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Toddlers' costly helping in three societies

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ABSTRACT

Over the second and third years of life, toddlers begin to engage in helping even when it comes at a personal cost. During this same period, toddlers gain experience of ownership, which may influence their tendency to help at a cost. Whereas costly helping has been studied in Western children, who have ample access to resources, the emergence of costly helping has not been examined in societies where children's experience with ownership is varied and access to resources is scarce. The current study compared the development of toddlers' costly and non-costly helping in three societies within Canada, India, and Peru that differ in these aspects of children's early social experience. In two conditions, 16- to 36-month-olds ($N = 100$) helped an experimenter by giving either their own items (Costly condition) or the experimenter's items (Non-costly condition). Children's tendency to help increased with age in the Non-costly condition across all three societies. In the Costly condition, in Canada children's tendency to help increased with age, in Peru children's helping remained stable across age, and in India children's level of helping decreased with age. Thus, whereas we replicate the findings that non-costly helping appears to develop synchronously across diverse societies, costly helping may depend on children's early society-specific experiences. We discuss these findings in relation to children's early ownership experience and access to resources, factors that may account for the divergent patterns in the development of costly helping across these societies.

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Introduction

Human children engage in helpful behaviors early in their lives, even at a cost to themselves. As early as 14 months of age, toddlers provide help to adults who demonstrate instrumental needs in a variety of novel scenarios (Warneken & Tomasello, 2007). At 18 months of age, toddlers help in even more situations and will give up a preferred toy to do so (Brownell, Iesue, Nichols, & Svetlova, 2013; Dunfield, Kuhlmeier, O'Connell, & Kelley, 2011; Köster, Ohmer, Nguyen, & Kärtner, 2016; Warneken, Hare, Melis, Hanus, & Tomasello, 2007; Warneken & Tomasello, 2006). Helping an adult achieve an instrumental goal emerges at the same age across diverse societies (Callaghan et al., 2011; Kärtner, Keller, & Chaudhary, 2010), suggesting a strong predisposition for human helping, yet one that manifests through distinct developmental pathways (Kärtner et al., 2010; Köster, Cavalcante, Vera Cruz de Carvalho, Resende, & Kärtner, 2016). Younger toddlers show a sensitivity to contextual factors, helping more readily when recipients' needs are associated with instrumental actions, such as retrieving a dropped clothespin, than when they require more complex inferences of internal states, such as sadness (Svetlova, Nichols, & Brownell, 2010). Providing communicative cues about the particular need of the recipient facilitates younger children's responses, with more cueing typically leading to higher levels of helping (Svetlova et al., 2010; Warneken & Tomasello, 2007). These findings suggest that one cognitive foundation for early helping is the ability to infer the goal or need state of a social partner and that young children's helping may be limited by their inferential abilities.

Children's helping may also be affected by their motivation to act positively toward their partner. In psychological research, altruism is generally considered to be behavior that is aimed at providing a benefit to another individual with no motivation to benefit the self (Piliavin & Charng, 1990; Warneken, 2016). Warneken and Tomasello (2008) reported that toddlers' helping occurred independent of material rewards and was sometimes reduced with reward, suggesting that it was intrinsically motivated. Furthermore, toddlers understand others' needs before engaging in helping themselves, suggesting that helping may be prosocially motivated from its emergence (Köster, Ohmer, et al., 2016). Using a pupil dilation measure, Hepach, Vaish, and Tomasello (2012) found that 2-year-old children showed arousal when they watched an individual needing help and showed relief after the need was alleviated either by the child or by someone else. This finding suggests a truly altruistic motivation, showing that children's desire to see the other helped was indeed based on their concern for the other achieving her or his goal and not just on a self-focused anticipation of a "warm glow" feeling that may accompany their act of helping (Aknin, Hamlin, & Dunn, 2012). Taken together, the findings from these studies converge to suggest that toddlers are strongly motivated to act prosocially toward a social partner with an instrumental need (but see Carpendale, Hammond, and Atwood (2013) and Dahl (2015) for arguments that early helping may have a social motivation rather than a prosocial one).

