doi.org/10.1080/15295192.2020.1843358>

 Published online: 24 Mar 2021.

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# Sharing in the Family System: Contributions of Parental Emotional Expressiveness and Children's Physiological Regulation

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## SYNOPSIS

**Objective.** The current study examines whether associations between mothers' and fathers' emotional expressiveness and children's observed sharing behavior differ for two young children in the same family and whether children's baseline respiratory sinus arrhythmia (RSA) moderates relations between emotional expressiveness and sharing. **Design.** Altogether 69 families, including mothers, fathers, older siblings ( $M_{age} = 57.52$  months), and younger siblings ( $M_{age} = 32.68$  months) participated. Multilevel Poisson models were used to account for nesting of children within families and the count outcome of sharing. **Results.** Mothers who reported expressing more positive emotion had children who shared more, and this effect was moderated by child baseline RSA such that mothers who reported expressing more positive emotions had children who shared more when children had lower levels of baseline RSA. This finding was not significant for children with higher levels of baseline RSA or for fathers. **Conclusions.** Variations in the family's emotional climate across individual members may be crucial to foster sharing behavior for children with lower levels of physiological regulation.

## INTRODUCTION

Early prosocial behavior contributes to how children form and maintain positive relationships with peers and adults (Eisenberg, Fabes, & Spinrad, 2006). Children who engage in higher levels of prosocial behavior are often better liked by their peers and are generally more socially competent (Denham et al., 1990; Hastings, Utendale, & Sullivan, 2007). Sharing behavior, in particular, may be a key prosocial behavior in early childhood, because it can emerge in the child's first year and has important implications for children's broader socioemotional functioning, such as empathy and social acceptance (Eisenberg-Berg & Hand, 1979; Hay & Murray, 1982; Malti et al., 2012).

The family context may provide some of the first and most salient opportunities for engagement in sharing, in which children learn about the emotional states of others and how to respond prosocially to those states (Valiente et al.,

2004). Emotional expressiveness (EE) is the feelings parents generally express in the family, but it is not necessarily limited to situations involving the child (Halberstadt, Crisp, & Eaton, 1999). Parents' positive EE is associated with decreases in children's self-concern, allowing them to form satisfying social relationships and attune to others' needs (Eisenberg, Cumberland, & Spinrad, 1998). Although parental socialization research largely focuses on mothers, both parents' socialization relates to children's socioemotional development (Shewark & Blandon, 2015). The degree to which parents' EE is related to children's socioemotional development may be due in part to children's physiological regulation. Biopsychosocial models suggest that links between emotion socialization and young children's adjustment may be moderated by poor parasympathetic self-regulation (Hastings & De, 2008).

The current study examines whether relations between parental EE and young children's sharing behavior differ between mothers and fathers and whether those associations are moderated by children's physiological regulation. Additionally, we examine whether the relations between parents' EE and sharing differ for older (age 5) and younger (age 2) siblings.

### ***Sharing Behavior in Early Childhood***

Sharing is a prosocial behavior that changes in form and frequency throughout early childhood (Dunfield & Kuhlmeier, 2013; Dunfield et al., 2011). Sharing can be conceptualized as both spontaneous (e.g. handing a toy to another individual unprompted) or solicited (e.g. handing a toy to another individual on request). Because these behaviors are meant to relieve another individual's material need and benefit another individual, they are both considered to be prosocial in nature (Dunfield et al., 2011; Eisenberg-Berg & Hand, 1979). Research has often examined prosocial behavior as a composite of many behaviors, although evidence suggests that different types of prosocial behavior have unique developmental trajectories and implications for child outcomes (Brownell et al., 2013; Dunfield et al., 2011; Dunn & Munn, 1986). Sharing, specifically, is an important prosocial behavior to examine in early childhood, as it has key implications for children's developing social adjustment. For instance, research has positively linked sharing with feelings of social acceptance and the ability to sympathize with others (Malti et al., 2012). Both spontaneous and solicited sharing behaviors have been associated with higher moral reasoning (Eisenberg-Berg & Hand, 1979). Sharing behavior may be a key prosocial behavior to capture in early childhood, particularly within the family context, because (1) it emerges relatively early on in development, characterizing social exchanges between the child and its burgeoning social world and (2) the family is the child's first and most proximal "training ground" for establishing sharing behavior.

Although the extant literature suggests that sharing behavior is common in early childhood, the development of sharing is still unclear. To share, the child must be able to interpret that an inequality exists between them and the other person and be willing to sacrifice a personal resource to rectify the inequality (Dunfield et al., 2011). Research suggests that sharing builds on broader constructs of emotional and cognitive development and requires a more developed other-orientation, such that the child must be motivated to give up a personal resource (Eisenberg-Berg & Hand, 1979; Yarrow et al., 1976). Spontaneous sharing behaviors can emerge as early as 8 months of age and are integrated in children's behavioral repertoire by 12 months (Hay & Murray, 1982). By age 3, children are often able to recognize unequal distributions of resources and respond negatively to those situations (LoBue et al., 2011). As children get older, they may be more selective with whom they want to share. For example, 3-year-olds have been found to share equally with people who were potentially able to reciprocate sharing as well as with those who were unable to share. Meanwhile, 5-year-olds are more likely to share with others they know have the potential to reciprocate sharing (Sebastián-Enesco & Warneken, 2015).

