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## Mine or Yours? Development of Sharing in Toddlers in Relation to Ownership Understanding

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### Abstract

To examine early developments in other-oriented resource sharing, fifty-one 18- and 24-month-old children were administered six tasks with toys or food that could be shared with an adult playmate who had none. On each task the playmate communicated her desire for the items in a series of progressively more explicit cues. Twenty-four-month-olds shared frequently and spontaneously. Eighteen-month-olds shared when given multiple opportunities and when the partner provided enough communicative support. Younger children engaged in self-focused and hypothesis-testing behavior in lieu of sharing more often than did older children. Ownership understanding, separately assessed, was positively associated with sharing and negatively associated with non-sharing behavior, independent of age and language ability.

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As adults, humans are uniquely caring and compassionate, willingly sacrificing time, effort, and resources to better others' lives. We do so not only because it is the "right" thing to do, but also because of the emotional satisfaction it provides. This prosocial imperative creates and sustains human morality and the complex human social order (Bowles & Gintis, 2011; Fehr & Fischbacher, 2003; Tomasello, 2009). However, we still know relatively little about the ontogenetic origins of prosocial behavior or the mechanisms that explain its emergence and early development.

In the current study we focus on resource sharing as a window onto early prosocial development. Because of its unique challenges, sharing may be particularly revealing. Sharing resources is difficult for young children because it typically entails a sacrifice of something valued to benefit someone else, such as giving up a toy that one is playing with to another child who doesn't have any. Preschool children are less likely to share than to exhibit other forms of prosocial behavior such as helping or cooperating (Birch & Billman, 1986; Grusec, 1991; Radke-Yarrow et al., 1976). Younger children are especially well-known for their reluctance to share (Levitt, Weber, Clark, & McDonnell, 1985). In a recent experimental study with 1- and 2-year-olds, for example, children were much less likely to give up their blanket or special toy brought from home to help a hapless adult than they were to help under identical circumstances without such a sacrifice (Svetlova, Nichols, & Brownell, 2010).

So how does sharing get off the ground? What contributes to its earliest manifestations? In the research reported here we examined toddlers' willingness to share resources with someone who had none, and how this changed over the second year. To reduce the motivational barrier, a procedure was used in which the cost of sharing was decreased,

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although some sacrifice was still required. To evaluate social understanding as a potential mechanism in the development of early sharing behavior, we also examined how age-related differences in sharing were associated with growth in self-understanding and ownership understanding.

## Early Developments in Sharing

We share all sorts of things with one another, from food and belongings to ideas, feelings, and beliefs. In young children, too, sharing takes a number of forms, including attention sharing, emotion sharing, information sharing, and resource sharing. Although these are all sharing, they differ in their specific functions and motivations. In particular, they are not all necessarily other-oriented. Other-oriented sharing occurs to benefit the recipient, typically to change the other's psychological or internal state for the better. For example, an older child may share his cookies with his younger sibling when she is crying to make her happy. By 12 months of age infants bring or show toys to parents in apparent acts of sharing (Hay, 1979; Rheingold, Hay, & West, 1976), and even earlier, by 10 – 12 months, they offer food to adults as a means of affiliation (Eibl-Eibesfeldt, 1989), and participate in object transfers in cultures that routinely socialize object exchange (Bakeman, Adamson, Konner, & Barr, 1990). However, these early social acts may not be prosocial in the sense of behavior that is intended to benefit another. Infants may show a toy to an adult as an act of emotion or attention sharing, or they may be seeking a positive reaction or other form of approval from the adult; they may offer a toy as a way to get the adult to play with them or as part of a regular game or routine, or deposit a toy in the adult's lap to prevent another child from gaining access to it.

In the current study we wished to examine other-oriented sharing specifically, because this form of sharing is clearly prosocial in that it is conditioned on another's need, desire, or negative emotion, and it occurs to alleviate that state. Other-oriented resource sharing is demonstrated when children relinquish possession of something that they themselves control, like, and want in direct response to another's desire or need. Their behavior is meant to benefit the other person and it entails some degree of sacrifice. We know very little about the development of this sort of sharing – when it emerges, how it changes with age, and what drives or constrains age-related change.

Among the few studies of resource sharing in very young children, Hay and her colleagues have observed toddlers' toy sharing in naturally occurring peer play. They defined sharing as offering or giving a toy to the peer or adding an object to an array of toys with which the peer was already playing (Hay, Caplan, Castle, & Stimson, 1991; Hay, Castle, Davies, Demetriou, & Stimson, 1999). Sharing occurred at low rates overall in these studies, but it did increase between 12 and 30 months of age, especially when toys were relatively scarce and sharing may have been costly. Such findings are an important first step in delineating the developmental picture of early other-oriented sharing. But without control over the circumstances under which sharing was observed, including nearby adults' behavior, the children's relationship with each other, their interest in the toys, whether toys were requested and other communications governing their exchange, and the actual cost of sharing to the child, it can be difficult to know how prosocial and other-oriented the children's acts of sharing were.

In a recent study with 1- and 2-year-old children, we attempted to address some of these concerns experimentally using a mechanical food-sharing task adapted from work with non-human primates (Brownell, Svetlova, & Nichols, 2009). Children could choose to deliver a snack either to themselves alone or to both themselves and an adult partner. The procedures permitted control over the conditions under which sharing occurred, including what was to

be shared, the recipient's need and communications about what was desired, and the cost to the child of sharing, as well as how children demonstrated sharing. Under these circumstances, sharing was evident only among the 2-year-olds and only when the recipient communicated quite directly what she wanted; 18-month-olds responded randomly. However, the artificial task and ecological conditions may have underestimated young children's emerging prosociality. In particular, by eliminating so much of the natural social context that governs decisions to share, and by children's having to generate a sharing response via a physical mechanism rather than a social bid, their motivation to share may have been reduced.

Two other recent experimental studies have used more natural scenarios, while still exerting control over key aspects of the situation, and both found some evidence for sharing in 1-year-olds. Dunfield (Dunfield, Kuhlmeier, O'Connell, & Kelly, 2011) gave 18- and 24-month-old children a container with several crackers in it while at the same time giving an empty food container to an adult partner. The adult then reached toward the child, palm up, and alternated gaze between her hand and the child until the child either shared some of her own snack or ate all of it. Under these conditions 40% of 18-month-olds and 60% of 24-month-olds shared. Although intriguing, the generality of these findings may be limited. First, food sharing may carry unique demands and may not reflect children's willingness (or unwillingness) to share other physical resources such as toys, books, clothing, and the like – resources that are not immediately consumed and that are less likely to be part of parent-child games or routines. More important, it is unclear whether the children were spontaneously engaging in prosocial sharing, or were simply complying with a direct request conveyed by the adult's outstretched palm and explicit gaze cues.