However, toddlers' propensity to help, and in particular to help by giving, varies depending on the context. One factor that has been shown to contribute to this variation is how valuable the needed object is for children, that is, whether they own it, how much they like it, and how costly it would be to give it up (Hay, 2006; House et al., 2013; Moore, 2009). Evidence from a variety of measures indicates that toddlers begin to understand ownership by the end of the second year of life (Blake, Ganea, & Harris, 2012; Blake & Harris, 2009; Fasig, 2000; Friedman & Neary, 2008; Hay, 2006; Ross, Friedman, & Field, 2015). Furthermore, toddlers act in accordance with ownership knowledge, being more likely to give their friend an item belonging to the friend and less likely to have conflict when adhering to ownership rights (Ross, 2013; Ross et al., 2015). Given that children are sensitive to ownership rights from early in ontogeny, it is important to take ownership into account when assessing the cost that is involved in the act of helping.

To systematically explore how toddlers' helping is influenced by cost as well as by other social-cognitive demands, Svetlova et al. (2010) conducted a study with 18- and 30-month-olds in which children could help an adult partner in three conditions that varied in task demands. In all conditions, children needed to infer a need based on the actions and expressions of the partner and were given a series of increasingly explicit communicative cues about the partner's need. Three items were avail-

able to the child, one of which would address the need of the partner. In the Action condition, helping required the toddler to infer how to help when a partner's instrumental goal was foiled. In the Emotion condition, helping required a more complex inference of a negative emotional or internal state. In both of these conditions, the item that could address the need belonged to the experimenter. In the Altruism condition, helping also required an inference about an emotional or internal state, but critically the items that were needed to address the need belonged to the children. These items were either brought from home or given to children on arrival at the lab. Thus, provision of help in the Altruism condition required a cost (i.e., giving up a belonging) on the part of children. In line with previous studies, both 18-month-olds and 30-month-olds readily helped in the Action condition. Younger, but not older, children showed lower levels of helping in the Emotion condition compared with the Action condition and required more cues to help, suggesting that for the younger children the inference of needs based on internal states was more difficult than that of needs resulting from instrumental actions. Importantly, both younger and older children helped more in the Emotion condition than in the Altruism condition, indicating that giving up their belongings was difficult for children at both ages. In addition, older children required more communicative cues before they helped in the Altruism condition compared with the Emotion condition (younger children did not show this difference, requiring high levels of cueing in both conditions), suggesting that between 18 and 30 months costly helping in particular becomes motivationally challenging, possibly because of children's growing understanding and appreciation of ownership.

To reduce this motivational challenge, a further study (Brownell et al., 2013) explored children's sharing behavior in a situation where multiple toys were available. In that study, 18- and 24-month-old children were given 8 to 12 toys to play with and then had a chance to share with a playmate who had no toys. In addition, children's knowledge of ownership was separately assessed. Older toddlers shared more, and more spontaneously, than younger toddlers. As in the previous study, higher levels of communicative support increased younger toddlers' sharing. Interestingly, ownership understanding was positively related to resource sharing at both 18 and 24 months. This finding is particularly relevant to the claims of early predisposition for altruism given that unless ownership is understood, one cannot be said to have sacrificed a belonging.

Taken together, the results of these two studies suggest that toddlers' growing understanding of ownership may contribute to an age-related decrease in sharing of scarce and valuable resources (Svetlova et al., 2010). However, it may also simultaneously contribute to an increase in sharing of abundant, and therefore less valuable, resources (Brownell et al., 2013).