Because the family serves as a venue for the child's first expressions of prosocial behavior, studying sharing behavior in the family system may help elucidate when and under what contexts sharing occurs. The sibling subsystem may be particularly important for engaging in prosocial behaviors. In early childhood, siblings spend a large amount of time together and their interactions are often uninhibited (Dunn, 2002). Therefore, examining sharing behavior in the sibling relationship may yield increases in the overall incidence of this behavior compared to examining it outside the home (Graziano et al., 2007). Age differences between siblings may construct a training ground for a multitude of both positive and negative behaviors. On one hand, siblings may be aggressive and compete for resources, limiting opportunities for sharing and modeling for a younger sibling (McHale, Updegraff, & Whiteman, 2012; Patterson, 1984). On the other hand, siblings can teach and learn important social skills (Howe & Recchia, 2014; Stormshak, Bellanti, & Bierman, 1996). In early childhood, older siblings (OS) have opportunities to share with their younger siblings (YS), serving as a model of how to share (Abramovitch, Corter, & Pepler, 1980; Dunn & Munn, 1986). YS tend to pay close attention to their OS and imitate their actions (Dunn & Kendrick, 1982). The imitation of prosocial behaviors may spill over to other important social contexts, such as interactions with peers (Stormshak et al., 1996).

Despite the importance of the sibling relationship as a training ground for the emergence of many social behaviors, there is a dearth of research on prosocial behavior in the family system. Sibling relationships that favor scaffolding prosocial behavior over perpetuating aggression and competition may, in large part,

be due to the extent to which parents provide opportunities to use socioemotional competencies early in development (Kramer, 2010).

### ***Parental Emotional Expressiveness and Children's Prosocial Behavior***

By the early school years, children's interpretation and understanding of the functional consequences of emotions become critical. At this point in development, children are expanding their social world to interactions with same-age peers. The abilities to recognize emotions and know how to respond to them set the stage for successful social interactions and remain vital components of social competence (Denham et al., 2003). By expressing emotions, either directly toward the child or in the home environment, parents socialize norms for socioemotional behavior. Although many socialization practices contribute to children's social behavior (Eisenberg et al., 1998), parents' expressiveness is thought to uniquely influence children's socioemotional development through multiple pathways. These pathways may include direct modeling of appropriate emotions under particular conditions, demonstrating information about display rules, and contributing to the schemas about the self and others (Dunsmore & Halberstadt, 1997). This scaffolding of emotion-related behavior may reduce or prevent over-arousal in emotionally charged situations and foster emotion regulation strategies that underlie prosocial behavior (Eisenberg et al., 1998; 2001; Hastings et al., 2007).

When the broader emotional climate that parents provide is more positive, children feel less self-concern and are more likely to respond to others' emotions (Janssens & Gerris, 1992). Higher levels of positive parental expressiveness are also related to higher levels of kindergarten children's prosocial behaviors including sharing, helping, and taking turns (Boyum & Parke, 1995). Mothers' positive EE has been positively associated with preschool children's prosocial caregiving behavior toward a YS (Garner, Jones, & Miner, 1994). Parents' negative EE, by contrast, may hinder children's development of prosocial behaviors. Exposure to higher levels of negative EE increases children's distress and undermines their abilities to learn appropriate strategies for dealing with their emotionally driven behavior (Eisenberg et al., 2001). These difficulties, in turn, limit children's other-oriented behavior (Eisenberg & Fabes, 1998). Lower levels of prosocial behavior in kindergartners have been associated with greater observed levels of parents' negative EE during family situations (Boyum & Parke, 1995).

The parental socialization of emotion research has primarily focused on the links between mothers' EE and children's socioemotional development. However, family systems theory conceptualizes the family as a complex system composed of multiple subsystems (Cox & Paley, 1997). From this perspective, the focus on one parent and one child in the family provides limited information regarding the socialization contexts children experience (e.g., Feinberg &

Hetherington, 2001). Mothers and fathers differ in the overall amount of emotion expressed, such that mothers express more overall emotion than fathers (Cassidy, Parke, Butkovsky, & Braungart, 1992). A study using retrospective reports of gender-based emotion socialization practices found that young adults recalled that their mothers were more active in responding to their emotions than were fathers (Garside & Klimes-Dougan, 2002). Mothers also report displaying higher and more frequent levels of positive emotion compared to fathers (Brown, Craig, & Halberstadt, 2015; Garner, Robertson, & Smith, 1997; Wong, McElwain, & Halberstadt, 2009). One of the theorized reasons for these differences is the gender of the parent, as males show less recognizable facial expressions than females (Brody, 1985).

Although mothers may express more emotions overall, in particular positive emotions, it is still unclear whether mothers' positive emotions relate to sharing behavior over and above fathers' positive emotions. By including both mothers and fathers in the same model predicting child behavior, researchers can examine the effects of one parent while accounting for the behavior of the other parent (e.g. Shewark & Blandon, 2015). Arguably, both parents may uniquely facilitate children's abilities to interpret and respond to a variety of different emotional contexts. For instance, mothers who express more positive emotions have toddlers who are more prosocial with peers, but this positive relation was not seen with fathers (Lindsey, Caldera, & Rivera, 2013). Fathers' reported positive EE, and not mothers', has been linked to teacher reports of kindergartners' helping and sharing behaviors (Boyum & Parke, 1995). A study using data from four family members found that fathers', and not mothers', supportive and non-supportive responses to negative emotions of OS were related to parent-reported rivalry/aggression and avoidance in the sibling relationship (Yaremych & Volling, 2020). In sum, findings on the unique implications of mothers' and fathers' emotion socialization for children's prosocial behavior are mixed and that there is little research on how both parents socialize children's positive social behavior with family members.

Moreover, when including both parents, we are able to see whether one parent can buffer the potentially negative effects of another parent on child outcomes. The parental buffering literature, although small, has identified paternal buffering when mothers are considered "at risk", such as having elevated depressive symptoms or being an adolescent (Gere et al., 2013; Howard et al., 2006). Fathers' supportive behavior has been positively related to children's school readiness only when mothers had average or low levels of supportiveness (Martin, Ryan, & Brooks-Gunn, 2010). The current study includes mothers' and fathers' EE in the same model, permitting examination of how parents contribute individually and jointly to children's sharing.