In a more clearly prosocial task, Vaish (Vaish, Carpenter, & Tomasello, 2009) gave 18- and 25-month-old children and an adult partner identical toy balloons, but the adult had only one while the child had two. The adult then "accidentally" lost hers (it floated away), becoming visibly upset and trying to get it. Half of the children exhibited some form of positive, potentially prosocial response to the distressed adult such as making a suggestion about what to do ("ladder") or commenting about the situation ("balloon gone"). However, only 12 out of 64 children (19%) actually gave a balloon to the adult, and an additional five children (8%) placed a balloon near the adult or threw it toward her (Vaish, personal communication). This is a much lower rate of sharing than found by Dunfield et al. (2011), possibly due to the procedural differences, including the requesting gesture used by the adult in Dunfield et al., and the fact that children had just two balloons making them perhaps especially valuable.

Taken together, this work suggests that other-oriented, prosocial sharing probably appears in the second year of life with both adults and peers. However, the developmental picture remains unclear. On the one hand, findings from naturalistic studies are constrained by uncontrolled features of the social situation, so developmental patterns from these studies may reflect something else in addition to the growth of sharing. Conclusions from the few well-controlled experimental studies, on the other hand, are limited by a variety of other factors: use of an artificial apparatus; use of food rather than potentially more desirable and age-relevant resources such as attractive toys; adult directives governing children's responses; or the value to the child of the resources to be shared. The results from these studies may therefore either over- or under-estimate children's sharing, obscuring age-related patterns.

The aim of the current study was to generate a fuller and more robust understanding of the early development of other-oriented resource sharing by addressing several of these issues while at the same time retaining the positive features of each research approach. Like

previous studies, we tested 18- and 24-month-olds, the period when multiple aspects of prosocial behavior are first emerging. The procedure mirrored naturalistic studies of resource sharing by providing children with a range of attractive toys in a realistic play setting, along with a friendly playmate who had none. Like the experimental studies, a standard protocol controlled how and when toys were presented as well as the recipient's behavior, and restricted the range of relevant responses. To control and reduce the motivational barrier to sharing, we provided the child with an overabundance of toys. We additionally provided several opportunities for children to share rather than just one, and we used multiple sets of toys to control for possible differences in children's interest in particular toys and how much they valued them. Furthermore, we varied the communications provided by the recipient about her desire from less to more explicit, culminating in a direct request, both to control for and to examine more systematically the role of recipient communications in the early propensity to share. We coded sharing behavior directly, indicated by children's actively handing over and relinquishing one or more of their own toys to the playmate. Finally, we also coded non-sharing behavior to further illuminate what might govern children's decisions about whether and when to share. There are many possible reasons for not sharing. For example, children may not understand their playmate's desire or need, they may not care, or they may feel possessive about their own toys. To explore these possibilities we coded what children did when they failed to share.

### Ownership understanding and early sharing

In addition to examining early developments in other-oriented sharing, we also sought to identify potential mechanisms. We focused on social understanding, because it is also undergoing significant developmental change during this period and has been shown to relate to other dimensions of prosocial behavior in toddlers (Brownell, Nichols, & Svetlova, in press). One aspect of early social cognition that may be fundamental to the development of sharing is ownership understanding. Ownership is an invisible attribute of an object which is socially and normatively defined and which confers unique possession rights (Blake & Harris, 2009, 2011; Friedman & Neary, 2008; Smetana, 1984). Because sharing entails transferring ownership, whether temporarily (as in sharing one's toys with a friend) or permanently (as in sharing food with a parent), until children understand ownership they cannot truly be characterized as sharing. For example, if I notice that you are thirsty and hand you a nearby cup of water, I have acted prosocially by helping you when you are thirsty, but I have *shared* only if the cup of water belongs to me, rather than to you or someone else, and I am aware of whose cup belongs to whom. Moreover, if children do not know what it means to own something, they may also fail to understand that they can offer something of theirs to someone else. If toys and other objects are "free," in the sense of being unmarked by ownership, then the toy in front of a young child might be perceived as no different from a toy in any other location, including the toys in front of or next to someone else. Related to this, an important feature of ownership understanding is knowing that what is "mine" is "not yours," and vice versa. Thus, a young child without ownership understanding may not know that someone else wants something of "theirs," or may fail to understand that they can opt to give "their" toy to the other. Mature ownership understanding also distinguishes between possession and ownership (Blake & Harris, 2009) which should make sharing easier when it entails temporary transfer of physical possession while retaining ownership and its corresponding rights. It might be expected, therefore, that young children would be less likely to share their things spontaneously with others prior to development of such understanding. For the purposes of this paper, the term "ownership" will be used broadly to include both permanent and temporary ownership (physical possession) of objects.

Ownership understanding develops over several years in early and middle childhood, but a broad sense of ownership may emerge in infancy. Late in the first year, infants sometimes protest when a peer or sibling takes a toy they are playing with (Bridges, 1933; Hay, Pedersen, & Nash, 1982); however, such protests may be reactions to the interruption or prevention of a desirable activity rather than an assertion of ownership or a claim to property rights. Young infants likewise object when they are prevented by adults from reaching for something they want to explore, or when something they are currently engaged with is surreptitiously removed (Stenberg & Campos, 1990). It is thus unclear what, if anything, young infants understand about ownership in the first year of life.

In the second year struggles over toys with peers and siblings become increasingly common (Eckerman & Peterman, 2001; Hay & Ross, 1982). Bakeman and Brownlee (1982) found that children as young as 18 months of age resisted peers' attempts to take their toys and tended to retain possession of a toy when challenged (see also Ross, in press). However, when the original possessor tried to regain the toy, the toy takers protested just as much as when someone without any previous possession history tried to take it. This suggests that it was the impending loss of something desirable that governed 18-month-olds' responses rather than an understanding of prior possession or ownership.