Several studies have shown that the relative abundance of available resources influences the relative cost of giving resources to others. In sharing paradigms, children as young as 2 years give more when they are in a position of relative wealth compared with a recipient (Hay, Caplan, Castle, & Stimson, 1991). Paulus, Gillis, Li, and Moore (2013) presented 5-year-old children with scenarios of a recipient with no resources and a third party with resources who could be recruited to share with the recipient. Children were given the opportunity to share themselves or recruit a third party to share with the child who had no resources. Children with more resources than the third party were more likely to share themselves, whereas children with fewer resources were more likely to recruit the third party to share. These findings suggest that from early in ontogeny, giving resources to others is easier when resources are abundant.

From the second year of life, children begin to understand ownership, which is a fundamental prerequisite to altruistic helping (i.e., knowingly giving a belonging to help another person in need), and are sensitive to abundance versus scarcity of resources when sharing with others. The impact of ownership understanding on the cost of helping likely depends on early experience with ownership, including the relative abundance of possessions. Both factors vary considerably across societies, suggesting that comparisons across societies may help to deepen our understanding of the influence of ownership and abundance on costly helping. In the current study, we investigated whether variation in costly helping exists across societies known to vary in ownership experience and abundance of resources owned during early childhood.

The first aim of the current study was to assess whether the development of costly and non-costly helping varied for toddlers across diverse societies located in India, Peru, and Canada. To do so, we employed a replication of the Emotion and Altruistic helping conditions of Svetlova et al. (2010);

we presented toddlers with the opportunity to help by giving items that they owned or were owned by an adult experimenter, and we then measured instances of helping and the level of salience of the communicative cueing needed to help. We sampled participants from small rural societies within each of the three countries where this research was conducted with the aim of capturing the influence of traditional values, beliefs, and practices that might no longer be present in urban centers. Our primary hypothesis was that non-costly helping would emerge synchronously across these societies, whereas variability across societies would emerge in costly helping. A growing body of research suggests synchrony in the emergence and an age-related increase in non-costly helping across diverse societies (Callaghan et al., 2011; Kärtner et al., 2010; Köster, Cavalcante, et al., 2016). Thus, we predicted that children's helping in the Non-costly condition would increase with age across all societies. In contrast, given evidence of greater variability across societies in costly prosocial behaviors (Callaghan & Corbit, 2018; House et al., 2013), we predicted differences in levels of helping between the Costly and Non-costly conditions across these societies.

To formulate secondary hypotheses regarding how costly helping might vary across these groups, we turned to prior ethnographic reports for the societies sampled here. Callaghan et al. (2011) documented variation in toddlers' ownership experience and the abundance of possessions across these societies. Sampling from these three societies enabled us to compare children's costly helping across diverse early social experiences as well as across the theoretically important dimensions of ownership experience and relative abundance of possessions. In the Indian society where we collected our sample, toddlers typically do not experience ownership, and when ownership experience begins during the third year of life they own very few items. In the Peruvian society, ownership is pervasive in toddlers but possessions are few. In the Canadian society, ownership in toddlers is ubiquitous and possessions are abundant.

Importantly, in the current design, the cost of helping was operationalized by the relative comparison of helping by giving an item needed to help that was owned by participants (Costly condition) compared with giving the experimenter's item (Non-costly condition). Evidence that participants experienced a cost in helping could come in two forms: a lower rate of helping in the Costly condition compared with the Non-costly condition or a greater level of cueing required for participants to help in the Costly condition compared with the Non-costly condition. We generated the following hypotheses for age-related changes in the cost of helping for each society. In the Indian society, where only older children experience ownership and possessions are scarce, we predicted that as children gained experience with ownership helping would decrease with age and the number of cues needed to help would increase. In the Peruvian society, where ownership is ubiquitous at both ages and resources are scarce, we predicted that children would help less and require more cues in the Costly condition compared with the Non-costly condition at both ages. In the Canadian society, where both ownership and abundance of possessions are pervasive, we predicted that levels of helping and number of cues needed to help would be at similar levels at both ages. To assess local socialization goals and practices and to deepen our understanding of potential differences in the developmental pathways of costly helping across these societies, we also conducted surveys with a subset of parents on relevant socialization practices and goals (i.e., to foster helping and sharing).