Furthermore, an assumption of studies that only include one parent in the family is that the influence of parental EE is the same for multiple children in

the same family. However, the effects of parents' EE on children's prosocial behavior likely differ depending on the sibling in question. Parental socialization strategies may have a greater influence on children as they get older, which can be partially attributed to the acquisition of greater emotional competence and cognitive ability that allow children to better understand the reasoning behind parents' behaviors (Grusec & Goodnow, 1994). However, sibling differences in prosocial behavior are likely due to factors apart from age (Deater-Deckard, 1996). OS may benefit more from positive socialization from parents, as they are typically expected to be more prosocial than YS and serve as a model of prosocial behavior (Cicirelli, 1975). Fathers', but not mothers', responses to children's negative emotions were significantly correlated with OS antisocial behaviors in the parent-reported sibling relationship (Yaremych & Volling, 2020).

Family systems research has yet to examine how mothers' and fathers' EE uniquely impact the prosocial behavior of multiple children within the family. In the current study, we aimed to examine within-family variability of mothers' and fathers' EE and their differential associations with OS and YS sharing behavior. Biopsychosocial models of socioemotional development argue that baseline dispositional characteristics of the child, such as physiological regulation, may make them more or less susceptible to parents' socialization efforts, thus moderating relations between socialization and socioemotional adjustment (Hastings & De, 2008). To help address inconsistencies in the literature on the within-family effects of expressiveness on sharing, we applied a biopsychosocial approach and examined whether child physiological regulation moderates relations between parents' EE and children's sharing.

### ***Physiological Regulation as a Moderator of the Socialization-Prosocial Behavior Link***

Responding prosocially to others depends on an individual's dispositional ability to self-regulate (Porges & Furman, 2011). Individuals who have difficulties self-regulating are more likely to experience protracted stress responses to demanding situations, which for some young children may include acting prosocially toward a sibling. Poor regulation can impede children's capabilities to access adaptive coping strategies that would allow them to engage positively in social interactions (Calkins & Fox, 2002). Therefore, individual differences in prosocial tendencies may be partially explained by one's trait physiological regulation. The functioning of the parasympathetic nervous system is an important aspect of physiological regulation, where the vagal system facilitates flexible responding to environmental challenges through variability in heart rate, or respiratory sinus arrhythmia (RSA; Porges, 2007). When vagal tone is engaged, it allows an



individual to maintain a lower heart rate and thus interact with others in adaptive and prosocial ways.

Baseline RSA, measured under conditions of little environmental demand, is often considered a physiological marker of the individual's dispositional and trait-like ability to self-regulate (Porges, 2007). High baseline RSA may positively impact the ability to adapt to emotionally charged situations and has been linked to more appropriate emotional reactivity (Calkins, 2007; Stifter & Fox, 1990). An individual with dispositionally low baseline RSA will most likely have a more highly engaged defensive system, hampering that individual's ability to engage in other-oriented behavior and opportunities for social bonding (Porges & Furman, 2011). However, the links between baseline RSA and children's adjustment are not robust in the literature, as many studies have failed to find significant associations (e.g., Hastings & De, 2008; Hastings et al., 2008).

Instead, children's trait physiological regulation may represent a vulnerability factor for social adjustment problems when exposed to poor parental socialization. Higher baseline RSA may buffer children from the detrimental effects of a negative emotional climate on children's socioemotional outcomes (El-Sheikh, Harger, & Whitson, 2001). For preschoolers with lower baseline RSA, the effects of direct parental socialization on adjustment problems were stronger than for those children with higher baseline RSA, demonstrating that children with lower baseline RSA may be more vulnerable to the effects of parents' socialization efforts (Hastings & De, 2008). These findings suggest that baseline RSA is not a product of socialization, but rather, positive emotion socialization may matter most for children who, at the dispositional level, struggle to engage in other-oriented, social behavior.

### ***The Current Study***

The first aim was to examine whether mothers' and fathers' EE were associated with children's sharing. It was hypothesized that parents who expressed more positive emotions would be more likely to have children with higher levels of sharing and that the inverse would be true for higher levels of negative EE. As subaims, we explored whether mothers' EE was contingent upon fathers' EE and whether these associations differed by each sibling in the family. We predicted that the effects of mothers' EE on children's sharing would be stronger than fathers', particularly for positive EE. Furthermore, we expected that fathers' positive EE would be related to greater sharing when mothers had lower positive EE, consistent with the small paternal buffering literature (e.g., Martin et al., 2010). Given the dearth of research on EE in the family context, differential associations with OS and YS sharing were exploratory.



The second aim was to examine if children's baseline RSA moderated relations between mothers' and fathers' EE and children's sharing. It was hypothesized that children with lower baseline RSA would be more susceptible to the effects of both positive and negative EE demonstrated by parents, which would impact children's tendency to share. This hypothesis accords with biopsychosocial models of emotion regulation and socialization, in which children with low parasympathetic regulation (as a relatively dispositional characteristic of the child) are more likely to benefit from positive socialization, but are also more likely to show poorer social competence when parents use maladaptive socialization strategies (Hastings & De, 2008; Hastings et al., 2008). We hypothesized that fathers' EE (accounting for mothers' EE) would contribute to children's sharing only for children with very low levels of baseline RSA.