By age two, toddlers do seem to understand something about ownership. Two-year-olds can identify to whom specific objects belong (e.g., mommy's hat), whereas children younger than two are at chance (Fasig, 2000; Rodgon & Rashman, 1976). Two-year-olds are more likely to claim ownership in property conflicts than are one-year-olds, and two-year-old toy owners are more likely than non-owners to object to peers' attempts to take a toy, whereas one-year-olds do not differentiate (Ross, in press). Older two-year-olds also sometimes make inferences about ownership based on prior possession (Friedman & Neary, 2008).

However, ownership concepts in toddlers are still fragile and may be specific to particular objects and contexts. For example, 24-month-olds cannot match owners to objects when the objects are out of sight even though they previously identified them as belonging to those individuals; however, 30-month-old children can do this (Blake & Harris, 2011). Whereas two-year-olds recognize their own property rights, they do not seem to understand ownership norms more generally: they protest if their own belongings are taken, but they do not recognize the injustice of someone else's belongings being taken (Rossano, Rakoczy, & Tomasello, 2011). Similarly, two- and three-year-old children do not seem to understand group ownership; when told that a toy belonged to the whole class rather than to them alone, they shared much less than did 4- and 5-year-olds (Eisenberg, Haake, Hand, & Sadalla, 1979). In sum, ownership is a complex and multi-faceted concept that develops over early childhood, but begins to appear in primitive form by age two.

Children also begin using words denoting ownership late in the second year of life, including "mine" most notably. Like ownership understanding, ownership language also emerges gradually over early childhood with "my" and "mine" appearing before "his/hers" or "yours" (Bates, 1990; Imbens-Bailey & Pan, 1998). In a naturalistic study of associations between ownership language and sharing among toddler peers, two-year-olds who used the possessive pronouns 'my,' 'mine,' and 'yours' more often, along with other terms of possession and desire, were found to engage in physical struggles over toys more often, as one might expect, but they were also more likely to share (Hay, 2006).

Based on these suggestive empirical findings and the reasoning outlined earlier, we hypothesized that children with more advanced ownership understanding, broadly defined, would be more likely to share their toys with a playmate who had none. We assessed children's ability to identify the owner of familiar objects brought from home, as well as

their use and understanding of ownership language conveyed in personal and possessive pronouns. We also separately assessed self-understanding. This is a more general construct than ownership understanding, but we expected that it, too, would be associated with early sharing insofar as objective self-awareness and the corresponding awareness of others' internal states enables children to consider another's emotions, needs, and desires in relation to their own, a fundamental component of other-oriented sharing.

## Method

### Participants

Participants were 51 healthy, typically developing children. Twenty-six were 18 months old ( $M = 18.0$  months;  $SD = .5$  months), and 25 were 24 months old ( $M = 24.2$  months;  $SD = .62$  months). The 24 boys and 27 girls were approximately equally distributed across ages. Families were recruited from a medium-sized city and surrounding suburbs, and were predominantly Caucasian (84%; 7% African-American; 5% Asian; 4% Hispanic). An additional four children were tested but their data could not be used because of attention problems, parental interference, or oppositional behavior and task refusal.

### General procedure

All procedures took place in a large playroom and were video recorded from behind a one-way mirror spanning one end of the room. An experimenter (E) conducted the session and an assistant (AE) served as the recipient in the sharing tasks. The session began with a period of warm-up free play. To emphasize AE's role as a playmate, E treated AE like a child and AE behaved similarly to the participant throughout the session, playing when the child did, looking at E when the child did, and so on. AE waited for and followed directions from E, moved about the playroom only when requested to change locations by E, and never instructed or helped the child. The social understanding tasks (see below), as well as other tasks not presented in the current paper (e.g., parent-child book reading) were interspersed among the sharing tasks. Parents also completed the MacArthur Communicative Development Inventory (Fenson, et al., 2000), to assess children's verbal comprehension and production. A total language score was calculated and used as a control for children's language competence in the primary analyses.

### Sharing Tasks

Six sharing tasks were administered with order counterbalanced across participants. Each task featured a different item to be shared (e.g., shapes for a shape sorter; a set of vehicles), so that children had multiple opportunities to share several different types of toys. One task involved food (e.g., crackers, Cheerios) instead of toys. E began each task by seating the child and AE side-by-side at adjoining child-size tables, and distributing the toys equally to each one so that they both had 4 – 6 individual toys to play with, depending on the task. Having a period of side-by-side toy play further reinforced the role of the adult as a playmate. It also served to emphasize the playmate's plight when, after 60 s, E gathered up all the toys from both child and AE and placed them all in front of the child, who now had 8 – 12 toys. AE moved 90 degrees perpendicular to the child so that she was out of reach of the toys and facing the child at an angle. The food-sharing task differed slightly from the others in that there was no initial period of parallel play; instead, E emptied a package of food onto a small plate for the child and then shook it and said "no more," as she set the plate in front of the child. After placing the toys or food in front of the child, E moved behind the child out of view and AE began a series of four progressively more explicit cues about her desire for some of the items. Each cue was repeated twice for a total of 5–7 s. First, using nonverbal cues, she audibly sighed several times, looked sad with downturned mouth and upturned eyebrows, and alternated gaze between the child's things and the empty

space in front of her (cue 1). Next, she verbalized her desire (e.g., “I don’t have any shapes to play with. I need some shapes so I can play, too”). As she said this she made eye contact with the child and then alternated gaze between the child’s things and the empty space in front of her (cue 2). Next, she indicated her desire gesturally by reaching effortfully but unsuccessfully toward the child’s toys or food with palm down and outstretched fingers, saying “I can’t reach them,” and alternating gaze between the child and the child’s things (cue 3). Finally, she made an explicit request, turning her palm up and holding it out to the child while making eye contact and saying, “Could I have a [shape/cracker]?” (cue 4). If the child did not share following cue 4, E gave one of the child’s things to AE to demonstrate sharing (cue 5). If the child shared at any point, AE discontinued the cues, briefly thanked the child, and began to play with the toy(s) or eat the food that the child had given her. Each task was administered twice.