Method

Participants

A total of 100 children from three societies completed the study (see Section 1 of the supplementary online material [SOM] for a comparative description of the participating societies). In India, 35 children participated (17 girls; mean age = 25.34 months, range = 16.30–36.43). In Peru, 34 children participated (11 girls; mean age = 25.30 months, range = 18.23–34.93). In Canada, 31 children participated (14 girls; mean age = 25.87 months, range = 16.83–3.43). An additional 6 children from India (3 19-month-olds and 3 30-month-olds), 2 children from Peru (both 19-month-olds), and 1 child from Canada (19-month-old) were excluded because they failed to engage with the experimenter during the warm-up period. Our sample size was constrained by the duration of our stay in the field sites in India and Peru as well as by logistical constraints of recruiting and testing children within this age range. During recruitment, parents were provided with a set of the three items for their children

that would later be used in the experimental task. To foster a sense of ownership over these items, we allotted a 1-week window between recruitment and testing where children had these items in their possession. In India, children were recruited through home visits made by a field worker from a local non-governmental organization that provided logistical assistance for the study. In Peru, the local experimenters recruited participants through a parent meeting held with the cooperation of the local elementary school as well as through home visits. In Canada, children were recruited through letters sent to parents via local day-care centers.

Descriptive data from parental questionnaires

As noted, parental questionnaires were completed by parents at each site to confirm that children's early experience with ownership aligned with previous reports of variability across these societies on this factor (Callaghan et al., 2011). All mothers were present for testing in India and Peru and responded to the questionnaire. In Canada, most children were tested in day-care centers and few parents indicated contact details on the consent forms. Thus, in Canada the experimenter administered the questionnaire to the subset of mothers who brought their children to the lab for testing or who could be reached by phone (33%). All questionnaires (see Section 2 of SOM) were presented by a local experimenter, who asked the questions and translated responses for one of the authors, who assisted in conducting the questionnaires. The local assistants lived in the regions where the studies were conducted, but they were not known to the children. The data from the parental questionnaires suggest that, as expected, children's ownership experience differed significantly across the three societies. Only 60% of Indian mothers reported that their children owned anything that belonged to the children alone, in comparison with 100% of Peruvian and Canadian mothers. The type of possessions listed by Indian and Peruvian mothers included clothing and toys; Canadian mothers listed only toys or electronics. Indian mothers who responded that their children owned items reported an average of 1.5 items (range = 1–3), as compared with an average of 5 items (range = 1–7) for Peruvian mothers. Canadian mothers found it difficult to assess how many items their children owned, and most (67%) estimated a possible range of items instead of giving an absolute amount (estimated to be > 50 items on average). To provide a descriptive framework from which to consider the main findings on helping measures that follow, we summarized societal differences in parental beliefs about children's sharing (see Table 2.1 in SOM).

Design

All children participated in two helping conditions: Costly and Non-costly, administered as two blocks of 3 trials in counterbalanced order. In each condition, there were three scenarios (order counterbalanced within the block) in which an experimenter acted out a need for help and provided increasingly more explicit communicative cues to her needs on each trial. Children had the opportunity to help by giving the needed object from among the three objects that were targets across the three scenarios. The dependent measures for helping consisted of the number of trials (out of 3 for each condition) on which children helped with the appropriate item and the communicative cue score (out of 7) for each trial on which children helped with the appropriate item (i.e., how many cues were given before children helped). After completing the helping tasks, children were asked to choose the three items that belonged to them from the entire set of six items used in the experiment (i.e., their own and the experimenter's) to assess whether they asserted ownership of the items used in the Costly helping condition. We tested children ranging in age from 16 to 36 months to facilitate comparison with previous research on altruistic helping in toddlers (Svetlova et al., 2010).