## METHOD

### *Participants*

Mothers, fathers, and their two children participated in a study that investigated children's social and emotional development in the context of the family ( $N = 70$ ). One family was not included in the current analysis because the younger sibling was later diagnosed with autism, for a final sample of 69 families. This sample size reflects the difficulty of obtaining observational data in both mothers and fathers and two children within specific age ranges (Parent et al., 2017). To participate in the study, parents had to be married ( $n = 66$ ) or cohabitating ( $n = 3$ ) and have two children between the ages of 2 and 5 years. Six of the families had other children between the ages of 2 and 5. Thus, children who were closest to ages 2 and 5 at the time of recruitment and who were not diagnosed with chronic and severe physical, mental, or developmental problems were selected to participate. Newspaper birth announcements, flyers posted at daycares, and a database of local families interested in participating in research studies were used for recruitment. Mothers were 32 years old on average ( $SD = 4.17$  years) and 56.5% of them were employed. Fathers were on average 35 years old ( $SD = 4.79$  years) and 94.2% of them were employed. The sample was primarily European American (fathers: 92.8% European American, 4.3% Latin American, and 2.9% Other; mothers: 89.9% European American, 7.2% Latin American, 1.4% Asian American, and 1.4% Other). The OS was on average 57.52 months old ( $SD = 7.56$  months;  $Range = 37.53$ – $74.07$  months), and the YS was on average 32.68 months ( $SD = 7.01$  months;  $Range = 23.93$ – $58.70$ ). Mothers reported having less than or high school degree (12.9%), some college (25.7%), a college degree (25.7%), and more than a college degree (35.7%). Fathers reported having less than or high school degree (18.6%), some

college (21.4%), a college degree (28.6%), and more than a college degree (31.4%). The average household size was 5 family members (*Range* = 4–8), and the median family income was 70,000 USD (*Range* = 10000 USD – 250000 USD). There were 17 girl/girl dyads, 20 boy/boy dyads, 15 older boy/younger girl dyads, and 17 older girl/younger boy dyads.

## **Procedures**

Families participated in a 2.5-hour laboratory visit, during which a variety of different social and emotional behaviors were measured. For this report, we focused on the sibling interaction task. Parents completed informed consent procedures, after which electrodes for cardiac data recording were placed on all four family members. Cardiac data were collected over the 5-min baseline session, during which all four family members sat quietly on a couch. Prosocial behaviors were coded from a 7-min digitally recorded sibling interaction task that was based on similar sibling tasks used with this age range (Abramovitch et al., 1980; Berndt & Bulleit, 1985; Dubrow & Howe, 1999; Dunn & Munn, 1986). This task took place over halfway into the entire visit after six other family tasks were completed. During the sibling interaction task, children were instructed to use a plastic screwdriver to put bolts in a board to make a design. They were given only one screwdriver, so they had to work together. The task was developmentally appropriate for the age range of the children, and it was difficult enough to present a challenge to the dyad and foster prosocial behavior, but not too difficult that each sibling could not work independently at times. The experimenter and the parents were not in the room during the task. Parents completed questionnaires throughout the visit, and any unfinished questionnaires were sent home with them to send back to the lab at their convenience. The Institutional Review Board at the Pennsylvania State University approved this study (approval #00031679).

## **Measures**

### **Parental EE**

Mothers and fathers completed the Self-Expressiveness in the Family Questionnaire (SEFQ; Halberstadt et al., 1995). This 40-item scale included two subscales that measure adults' positive and negative verbal and nonverbal EE within a family setting. Each item was scored on a scale from 1 *not at all* to 9 *very frequently*. The positive expressiveness subscale included 23 items such as, "expressing excitement for one's future plans" and "expressing deep affection or love for someone." The negative expressiveness subscale included 17 items such as, "quarreling with a family member." The positive (Mother  $\alpha = .89$ ; Father  $\alpha = .93$ ) and negative (Mother  $\alpha = .88$ ; Father  $\alpha = .86$ ) subscales were reliable. Higher scores indicated greater EE.

### **Physiological Regulation**

To collect cardiac data, three disposable pre-gelled spot electrodes were placed on the child's top right chest, bottom right ribs, and bottom left ribs. The electrocardiograph (ECG) signal was acquired with Mindware Technologies LTD ambulatory Impedance Cardiographs (MW1000a) using the WiFi ACQ software, Version 3.0.1 (Gahanna, OH). The ECG signal was sampled at 500 Hz, and the ECG time series was transmitted wirelessly to a computer for offline processing. The Mindware HRV analysis program (Version 3.0.17) was used to process the data. First, the interbeat intervals (IBIs) were identified. Second, physiologically improbable intervals were detected based on the overall IBI distribution using a validated algorithm (Berntson et al., 1990). A team of editors then visually inspected and manually corrected any artifacts and erroneous or missing beats. Next, data were detrended using a first-order polynomial to remove the mean and any linear trends, then cosine tapered, and submitted to Fast Fourier Transform (FFT). Finally, RSA was defined as the natural log integral of the .24 to 1.04 Hz power band and calculated in 30-s epochs, which is consistent with existing studies examining RSA in young children (e.g., Calkins & Keane, 2004). Inter-editor reliability (RSA values obtained by coders were considered reliable or in agreement if each coder's values fell within 0.10 of each other) was calculated for 20% of the cases, and coders achieved 95% agreement. Missing data were due to technical problems (OS = 7; YS = 8), data that were too messy to edit (OS = 2), and children refusing to wear the electrodes (OS = 1; YS = 3).

### **Sharing Behavior**

Children's prosocial behavior was coded from the digitally recorded sibling interaction task ( $M$  task length = 6.4 min,  $Range$  = 2.77–7.53 min). The frequencies of four different types of prosocial behavior were coded: sharing, helping, comforting, and cooperation. The current study focused on sharing behavior to capture individual prosocial behavior. Helping behavior was not examined because it occurred infrequently for YS ( $M$  = .34%), comforting behavior was not examined because it occurred very infrequently for both siblings (OS  $M$  = .09%; YS  $M$  = 0%), and cooperation was not examined because it was coded per dyad. Sharing captured children giving away or allowing temporary use of an object that was previously in the child's possession (e.g., YS hands the screwdriver to OS when YS had possession). Inter-rater reliability was calculated on 20% of the cases for both the OS and YS. *Sharing* included requested or solicited behaviors (e.g., YS asks OS for the screwdriver, and OS hands it over) and spontaneous or unsolicited behaviors (e.g., OS hands YS a bolt unprompted). We created this composite variable for sharing to increase the variability of sharing behavior, because these behaviors were significantly positively correlated for OS ( $r$  = .32,  $p$  < .05),

and 86% of YS had a requested sharing frequency of 1 or 0. Sharing behaviors have been composited in other studies using similar methods and ages (e.g., Dunn & Munn, 1986). Inter-rater agreements were 85.5% ( $\kappa = .92$ ) for OS and 92.5% ( $\kappa = .97$ ) for YS.