Sharing was scored if the child actively gave an item to AE by transferring it to AE’s table within reach of AE, or by holding it out to AE and depositing it in her hand. If the child held something out toward AE, AE opened her hand and held it in front of her, but she did not reach for, touch, or grasp the child’s thing before the child placed it in her hand and released it. This was to discriminate the child’s showing something to AE from sharing it. Starting to hand something to AE and then changing one’s mind, or placing an item in AE’s hand and then taking it back, or handing an item to AE while holding on to it and failing to release it, were not scored as sharing. Sharing was recorded as occurring or not occurring on each task, without counting how many individual items were shared. The child received a sharing score from 0 – 5 for each task, corresponding to the cue at which sharing occurred (0 = did not share; 1 = shared after E demonstrated; 2 = shared after AE explicitly requested; 3 = shared after AE reached; 4 = shared after AE verbalized desire; 5 = shared immediately upon AE nonverbal cue). Higher scores thus indicated earlier sharing, with fewer cues. Scores were averaged over the six tasks to create an average sharing score for each child.

On three of the tasks it was also possible to track from video records how many and which toys children shared to determine how generous children were and whether they were more inclined to share the toys that AE had been given initially, suggesting that they were simply giving them back. For the other tasks the items were either too similar to be able to track or were partially obscured by another part of the toy (e.g., shape toys were behind the shape sorter out of camera view). The number of toys shared on each task was coded, as well as the number of shared toys that had previously been played with exclusively by AE.

Children’s non-sharing behavior, i.e., their task-related behavior prior to sharing, was also coded after each cue (see Table 1 for definitions): Imitation; Social-Affiliative; Gives-all; Hypothesis-testing; Refusal; Self-focused. The number of times each non-sharing behavior occurred on each task was summed across the six tasks. Because Imitation, Social-affiliative behavior, and Gives-all occurred infrequently ( $M_s = .07, .88, \text{ and } .47$ , respectively), they were not submitted to analysis.

Behavior was coded from video records by assistants who were trained to reliability by one of the authors. Kappa’s were calculated for each coder with the primary coder on 30% of the video records, and ranged from .94 to .98 for sharing scores, and from .68 to .72 for non-sharing behaviors. For the number of toys shared, percent agreement was calculated between the two coders on 16% of the records and averaged 93% for number of toys shared (range = 80% – 100%) and 89% for the number of AE’s toys shared (range = 67% – 100%).

### Social Understanding Tasks

At the beginning of the session E informed parents that their help would be needed with some of the tasks; they were given detailed instructions for the ownership tasks and an

accompanying instruction sheet with specific wording to be followed. They were instructed to read or say only what was printed on the instruction sheet, not to add anything or say it any other way, and not to point, gesture, or help the child in any way. E reminded them of the instructions immediately prior to each of the relevant tasks. Parents proved to be excellent administrators and followed instructions appropriately. One child's data from these tasks could not be used because the parent spoke in Korean and no translation was available to be sure that instructions had been followed.

**Ownership understanding**—Two tasks were administered, both adapted from previous research. For the first task, toddlers were asked to identify the owner of objects by the owner's name, e.g., 'Mommy's hat,' or 'Joey's shoe' (adapted from Fasig, 2000). Parents had been asked to bring with them to the lab two pairs of things that the child recognized as belonging to the parent and to the child (e.g., toothbrushes, books, hats). Additionally, E pointed out, labeled, described, and emphasized the child's chair and the parent's chair in the lab playroom at the beginning of the session and again part way through; the parent's and child's chairs were distinct in size (adult vs. child size), material (fabric vs. plastic), and color (blue vs. red). Three trials were administered, each with two questions. For the first two trials, E presented each pair of items from home, one pair at a time. The child was first given up to 10 s to explore them, after which E placed them on a tray, spaced equidistantly. She then presented the tray and asked the child, "Which one is [Mommy's]/[child's name] [book]?" for each item. Children pointed to or touched the item to indicate their answer. If the child picked up an item instead of pointing to it, that item was replaced before the second question was asked. For the third trial, E placed the child's and parent's chairs next to each other and asked the same questions. Owner order was counterbalanced across questions, and question order was counterbalanced across subjects. For each of the six questions children's responses were scored correct or incorrect by AE as they occurred (total score = 0 – 6). A second coder scored 50% of the sessions from the observation booth with 80% agreement. Because not every child completed all trials, the proportion correct of completed trials was used in analyses.

In the second task, toddlers were asked by mothers to perform actions directed to something of the mother's (my) or the child's (your) using possessive pronouns (adapted from Levine, 1983). Five trials were administered, each with two questions. The specific wording for each question was provided to mothers on the instruction sheet given to them at the beginning of the session. The first two trials referred to body parts or clothing. Mothers had previously indicated two body parts or pieces of clothing which their child knew by name (e.g., nose; shoe). During the task, they asked the child to identify these by asking "Where is my [nose/shoe]?" and "Where is your [nose/shoe]?" The next three trials used objects from the lab. First, E gave the child and parent each a sheet of paper; the parent then asked the child to put a sticker on "my paper," and then asked the child to put a second sticker on "your paper." Next, handing the child a hairbrush, the parent asked the child to "brush my hair," and to "brush your hair." Finally, the parent gave a pop-bead necklace to the child and asked the child to put the necklace on "me" or "my neck" and then on "you" or "your neck." Pronoun order was counterbalanced across questions. For each of the 10 questions children were scored correct or incorrect by AE (total score = 0 – 10). A second coder scored 50% of the sessions from the observation booth with 92% agreement. Because not every child completed all trials, the proportion correct of completed trials was used in analyses.

Total scores on the two tasks were significantly correlated ( $r = .44$ ,  $p < .003$ ), so they were averaged to create a single ownership understanding score which was used in the substantive analyses.



**Self-understanding**—Self-understanding was assessed by parental report using the UCLA Self-Understanding Questionnaire developed for this age group (Stipek, Gralinski, & Kopp, 1990). Parents rated twenty-four items describing their children on a 3-point scale (0 = definitely not; 1 = sometimes/just starting to; 2 = definitely). Items index self-recognition (including mirror self-recognition), self-description and self-evaluation (e.g., uses own name; says “me,” “mine”; uses terms like “good” or “bad” about self). Children received a total score ranging from 0 to 48.

## Results

### Preliminary analyses

Preliminary analyses using the sharing score showed that there were no significant order differences, sex differences, or differences for resource type (food, vehicles, shapes, etc.), nor was there an interaction between sex and resource type (e.g., boys shared vehicles neither more nor less than did girls). There were also no significant differences in average sharing scores between the first half and the second half of the session at either age, i.e., children did not tend to share more or less as the session went on. Substantive analyses therefore collapsed over these factors.