Materials

Items used in the helping tasks.

Prior to the study, parents were provided with a set of three common items that could later be used in the scenarios to address the experimenter's demonstrated need (India: ball, cup, and fan; Peru and

Canada: ball, cup, and manta/scarf). The items were locally sourced but were similar across sites to ensure standardization of the procedure. Common items across sites included a child's plastic cup and a rubber ball. Due to the ambient temperature differences across the sites, in the Temperature scenario the experimenter appeared to be too warm in India and appeared to be too cold in Peru and Canada. Thus, different items were required (India: handheld fan; Peru: manta [warm scarf mothers use to carry infants]; Canada: neck scarf). A set of items belonging to the adult experimenter was also locally sourced and consisted of slightly larger versions of the child's cup, ball, and fan/manta/scarf.

Additional props used in helping scenarios.

In the Thirsty scenario, the experimenter displayed a need for water, and a locally sourced container was used to make the scene more convincing. In the Hurt scenario, the experimenter pricked her finger either with a safety pin or with a small pair of scissors, both of which were common items in all testing sites. In the Temperature scenario, the experimenter indicated that she was too warm or too cold with body gestures, and no additional props were needed.

Procedure

General

All children were tested individually in a quiet room using a standard procedure across all testing sites. The sessions were videotaped by a secondary experimenter and later coded from video for reliability. The videographer also live-coded children's responses (which item was chosen at which cue level) and informed the experimenter of the counterbalancing order to be used. In India and Peru, local female experimenters, fluently bilingual in the children's mother tongue and in English, conducted all procedures with children and were trained by one of the authors. Training consisted of learning and practicing the naturalistic delivery of the instructions and the scenarios over the course of several days. All instructions and scripts were translated from English to the local language (Telugu in India and Spanish in Peru) and back-translated to English. Any discrepancies in the intended meaning identified during the translation process were resolved. Items to be used in the helping task were given to the mothers of the children 1 week in advance of the testing date. Mothers were asked to ensure that their children knew that the items belonged to them, to encourage their children to use the items, and to bring the items with them on the test day. Additional identical items were available at the testing site in case any mothers forgot the items. All interactions took place on a floor mat with the experimenter sitting directly across from the children and the mothers sitting slightly behind. Mothers were asked not to communicate with their children or to help them in any way, and all mothers complied. When each mother and child arrived, the experimenter played with the child while an assistant obtained the child's belongings to be used in the helping tasks and debriefed the parent about the procedure. The helping tasks were conducted immediately following the debriefing. At the end of the helping tasks, the three items belonging to the child and the three items belonging to the experimenter were randomly arranged together on a tray and the child was asked to choose, in a random sequence, the cup, ball, and fan/manta/scarf. At the end of testing in India and Peru, all the mothers completed the questionnaire. The local experimenter delivered the questions and translated answers into English for the author who coordinated the field research. The field coordinator asked follow-up questions as needed to achieve clarity.

The helping tasks

All children participated in both Costly and Non-costly helping conditions (with approximately half participating in the Costly condition followed by the Non-costly condition in each site and half with the reverse order). In the Costly condition the child's three items were placed on a tray within reach, and in the Non-costly condition the experimenter's three items were placed on the tray. The same three scenarios (see Table 3.2 in SOM) were acted out for each condition and presented in blocks of three scenarios per condition. Thus, the only difference between the Costly and Non-costly helping conditions was whether the items that could be used to help the experimenter belonged to the child or the experimenter. Assignment of children to counterbalancing order was rotated through three

orders, which ensured that each scenario appeared first, second, and third in the sequence. In the Thirsty scenario, the experimenter demonstrated that she was thirsty, giving progressively more explicit cues to her need (cues were common to all scenarios; see Table 3.3 in SOM). In the Hurt scenario, the experimenter pricked her finger and indicated that she was hurt and sad with increasingly more explicit cues. In the Temperature scenario, the experimenter demonstrated either that she was too warm (India) or too cold (Peru and Canada), again accompanied by increasingly more explicit communicative cues.