Because the duration of the sibling interaction task varied for each family, weighted frequencies of sharing were calculated. The original frequency of sharing was divided by the duration of the task, and that proportion was converted back to a standard frequency by multiplying each proportion score by the maximum task length. Higher scores indicated higher frequency of sharing.

## RESULTS

### *Missing Data*

Survey data were missing for 16.8% and 10.9% of mothers and fathers, respectively. Baseline RSA had 14% missing data for OS and 14% for YS. Family income was related to missing data. As such, family income was included as an auxiliary variable in the imputation model and therefore any residual missingness is missing completely at random (MCAR; Graham, 2009). Multiple imputation ( $N = 75$  imputations) was performed in *Mplus* 7.3 (Asparouhov & Muthén, 2010; Muthén & Muthén, 1998-2012). Analyses were conducted in *Mplus* 7.3 using the imputed data.

### *Preliminary Analyses*

All variables were examined for distribution normality and skewness. Descriptive statistics for study variables are presented in Table 1, and correlations are presented in Table 2.

We conducted paired *t*-tests to examine whether there were differences in EE for mothers and fathers, as well as differences in baseline RSA and sharing for OS and YS. There was a significant difference in mothers' ( $M = 6.60$ ,  $SD = 1.13$ ) and fathers' ( $M = 6.10$ ,  $SD = 1.25$ ) positive expressiveness,  $t(68) = -2.73$ ,  $p < .01$ ,  $d = 0.35$ . There was no difference in mothers' ( $M = 3.44$ ,  $SD = 1.19$ ) and fathers' negative expressiveness ( $M = 3.48$ ,  $SD = 1.03$ ),  $t(68) = 0.23$ ,  $p = .82$ . There was a significant difference in OS ( $M = 5.85$ ,  $SD = 1.35$ ) and YS ( $M = 4.88$ ,  $SD = 1.42$ ) baseline RSA,  $t(68) = 4.63$ ,  $p < .01$ ,  $d = 0.59$ . OS ( $M = 3.00$ ,  $SD = 3.18$ ) and YS ( $M = 2.51$ ,  $SD = 2.97$ ) did not differ on sharing,  $t(68) = 1.10$ ,  $p = .27$ .

**TABLE 1.** Descriptive statistics.

	Older Sibling			Younger Sibling		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Sharing	3.00	3.18	0–23	2.51	2.97	0–16
Baseline RSA	5.85	1.35	1.62–9.00	4.88	1.42	1.12–9.00
	Mother			Father		
	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>M</i>	<i>SD</i>	<i>Range</i>
Positive EE	6.60	1.13	2.00–9.00	6.10	1.25	1.83–9.00
Negative EE	3.44	1.19	1.00–7.00	3.48	1.03	1.00–7.00

Note. Descriptive statistics for sharing were calculated using the recoded weighted frequencies (Frequency Range for sharing = 0–23).

**TABLE 2.** Correlations among study variables.

Measure	1	2	3	4	5	6	7	8
1. OS sharing	--	.03	.41**	.41**	.27*	-.23	.14	-.06
2. OS baseline RSA	--	--	.19	.31*	.47**	.18	-.09	-.20
3. YS sharing	--	--	--	.28*	.26*	.06	.01	.02
4. YS baseline RSA	--	--	--	--	.33*	.09	-.14	-.09
5. Mother positive EE	--	--	--	--	--	.19	.29*	-.05
6. Mother negative EE	--	--	--	--	--	--	.04	.09
7. Father positive EE	--	--	--	--	--	--	--	.15
8. Father negative EE	--	--	--	--	--	--	--	--

\*  $p < .05$ . \*\*  $p < .01$ .

### **Zero-inflated Poisson Multilevel Models**

Multilevel models were used to account for the nested structure of the data, specifically the interdependence between OS and YS prosocial behavior. Due to the over-dispersion and excess of zeros in the distributions of the outcome variable (i.e., OS and YS sharing behavior), a zero-inflated Poisson (ZIP; Gardner, Mulvey, & Shaw, 1995) multilevel model was used to analyze the data. Although the data were over-dispersed with an excess of zeros, the over-dispersion coefficient, alpha, was close to zero and not significant in the zero-inflated negative binomial model, which suggests that a Poisson regression model should be used (UCLA: Statistical Consulting Group). The ZIP multilevel model was estimated using *Mplus* 7.3 (Muthén & Muthén, 1998–2012).

All data were handled as repeated within the dyad. All continuous variables were grand mean centered. Sibling, the distinguishing variable, was effect coded (OS = 1; YS = -1). To limit the number of predictors, separate models were conducted for each dimension of parents' EE (i.e., positive and negative EE). To investigate whether the association between parental EE and sharing was moderated by baseline RSA, interaction terms were created by multiplying parents' EE by baseline RSA (Aiken & West, 1991) differed for OS and YS, interaction terms were created by multiplying parents' EE and baseline RSA variables by sibling (Aiken & West,

1991). Nonsignificant (greater than  $p = .05$ ) interactions were trimmed using a backward elimination method (Snijders & Bosker, 2012). Specifically, a full model including all predictors was fit, then nonsignificant interactions were subsequently removed individually. Reported are the Poisson regression coefficient (estimates), standard errors, and the ratios of the estimates to their standard errors. To examine whether the associations between parental EE and sharing differed for the OS and YS, interaction terms were created by multiplying mothers' and fathers' expressiveness variables by sibling (Aiken & West, 1991). Follow-up models used a two-intercept approach to test whether simple slopes for OS and YS were significantly different from zero for significant interactions with sibling (Cook & Kenny, 2005). Significant interactions for continuous moderators were plotted with regions of significance using the Johnson-Neyman technique (Johnson & Neyman, 1936) in *Mplus*.