Children did tend to receive higher sharing scores, meaning that they shared more quickly, on the second presentation of each task than on the first ( $M = 2.59$  vs.  $2.38$ , respectively), but these differences were not significant  $F(1, 49) = 2.67$   $p = .11$ . However, children completed more of the tasks on the first presentation ( $M = 5.5$ ) than on second ( $M = 4.9$ ), which was significant,  $F(1, 49) = 15.65$ ,  $p < .001$ ; therefore, substantive analyses were conducted on the first presentation of each task so as to maximize the amount of data included, especially for analyses of associations between sharing and social understanding. The same general pattern of results was found when data were collapsed over the two presentations of each task (results available upon request). Means and standard deviations for the primary measures are presented in Table 2.

### Age differences in sharing

Older toddlers shared more quickly and more often than did younger toddlers,  $F(1, 49) = 26.03$ ,  $p < .001$  (see Table 2 for means and SDs). Age differences remained significant in an ANCOVA with language controlled,  $F(1, 46) = 15.49$ ,  $p = .001$ , indicating that children’s language competence did not account for age differences in sharing scores. Concretely, 24-month-olds shared early in the series of cues, typically after the adult playmate verbalized her desire. Eighteen-month-olds, in contrast, shared primarily after the playmate made an explicit request for a toy, following both her verbalizing desire and reaching toward the toys. Including only those tasks on which a child shared at some point (i.e., excluding sharing scores of 0), 24-month-olds shared upon the playmate’s verbalizing her desire, on average ( $M = 3.90$ ), whereas 18-month-olds shared later, upon the playmate’s reach for the toys ( $M = 2.93$ ),  $F(1, 47) = 11.46$ ,  $p < .001$ . Among children who shared on a given task, 18-month-olds’ modal sharing score was 2.0, meaning that most shared only when explicitly requested to do so; 24-month-olds’ modal score was 3.8, meaning that most shared upon the recipient’s verbalization of desire.

Indeed, 24-month-olds often shared immediately within the first 5 seconds, upon the playmate’s sigh or forlorn look, doing so more than four times as often as 18-month-olds, who almost never shared immediately,  $F(1, 49) = 16.25$ ,  $p = .001$  (see Table 2). Twenty-four-month-olds shared without being asked approximately three quarters of the time, compared to 18-month-olds who shared without being asked approximately one quarter of the time,  $F(1, 49) = 32.10$ ,  $p < .001$ . When all sharing was considered, including when the

playmate explicitly requested it, 18-month-olds shared about half the time, whereas 24-month-olds shared most of the time,  $F(1, 49) = 12.26, p = .001$ . In sum, 18-month-olds sometimes shared without being asked by the playmate, but rarely did so spontaneously; overall they shared about half the time including when directly asked for a toy. Twenty-four-month-olds, in contrast, shared spontaneously more often than not and did so more quickly, often immediately.

Perhaps the most conservative estimate of the children's sharing behavior would be whether they shared on their first opportunity, i.e., on the first sharing task. The most liberal estimate, in contrast, would be whether they shared at least once over all six tasks. Accordingly, chi-square analyses were conducted to detect age differences in how many children shared at each cue level for the first task, and how many shared at least once without being asked across all six tasks (see Figure 1). Whereas most 24-month-olds shared on the first task (76% shared), most 18-month-olds did not (71% failed to share). Moreover, many 24-month-olds shared immediately on the first task, at the first cue (28% of children), whereas no 18-month-old ever shared immediately on the first task, Pearson  $\chi^2(5) = 17.5, p = .004$ . Across all six opportunities to share, 65% of 18-month-olds did so at least once before being asked compared to 96% of 24-month-olds, Pearson  $\chi^2(1) = 7.58, p = .006$ . Thus, on the first opportunity to share, 18-month-olds were very unlikely to do so whereas 24-month-olds were very likely to; but given multiple opportunities, the majority of younger children and nearly all of the older children shared at least once, although age differences still remained.

When children shared, 24-month-olds tended to be more generous than 18-month-olds. For the three tasks on which it was possible to track from the video records how many and which toys children shared, older toddlers shared significantly more toys than did younger toddlers on two of the three, ( $M_s = 2.5$  and  $1.1$  items shared for stacking rings, older and younger children respectively,  $F(1, 22) = 5.23, p = .03$ ;  $M_s = 2.1$  and  $1.3$  for vehicles,  $F(1, 29) = 4.72, p = .04$ ;  $M_s = 1.7$  and  $1.3$  for animals,  $ns$ ). Notably, at neither age were children significantly more likely to share the toys that had previously been played with by AE. In other words, they were not simply giving back to the recipient the toys that had been "hers" during the preceding play period. Our anecdotal impression was that they shared the toys that were most easily within their reach, those that were closest to the recipient, or those they happened to be holding.

### Age differences in non-sharing behavior

When children did not share, 18-month-olds engaged in self-focused non-sharing behavior significantly more often than did 24-month-olds, which included ignoring the partner altogether or glancing quickly at the partner and then returning to play,  $F(1, 49) = 6.81, p = .012$  (see Table 2 for means and SDs), suggesting that they didn't notice or perhaps didn't care about their playmate's desire for some toys, even when she communicated it quite clearly. Eighteen-month-olds also engaged in significantly more hypothesis-testing behavior than did 24-month-olds,  $F(1, 49) = 5.56, p = .023$ . This included stopping their own play and staring at the partner for several seconds, suggesting that they may not have understood what the playmate wanted and were trying to figure it out. Finally, 18-month-olds refused to share somewhat more often than 24-month-olds, although this difference was not significant.

Interestingly, self-focused behavior and hypothesis-testing were uncorrelated (*Pearson*  $r = .04, ns$ ), meaning that different children engaged in each type of behavior. Thus, some children may have been trying to understand what the playmate wanted or what they could do to meet her need or desire, whereas other children may not have recognized that the playmate wanted some toys, or may not have cared about the playmate's need or desire.

## Social understanding and the growth of sharing

Because intentional resource sharing is an other-oriented behavior that depends on understanding others' psychological states, we would expect the development of sharing to be associated with advances in self-other understanding, especially understanding of ownership.

As expected, social understanding increased with age. Twenty-four-month-olds had significantly higher scores on the UCLA self-understanding scale than did 18-month-olds,  $F(1, 49) = 25.35, p < .001$  (see Table 2 for means and SDs). Older children also produced a significantly higher proportion of correct responses on the ownership understanding tasks,  $F(1, 49) = 20.99, p < .001$ .