Each block of scenarios (Costly or Non-costly) began with the experimenter introducing the three items that were placed on the tray, and how they could be used (see script in Section 3.1 of SOM). Once the items were introduced, they were placed on a tray within reach of the child. One of the three items was appropriate to the need displayed by the experimenter, and the other two items were the items needed to address the needs in the other two scenarios. The experimenter began acting out the first scenario of the first block, ensuring that the child was watching and gaining the child's attention by saying her or his name if attention wandered. Then, the experimenter presented the script along with communicative cues naturalistically in the sequence outlined in Table 3.3 of the SOM and stopped cueing as soon as the child gave her one of the items. When the item was appropriate to the need, the experimenter took the item, thanked the child, and completed the scenario by addressing the need (getting some water in the cup and drinking it, playing with the ball, or fanning herself). If the item was not appropriate to the need, the experimenter took the item, thanked the child, and then placed the item back on the tray and began the next scenario. Items were replaced at the end of each scenario so that the child needed to choose one of three items to address the experimenter's need on each helping trial. This procedure was repeated for all three scenarios within each block. In between blocks (Costly and Non-costly), the secondary experimenter switched the items (child's and experimenter's) and brought the tray to the primary experimenter.

Ownership measure

At the end of the helping task, the experimenter thanked the child for participating and presented the child with all six items (i.e., the child's and experimenter's) randomly arranged on the tray. She asked the child to take her or his cup, ball, and fan/manta/scarf, in turn and without replacement, so that the child could take them home. An assistant placed the child's items in a bag (replacing chosen items that did not belong to the child with the child's items) and played with the child as the parent stayed to complete the questionnaire. The resulting outcome measure was a score ranging from 0 to 3 according to the number of items the child chose correctly.

Methods of coding and data analysis for helping measures

Coding and preliminary analyses

To assess the extent to which children helped, the number of trials (out of 3) on which children provided the appropriate item to the experimenter and the communicative cue scores were calculated. All data entered on the scoresheets were later checked for accuracy from videotapes by a coding assistant naïve to the study hypotheses. Due to the objective nature of the responses, discrepancies were rare (agreement was 92%–98% across the societies) and were resolved by discussion between the live coder and the video coder.

Main data analyses

The general approach we took to the analysis is described here, with supplementary analyses presented in Section 4 of the SOM. To estimate the variables influencing the likelihood of helping, we used a generalized linear mixed model (GLMM) approach (Baayen, 2008; Bolker et al., 2008). The response measure for the helping model was the proportion of trials in which children helped with the appropriate item per condition (Costly or Non-costly), and it was fitted using a binomial error structure and logit link function (McCullagh & Nelder, 1996). We did not consider trials for which children helped with an item other than the appropriate item. As fixed effects, we included society (India, Peru, or Canada), condition (Costly or Non-costly), children's age in days (z-transformed to a mean of 0 and a standard deviation of 1; Schielzeth, 2010), and all their interactions up to the three-way interaction.

To control for their effects, we included participant sex and the order in which the two conditions were applied as additional fixed effects and included participant ID and block ID (i.e., the combination of condition and participant ID) as random effects. To assess whether the effects of our test predictors (condition, society, age, and their interactions) could be mediated by ownership understanding, we tested whether the ownership score was significantly related to our test predictors. The effect of the predictors on ownership was clearly significant (full-null model comparison: $\chi^2 = 28.703$, $df = 11$, $p = .003$). We then refitted the helping model with ownership score included as an additional covariate.