First, unconditional models were estimated to assess the interdependence between OS and YS sharing. Second, models were fit to determine whether OS and YS gender, OS and YS age, age space between children, and sibling dyad gender composition needed to be included as covariates in the subsequent analyses. Age spacing was considered as a covariate because previous work suggests that a larger gap in age between siblings affords more opportunities for the OS to teach the YS important skills, where siblings closer in age may compete more for resources (White, 1975). Sibling dyad gender composition was considered given the existing literature finding that parents may socialize the importance of social relationships, others' emotions, and social consequences of behaviors more with their daughters than their sons (Tangney & Fischer, 1995). Also, same-gender dyads may be closer than opposite-gender dyads (Furman & Buhrmester, 1985). Third, full models were estimated that included: (1) the direct effects of mothers' and fathers' EE to determine whether EE was associated with children's sharing (Aim 1), (2) whether sibling moderated relations between mothers' and fathers' EE and sharing (Aim 1), and (3) interactions between mothers'/fathers' EE and children's baseline RSA predicting children's sharing (Aim 2).

### ***Interdependence between Older and Younger Siblings' Sharing***

The interdependence between OS and YS sharing was modeled as a covariance as opposed to a variance to allow for the potential interdependence to be negative (Kenny, Kashy, & Cook, 2006). The interdependence between OS and YS sharing was significant; the intraclass correlation was .41 ( $SE = .12$ ,  $p < .01$ ; intercept estimate = 2.75,  $SE = .34$ ,  $t(68) = 8.12$ ,  $p < .01$ ).

## Covariates

OS and YS gender, age, age space between children, and sibling dyad gender composition were not associated with children's sharing. Compared to boy/boy dyads, fathers of older girl/younger boy dyads were more negative,  $b = -.770$ ,  $t(68) = -2.142$ ,  $p = .03$ . Within families, age was significantly related to baseline RSA, such that older children had higher baseline RSA,  $b = .03$ ,  $Est./S.E. = 4.04$ ,  $p < .01$ . Given the small number of significant findings among the predictor variables and potential covariates, and no relations among the outcome variables and covariates, the covariates were not included in the subsequent analyses.

## Parental EE and Children's Baseline RSA in Relation to Sharing

The model of parents' EE and children's baseline RSA predicting children's sharing behavior is presented in Table 3. Mothers' positive EE was associated with children's sharing, demonstrating that mothers who reported using more positive expressiveness in the family context had children who shared more. The relation between fathers' positive EE and children's sharing behavior was not significant. The main effects of sibling and baseline RSA were not significant. Baseline RSA moderated the association between mothers' positive expressiveness and children's sharing (Figure 1). Regions of significance analyses indicated that, when children's baseline RSA was less than .34 above the mean, mothers who were more positive had children who shared more. All other interactions with positive EE were not significant.

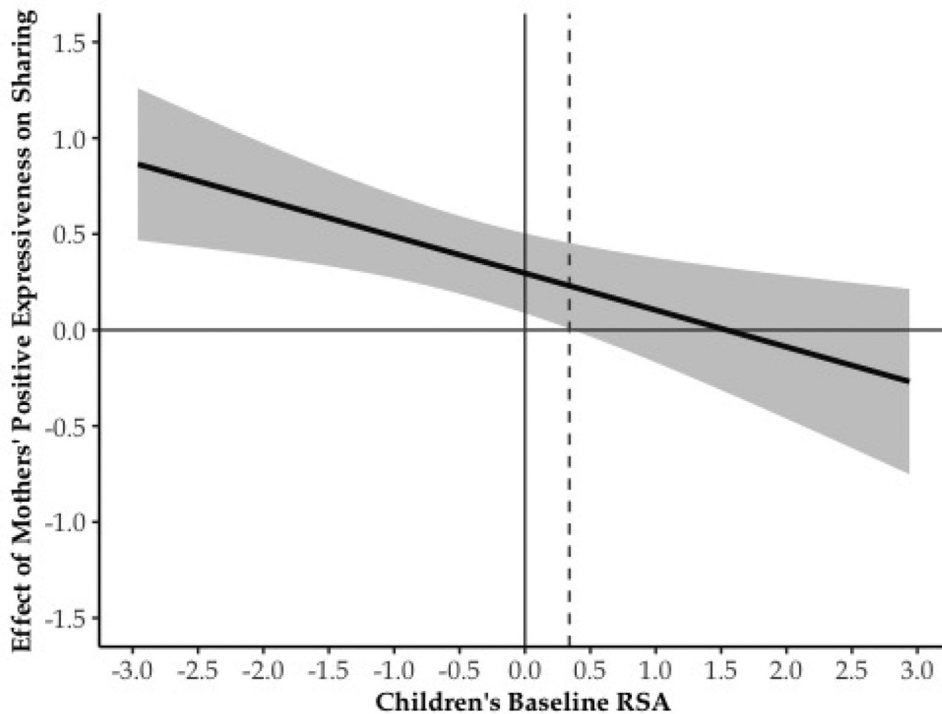
Regarding negative EE, there were no significant main effects of mothers' and fathers' EE on children's sharing behavior. Interactions between parents' negative EE and sibling, and between parents' negative EE and child baseline RSA, were not statistically significant.

**TABLE 3.** Multilevel Poisson models examining mothers' and fathers' EE, children's baseline RSA, and sibling as correlates of children's sharing behavior.