Children's sharing was associated with both aspects of social understanding, as shown in Table 3. Pearson correlations confirmed that children who shared more quickly, with fewer cues, and children who shared more often before being asked by the partner were more advanced in self-understanding and better understood ownership. With age and language competence controlled, these patterns remained for ownership understanding but not for self-understanding.

Children's non-sharing behavior was also associated with self-understanding and ownership understanding, but negatively (see Table 3). Patterns differed for the two aspects of social understanding. Children who produced more hypothesis-testing on the sharing tasks were lower in self-understanding, but not in ownership understanding. In contrast, children who produced more self-focused behavior on the sharing tasks had lower levels of ownership understanding, but not of self-understanding.

## Discussion

In the current study we examined early developments in other-oriented resource sharing, a relatively little explored dimension of prosocial responding in very young children. We found that toddlers recognize when they and a partner have unequal resources and voluntarily share their own things when the costs are relatively minimal, that is, when sharing does not require them to completely give up everything they are playing with, as is often the case in more naturalistic contexts. We also found significant growth in other-oriented sharing over the second year of life. Whereas 24-month-olds shared readily, frequently, and generously, 18-month-olds did so much less often, required substantial scaffolding from the partner to behave prosocially, and were less generous than older children. But younger toddlers, too, shared on occasion when given multiple opportunities to do so and when the partner provided enough communicative support to help the children understand her desire and how to satisfy it. Additionally, sharing varied with children's social understanding. In particular, ownership understanding was positively associated with how often and how quickly children shared, even with age and general language competence controlled; conversely, non-sharing behavior was negatively associated with social understanding.

It is now recognized that the capacity for prosocial behavior appears very early, in the second year of life. Some have suggested that human infants are born as "natural altruists," i.e., with the innate ability to behave prosocially without any particular shaping or triggering influences, constrained only by their immature behavioral and cognitive capacities (e.g., Hoffman, 1975; Warneken & Tomasello, 2009). Alternatively, human infants may be born especially responsive to socialization influences, relatively unformed and unspecialized with respect to prosocial behavior at birth but possessing experience-expectant predispositions that are readily shaped by the intensely caring, reciprocal, and prosocial human social

environment (Dunn, 2006; Hastings, Utendale, & Sullivan, 2007). In either case, to understand the origins of prosocial behavior and what drives its growth, we must first understand what forms it takes early on, how it develops, and what influences its expression at different ages.

### Developmental differences in sharing

The focus of the current study was on the development of other-oriented resource sharing as distinct from social or affiliative forms such as sharing attention or affect with a parent, or bringing a toy to a parent so that the child and parent can play with it together. Such affiliative sharing has been shown to arise at the end of the first year of life (Hay, 1979; Karasik, Tamis-LeMonda, & Adolph, 2011; Liszkowski, Carpenter, Henning, Striano, & Tomasello, 2004). Less is known about the emergence of sharing in which the child's action is meant to benefit another.

Building on the strengths of both naturalistic and experimental approaches to investigate early prosocial behavior, we have shown that other-oriented resource sharing, in which the child willingly gives up a toy he is currently playing with to a playmate who has none, is emergent in the second year of life, and at its outset is heavily dependent on social and communicative support from the potential recipient. Sharing increases considerably by age two, becoming more frequent, spontaneous, and autonomous. Specifically, we found that by 24 months of age children shared attractive toys quickly and often eagerly. Nearly all two-year-olds shared at least once without being asked, and they did so on nearly 75% of opportunities. Most shared on the first opportunity and they shared relatively promptly, upon noticing that the adult playmate had no toys. Eighteen-month-old infants, who needed substantial cueing from the adult to initiate sharing and who were unlikely to share on the first opportunity, still shared without an explicit request from the playmate over a quarter of the time; across all six opportunities more than half of them shared at least once without being asked. Thus, although "mine!" is a favorite refrain of toddlers, by age two they readily share their toys when supplies are abundant, and even 18-month-olds share when their companions' needs are made clear.

An important feature of the experimental paradigm was the standardized series of cues that the playmate delivered about her need. These were progressively more explicit, culminating in an outright request for a toy. This permitted consideration not just of whether children of a given age share or not, but also how much communicative support and scaffolding is needed to generate a sharing response. Previous studies of early prosocial behavior have shown that making a recipient's need clear can facilitate helping and sharing in young children whose actions might otherwise be constrained by their inadequate understanding of the situation (Brownell et al., 2009; Svetlova et al., 2010). On average, 18-month-olds in the current study required a gestural or verbal request from the partner before they shared. Twenty-four-month-olds, in contrast, responded to the playmate's verbal and nonverbal indications of desire without the need for an actual request. Moreover, the age differences were not a function of children's language competence. Indeed, toward the end of the second year of life there appears to be a transition from a reliance on explicit cues, including verbalizations, to more subtle non-verbal cues. Thus, like some forms of helping (Svetlova et al., 2010), sharing in one-year-olds depends on substantial support and clear communications from the recipient that make explicit what she needs or wants. Two-year-olds need much less information and support from the partner to interpret the situation and figure out what it calls for. Development occurs not just in the rate of sharing, but also in the child's ability to share spontaneously and autonomously, with progressively less scaffolding and encouragement.

The findings for age-related differences in children's non-sharing behavior are consistent with this interpretation. Eighteen-month-olds engaged in higher rates of both self-focused non-sharing behavior such as ignoring the partner or refusing her entreaties, and hypothesis-testing in which they stopped playing with their own toys and stared at the partner. These two types of non-sharing behavior were uncorrelated; children who engaged in more of one did not engage in more of the other, suggesting that they are distinct responses by different children to the sharing situation. Hypothesis-testing, in particular, suggests that the child is unsure about how to interpret the situation and what the partner wants or needs. Other toddlers, on the other hand, may not care about the partner's plight, hence ignore her while they go on playing with their toys. This may not be because they are callous or uncaring, however, but rather because they fail to comprehend the situation.

The fact that even the younger children shared successfully with the support of the adult playmate shows that they are willing to give up a toy they are playing with when they can be helped to understand the partner's needs. Give-and-take games are among the earliest that parents play with their infants, and giving things to others is an affiliative behavior encouraged by parents. Moreover, such games have been shown to increase infants' willingness to show and give things to an adult (Hay & Murray, 1982), and parents routinely praise and reinforce their toddlers when they share objects with the parent, whether the sharing is spontaneous or requested (Eisenberg, Wolchik, Goldberg, & Engel, 1992; Gralinski & Kopp, 1993). Thus, sharing may be more directly socialized by adults than some other forms of prosocial action such as helping or comforting, for which infants and young children are more typically recipients rather than agents.

That young children need the recipient's active support to engage in other-oriented sharing may also explain the low sharing rates observed among toddlers during naturalistic peer play. Peers are equals in social understanding and social skill. In the absence of adult scaffolding young children may find it difficult to understand one another's needs or desires or may misinterpret one another's immature communications, making it unlikely that they will share spontaneously (Smiley, 2001). Indeed, if the clearest indication of a toddler's desire for something being used by someone else is to grab it, perhaps it is not so surprising that sharing is infrequent among toddler peers. Insofar as sharing develops within the broader social context, supported by the interactive partner and potential recipient, it is likely to emerge first with adults or older siblings and to be most reliable and robust with older partners.

### **Ownership understanding and sharing**

Social-cognitive mechanisms have been recognized by many scholars as important contributors to the development of prosocial behavior. Here we aimed to identify specific dimensions of social understanding likely to be important for early developments in other-oriented resource sharing. We conceptualized ownership understanding as one such potential mechanism, with some initial empirical support from a previous naturalistic study which found that toddlers who produced more ownership language were more likely to share with age-mates (Hay, 2006).

In the current study we found that advances in both self-understanding and ownership understanding were associated with age-related differences in toddlers' propensity to share. Once age was controlled, however, self-understanding was no longer a significant predictor, whereas ownership understanding continued to be associated with sharing. In other words, both self-understanding and ownership understanding explained age-related variation in sharing, but only ownership understanding explained individual differences in sharing above and beyond age-related influences.

The finding that self-understanding is associated with age differences in resource sharing is consistent with and extends previous research demonstrating associations between self-other understanding and other forms of early prosocial behavior including empathy, cooperation, and helping (Bischof-Kohler, 1991; Brownell & Carriger, 1990; Brownell, Ramani, & Zerwas, 2006; Zahn-Waxler, et al., 1992). As a number of scholars have argued, prosocial behavior depends on being able both to differentiate and to relate one's own emotions, needs, and desires to those of others. The findings from the current study show that intentional, other-oriented resource sharing likewise must depend on some level of understanding and caring about others' psychological states both separate from and in relation to one's own.

With respect to ownership understanding, it should be noted at the outset that our measures reflect a much more nascent and primitive level of such knowledge than that studied in preschoolers and older children (e.g., Friedman, Neary, Defeyter, & Malcolm, 2011). Here ownership understanding was indexed by children's ability to identify which of several objects brought from home belonged to the parent and the child, and by their comprehension of ownership language when asked to do things like brush "my" vs. "your" hair. Moreover, children's performance may have reflected, at least in part, general social responsiveness or willingness to comply with a parent's requests, in addition to ownership understanding. Nevertheless, even this emergent and relatively basic understanding of ownership was associated with sharing in the current study.

It is interesting that the associations between ownership understanding and sharing were positive, since one might intuitively expect the reverse – as children better understand ownership, their property claims should increase and their willingness to share should decline (e.g., Rochat, 2011). An important feature of ownership, however, is that it is a social construct, a normatively defined relationship between individuals and objects; there is nothing inherent about an object that specifies ownership (Blake & Harris, 2009, 2011; Friedman & Neary, 2008). Even primitive representations of ownership may, then, reflect some degree of normativity and associated social expectations. Toddlers may be starting to understand that ownership can be exchanged between consenting individuals, that others have expectations with respect to owned things, that objects can make others happy, and other embryonic notions of objects as possessing social value. This sort of understanding could make children more attentive to and aware of others' resource status, as well as the emotional consequences for others of being deprived of resources. It could also help youngsters understand the act of offering something to another as a gesture of goodwill or liking, or as a means to alter someone else's object-related emotions. Toddlers may also be starting to distinguish between ownership and possession, with two-year-olds understanding that they were granted temporary possession of the playroom toys but not ownership, which could contribute to their greater willingness to share them. Altogether then, beginning to understand ownership as a socially defined attribute of objects may provide a rational basis for sharing, as well as an early normative standard for object exchange.

Sharing didn't occur on every opportunity, and distinct associations between social understanding and non-sharing behavior were also obtained. With age and language competence controlled, ownership understanding was associated with less self-focused non-sharing behavior while self-understanding was associated with less hypothesis testing. These specific associations were not predicted, so we can only speculate about possible reasons for them. It is conceivable that emergent ownership understanding heightens young children's awareness of and interest in others' property status as suggested above, resulting in increased attention to the play partner's predicament and a corresponding decrease in self-focused toy play. Insofar as self-understanding entails equivalent and complementary other-understanding (Moore, 2007), more advanced self-representations may have contributed to

children's ability to understand what the playmate wanted or needed, how this related to the child's own situation, and what the child could do to remedy the playmate's problem. Children with more advanced self-other understanding would thus be more able to figure out what was called for and to act appropriately in this context.

### Limitations & future directions

Combining the strengths of naturalistic and experimental procedures has enabled us to clarify and extend previous research on the emergence and early development of other-oriented resource sharing. Nevertheless, these laboratory-based procedures may have eliminated some demand characteristics of naturalistic sharing or may have introduced others. The playmate in the current study was a friendly, cooperative adult, not a peer or sibling in competition for the child's belongings; the recipient's plight was amplified by removing all of the toys she had been playing with just moments before, and she very clearly communicated her desire and need; the child's supply of shareable toys was substantial and the toys were temporary possessions rather than owned by either the child or the recipient; and children were given multiple successive opportunities to share several different types of toys as well as food, making it possible to give up less valued resources while perhaps not sharing those that were more valued. Children may sometimes have been complying as much as sharing, given that the tasks were highly standardized and similarly structured, with multiple repetitions. Some or all of these factors may have increased the likelihood of sharing, possibly resulting in an overestimate of toddlers' altruistic proclivities. However, it should be noted that the rates of sharing found in the current study roughly correspond to those in two other recent experimental studies of toddlers' sharing with adults using different procedures (Dunfield, et al, 2011; Vaish et al, 2009). Nevertheless, manipulating factors such as the child's relationship to the recipient and other recipient characteristics, value of the toys to the child, and temporary vs. permanent ownership would enable more precise characterization of the conditions under which toddlers are willing and able to share. The ownership understanding tasks in the current study were also somewhat broad. For example, they did not ask the child to differentiate between possession (temporary) and ownership (permanent), a distinction which may itself develop. More precise characterization of this knowledge early in development is necessary to fully understand how sharing relates to ownership understanding. Finally, the sample was relatively homogeneous; recent cross-cultural research has shown that cultural and socialization practices shape self-interested and other-oriented behavior in preschool-age children (e.g., Rochat et al., 2009). Future studies which assess socialization practices in more diverse samples can further inform questions about the origins and developmental course of early prosociality.