Variable	Positive			Negative		
	Estimate	SE	Est./SE	Estimate	SE	Est./SE
<i>Intercept</i>	.98**	.14	7.08	.98**	.16	6.26
Sibling	.09	.08	1.21	.09	.08	1.04
Baseline RSA	.07	.07	.99	.04	.08	.54
Mother EE	.30*	.12	2.50	-.07	.12	-.58
Father EE	-.01	.11	-.10	.09	.14	.64
Mother EE x Father EE	--	--	--	--	--	--
Mother EE x Sibling	--	--	--	--	--	--
Mother EE x Baseline RSA	-.19*	.08	-2.40	--	--	--
Father EE x Sibling	--	--	--	--	--	--
Father EE x Baseline RSA	--	--	--	--	--	--

\*  $p < .05$ . \*\*  $p < .01$ .





**FIGURE 1.** Interaction between mothers' emotional expressiveness and children's baseline RSA predicting children's sharing. Y-axis portrays the continuous range of values for the adjusted effect of mothers' emotional expressiveness on children's sharing. Thick, diagonal line represents values of the adjusted effect that correspond to baseline RSA values. Regions of significance analyses indicated that when children's baseline RSA was less than .34 above the mean (indicated by vertical, dotted line), mothers who were more positive had children who shared more.

## DISCUSSION

Drawing from a biopsychosocial model of emotion socialization and physiological regulation, the current study examined whether mothers' and fathers' EE were associated with children's sharing behavior. It also examined whether children's baseline RSA moderated those associations. This study is unique in that it nests emotion socialization processes in a broader family systems framework, allowing us to capture differences between both parents and two siblings in the same family.

The first aim of the study examined relations between mothers' and fathers' EE and children's sharing behavior. Accounting for fathers' positive expressiveness, mothers who reported expressing more positive emotions had children who shared more. When mothers express more positive emotions in the family context, children may experience less self-concern and be more adept at responding to others' emotions (Janssens & Gerris, 1992), particularly with other members of the family. More specifically, children's recognition of opportunities to share, as well as their willingness

to share with their siblings, may be heightened by a context in which mothers show higher levels of positive expressiveness. An important consideration for this association is the possibility that mothers who express more positive emotions in the family have children who are more prosocial in the family because of shared genes between parents and children. However, we could not test these underlying genetic mechanisms or the potentially different genetic maternal and paternal contributions in the current sample.

By including mothers, fathers, and siblings in the same model, we found that fathers' EE while accounting for mothers' EE, was not a significant predictor of prosocial behavior in the context of the sibling relationship, nor did fathers' EE buffer the effects of mothers' EE. One potential reason why mothers' emotional displays may be particularly salient to young children is because young children tend to express more emotions overall than fathers (Cassidy et al., 1992). This finding is consistent with that of the current study, in that mothers expressed more positive emotions than fathers, even though the two did not differ in their negative EE. Mothers also tend to spend more time with children in early childhood than fathers do (Wood & Repetti, 2004), and thus children may rely on mothers as a guide for expressing positive social behaviors with their sibling, such as sharing.

Although models examining both mothers' and fathers' socialization find significant effects for fathers' socialization (e.g., Boyum & Parke, 1995; Dunsmore et al., 2009; Yaremych & Volling, 2020) and a buffering role of fathers (Martin et al., 2010), these studies have yet to test or find links between both parents' socialization and positive social behaviors in the family system. It could be that fathers' emotion socialization practices are particularly salient to emotional competence outcomes (Dunsmore et al., 2009; Shewark & Blandon, 2015) or more contentious sibling relationships (Yaremych & Volling, 2020). Future research should consider mother and father emotion socialization effects across adaptive socioemotional behaviors in the family system. These findings emphasize the importance of studying within-family correlates of children's social development to better understand the unique and joint contributions multiple family members make to children's positive social behaviors.

We also investigated whether siblings moderated relations between parental EE and sharing. Siblings did not differ on prosocial behavior as a function of either mothers' or fathers' EE. Past work has found that in early childhood OS initiate more prosocial behaviors during sibling interactions (Abramovitch et al., 1980; Dunn & Munn, 1986). The OS is often expected to model prosocial behavior for YS (Cicirelli, 1975), and YS may be accustomed to watching the OS take the lead on tasks. Our findings suggest that mothers' positive socialization may matter for their young

children's sharing behavior regardless of sibling status and that both OS and YS may benefit from mothers' positive EE.

The second aim explored whether the links between parents' EE and children's sharing differed as a function of children's level of baseline RSA. Baseline RSA moderated the association between mothers' positive EE and children's sharing behavior, such that mothers who reported higher levels of positive emotions had children who shared more when children had lower levels of baseline RSA. Expressions characterized by joy, enthusiasm, delight, and pleasant surprise may foster an environment for children that is more positive and stable, allowing children to feel less self-concern and respond appropriately to others' emotions (Janssens & Gerris, 1992). The maternal positive EE by RSA interaction supports the biopsychosocial model, in that positive socialization experiences may be particularly important for children who have lower baseline RSA, as they may need to differentially rely on effective parental emotion socialization to engage prosocially. Low baseline RSA may not be a determinant of poor prosocial engagement if the maternal emotional context is positive. Children with higher baseline RSA may not have as substantial a need to rely on their parents' cues for socially engaging with their environment (Hastings & De, 2008). The maternal positive EE by RSA interaction provides needed clarity on the relations between parental positive EE and children's social behavior, such that positive EE was associated with sharing only for mothers' socialization and for children with lower baseline RSA.

Surprisingly, the interactions between parents' negative EE and children's baseline RSA did not predict children's sharing. Heightened distress in the family context, such as exposure to harsh negative emotions, has been found to draw children's attention away from situational cues and the facial expressions of others (Eisenberg et al., 1990). The significant positive EE by RSA interaction demonstrates that positive socialization may be more likely to contribute to positive social behaviors than negative socialization, particularly for children with lower trait physiological regulation. Negative socialization may not make sharing more difficult for children with low trait physiological regulation, but positive socialization, from mothers specifically, may cultivate a family climate that supports the engagement of positive sibling behaviors between children who may need it. It is important to note that consistent with past research, the sample means for negative expressiveness for both mothers and fathers were relatively low compared to the scale. This relatively infrequent expression of negative emotion may in part explain the non-significant associations with negative EE.