### Conclusions

Affiliative sharing begins in the first year of life in the context of social interactions with adults. Findings from the current study suggest that sharing becomes transformed in the second year into its prosocial, other-oriented form, undertaken for another's benefit. Between 18 and 24 months of age, other-oriented resource sharing becomes more frequent, spontaneous, and autonomous, with less need for support and encouragement from the recipient. This transformation is accompanied by, and perhaps partly driven by, growth in social understanding, including which things belong to self and others and language denoting ownership such as "mine" and "yours."

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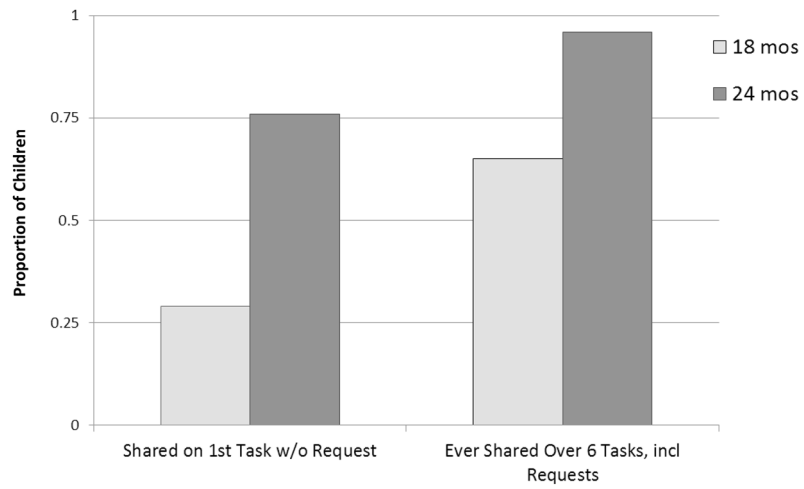
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**Figure 1.** Proportion of 18- and 24-month-olds who shared on the first task without being asked, and proportion who ever shared over all six tasks, including when directly asked.

**Table 1**

## Coding Definitions for Sharing and Non-sharing Behaviors

<b>Behavior</b>	<b>Definition</b>
Shares	Actively gives at least one item to AE (assistant experimenter/playmate) by placing it on AEs table within her reach and leaving it there, or by handing an item to AE & releasing it into her hand; returns to own play(or eating) afterwards; looks at AE before, during, or immediately after sharing
Imitates	Imitates AEs verbal, vocal, or gestural behavior
Social-affiliative	Looks at AE while directing other social behavior toward her, i.e., gestures, vocalizes, or speaks to AE; shows own things to AE; brings own thing(s) over to AE and plays next to her without offering any
Gives All	Puts all of the items on AEs table all at once. Does not interrupt this behavior to return to own play or eating. Does not request or try to take things back. Looks like compliance, not sharing.
Hypothesis-testing	Stares fixedly at AE for at least 4 continuous seconds, or glances repeatedly at AE while stopping own play or eating; may seem confused or tense; may look repeatedly back & forth between own items and AE; social referencing to parent or E
Refuses	Overt refusal, either verbally or gesturally (“no;” “mine;” shakes head ‘no’); guarding, hoarding, or hiding own things; fake-out or take-back (offers or hands item then changes mind and reclaims it before releasing it)
Self-focus	Doesn’t visibly respond to AE’s cue; may occasionally glance at AE’s things or may glance at AE briefly, but returns to own play or eating; can include apparently deliberate ignoring of AE; predominantly playing with (or eating) own things

**Table 2**

Means and Standard Deviations (in parentheses) for Primary Measures as a Function of Age

Measure	18 months	24 months
<b>Sharing</b>		
Sharing score (0 – 5)	1.56 (1.05)	3.24 (1.26)
Proportion Trials Shared Immediately	.08 (.12)	.34 (.29)
Proportion Trials Shared Before Verbal Request	.28 (.27)	.73 (.30)
Proportion Trials Ever Shared (including after verbal request or demonstration)	.53 (.31)	.81 (.26)
<b>Non-Sharing Behavior</b>		
Hypothesis-test (freq)	7.88 (4.0)	5.20 (4.1)
Self-focused (freq)	5.23 (4.7)	2.08 (3.8)
Refusals (freq)	1.85 (2.9)	.84 (1.8)
<b>Self-Other Understanding</b>		
Self-understanding (0 – 48)	18.32 (5.6)	29.8 (9.9)
Ownership Understanding (proportion correct)	.56 (.25)	.84 (.18)

**Table 3**

Zero-order and Partial Correlations (With age and MCDI Language Score Controlled)

	Sharing Score	Sharing Frequency (before request)	Non-sharing: Hypothesis Testing	Non-sharing: Self-focused
<b>Self Understanding (UCLA)</b>	.42 <sup>**</sup> (.11)	.46 <sup>**</sup> (.13)	-.41 <sup>**</sup> (-.32 <sup>**</sup> )	-.12 (.14)
<b>Ownership Understanding</b>	.69 <sup>***</sup> (.55 <sup>***</sup> )	.64 <sup>***</sup> (.45 <sup>**</sup> )	-.24 <sup>+</sup> (-.09)	-.46 <sup>**</sup> (-.33 <sup>*</sup> )

Between Measures of Social Understanding and Measures of Sharing and Non-sharing behavior

Notes: Partial correlations are in parentheses.

<sup>+</sup> p < .10;<sup>\*</sup> p < .05;<sup>\*\*</sup> p < .01;<sup>\*\*\*</sup> p < .001