### ***Limitations and Conclusions***

The current study was one of the first to investigate, from a family systems perspective, the roles of the family's emotional climate and

children's baseline RSA in explaining differences in sharing behavior in early childhood. Although interesting results emerged, limitations need to be discussed. First, the sample was small for detecting interaction effects.

Second, participants were predominantly European American, thus the findings in the current study may not generalize to different populations. Parental socialization of emotion processes may differ across ethnicities, and therefore, particular emotional displays may have different consequences for social adjustment (Brown et al., 2015; Nelson et al., 2012).

Third, the study was correlational with testing at one point in time, so it cannot be assumed that parents causally influenced children's baseline RSA and prosocial behavior. How prosocial children are with their siblings can also influence the degree to which parents express positive or negative emotions.

Fourth, despite trying to capture multiple prosocial behaviors (sharing, helping, comforting), only sharing was analyzed because the other behaviors occurred infrequently. Although a limitation, this information regarding what types of prosocial behaviors children use with their siblings is a meaningful indicator of prosocial behavior in this relationship. Prosocial behavior in the family is a relatively unexplored area of research and describing which prosocial behaviors are prevalent (or absent) in early development is important for better understanding how siblings come to shape each other's social development over time.

Fifth, mothers' and fathers' positive and negative EE were measured via self-report. These self-report data captured EE over a variety of family contexts and situations, but parents may have been biased by social desirability and thus reported more positive expressiveness. In addition to self-report measures, future studies should observe parental EE across different family settings to capture measures of expressiveness using a multi-method approach.

Sixth, to limit the number of models and to take advantage of this unique whole-family dataset, we prioritized including mothers' and fathers' EE in the same model. Therefore, more complex relations among EE variables, such as the interactions between positive and negative EE, as well as subtypes of negative EE, were not tested. Positive and negative EE do not fall on opposite sides of a continuum and are not necessarily correlated. Future research should consider examining the interactive effect of positive and negative EE for each parent and between parents. Relatedly, negative EE may be further categorized into "dominant" and "submissive" types and may have different associations with children's sharing (Crockenberg, 1985). Emotion socialization is complex, and future research would benefit from examining the nuanced contributions of negative EE subtypes on prosocial development in the family.

Last, future research should address socialization within triadic or quadratic interactions to fully examine the individual and combined roles of family members in socializing prosocial behavior. The introduction of a third family member to a dyadic interaction qualitatively changes the dynamics of that interaction, providing a different lens with which to view the emergence of behaviors in the family system (Minuchin, 1985).

Despite the notion that most children in the United States grow up in families with more than one parent and at least one sibling (Vespa, Lewis, & Kreider, 2013), psychological research overwhelmingly represents family processes within the confines of mother-child relationships. Our research underscores the importance of a family systems perspective in elucidating how emotion socialization and physiological regulation relate to children's emerging sharing behavior. By including maternal and paternal EE in the model, the current study capitalized on rich within-family data to disentangle the unique effects of mothers' and fathers' EE on sharing. Examining the socialization of children's sharing using a relatively whole-family approach is a novel contribution to the broader literature on children's social development.

## **IMPLICATIONS FOR PRACTICE, APPLICATION, THEORY, AND POLICY**

Historically, developmental psychology has predominantly focused on risk mechanisms that lead to adverse outcomes for children. Although less emphasized, development is the process of increasing competence, and developmental psychology includes the study of how children become compassionate, motivated, and capable adults (Larson, 2000). The findings from the current study emphasize the importance of parents' positive EE for the development of positive child behaviors. The sibling relationship can serve as a training ground for children's prosocial behavior development, in which siblings have multiple opportunities to engage in prosocial behaviors, such as sharing, on a regular basis. Sharing is associated with important developmental outcomes, such as social competence, moral reasoning, and sympathizing with others (Eisenberg-Berg & Hand, 1979; Malti et al., 2012), and our findings suggest that sharing in early childhood relates to positive expressions within the family system. The human ability to encode others' experiences is essential groundwork for social policy issues related to health, education, and humanitarianism, such that prosocial processes can at least partially explain how individuals respond to others who are similar or different because of gender, ethnicity, and nationality (Eisenberg, Eggum, & Di Giunta, 2010). Policy and intervention programs may glean important information from research on the emergence of these behaviors and the contexts in which they develop, including the family system.

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## ARTICLE INFORMATION

### *Conflict of Interest Disclosure*

The authors have no conflicts of interest to declare.

### Funding

Preparation of this manuscript was supported by the Pennsylvania State University and a National Institute of Child Health and Human Development [T32 HD007376], Carolina Consortium on Human Development Training Program (to L.M.).

### Ethical Principles

The authors affirm having followed professional ethical guidelines in preparing this work. These guidelines include obtaining informed consent from human participants, maintaining ethical treatment and respect for the rights of human or animal participants, and ensuring the privacy of participants and their data, such as ensuring that individual participants cannot be identified in reported results.

### Role of the Funders/Sponsors

None of the funders or sponsors of this research had any role in the design and conduct of the study; collection, management, analysis, and interpretation of data; preparation, review, or approval of the manuscript; or decision to submit the manuscript for publication.

### Acknowledgments

We gratefully acknowledge the families who generously gave their time and effort to participate in this study. We would also like to thank Meghan Scrimgeour for her work coding these data, as well as the numerous undergraduate research assistants in the Family and Child Development Lab for their contributions to data collection and cardiac data editing. Dr. Blandon contributed to this article in her personal capacity. The opinions expressed in this article are the author's own and do not reflect the views of the Office of Planning, Research, and Evaluation, Administration for Children and Families, the Department of Health and Human Services, or the United States government.

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