For the analysis of the communicative cue score (i.e., after how many cues children helped, if at all), we used a survival analysis. We chose this approach because children could help or not help, and when they helped this could have happened after any of the up to 7 cues provided (or not at all). A survival analysis applied to such data basically addresses the question of how long (i.e., for how many cues) children can resist helping. We fitted a mixed Cox proportional hazards model, with the response being the number of cues the children were given, including the cue given immediately prior to when they helped. The fixed effects in the model were the same as in the previous one, with the inclusion of an additional fixed effect for the type of item requested (levels; manta/scarf, ball, and cup). We again included a random effect of participant ID and this time included one random slope (Barr, Levy, Scheepers, & Tily, 2013; Schielzeth & Forstmeier, 2009), namely that of condition (manually dummy coded and then centered) within participant ID. Ownership score was once again included as a fixed effect.

The survival analyses were fitted with the appendix function `coxme` of the R package `coxme` (Therneau, 2018). We estimated model stability, determined significance, and proceeded with regard to the removal of nonsignificant terms as in the case of the helping models. We determined confidence intervals by means of a nonparametric bootstrap ($n = 1000$ bootstraps) based on resampling of the participants.

Results

Helping tasks: Proportion of trials on which the child helped

Overall, the model assessing the proportion of trials with appropriate helping was clearly significant (likelihood ratio tests, full-null model comparisons, $\chi^2 = 53.62$, $df = 11$, $p < .001$). The three-way interaction was not significant ($\chi^2 = 0.469$, $df = 2$, $p = .79$) and, thus, was dropped from the model. The resulting model revealed a nonsignificant interaction between society and condition but a clearly significant interaction between society and age ($\chi^2 = 13.14$, $df = 2$, $p = .001$) as well as between condition and age ($\chi^2 = 7.64$, $df = 1$, $p = .006$). See Table 1 for the final model excluding nonsignificant interaction terms. The probability that children helped across age (continuous), society, and condition is plotted in Fig. 1. Visual inspection of the figure reveals that the probability of helping increased with age for children in the Canadian sample in both conditions and for children in the Peruvian sample in the Non-costly condition with a tendency for increase in the Costly condition. For children in the Indian sample, helping decreased in the Costly condition and remained at intermediate levels in the Non-costly condition. Excluding trials where children did not help until after Question 7 (see Table 3.3 in SOM indicating that Cue 7 instructed children how to respond) did not lead to a different pattern of significant predictors (see Section 4.1.4 in SOM).

Helping tasks: Communicative cue score

The results of the survival analysis of the communicative cues required to help mirrored that of the proportion of trials on which children helped. The full model based on all data provided a better fit than the null model ($\chi^2 = 62.75$, $df = 11$, $p < .001$), and again the three-way interaction was not significant ($\chi^2 = 4.27$, $df = 2$, $p = .118$) and so was dropped from the model. The resulting model revealed a nonsignificant interaction between society and condition but clearly significant two-way interactions between society and age ($\chi^2 = 10.78$, $df = 2$, $p = .005$) and between condition and age

Table 1

Results for the final model predicting the proportion of trials on which children helped.

Term	Estimate	SE	Lower CI	Upper CI	χ^2	df	p
Intercept	0.738	0.539	-0.297	1.935			
Society: India	-2.127	0.463	-3.201	-1.296			
Society: Peru	-0.260	0.448	-1.285	0.694			
Condition: Non-costly	0.817	0.269	0.297	1.375			
Age	0.911	0.383	0.217	1.817			
Ownership	0.359	0.180	-0.005	0.722	4.028	1	.045
Sex: Male	0.727	0.343	0.065	1.470	4.514	1	.034
Order	0.428	0.255	-0.056	0.955	2.850	1	.091
Society: India \times Age	-1.509	0.439	-2.497	-0.721	13.142	2	.001
Society: Peru \times Age	-0.910	0.463	-1.982	0.036			
Condition: Non-costly \times Age	0.713	0.259	0.220	1.278	7.639	1	.006

Note. CI, confidence interval.

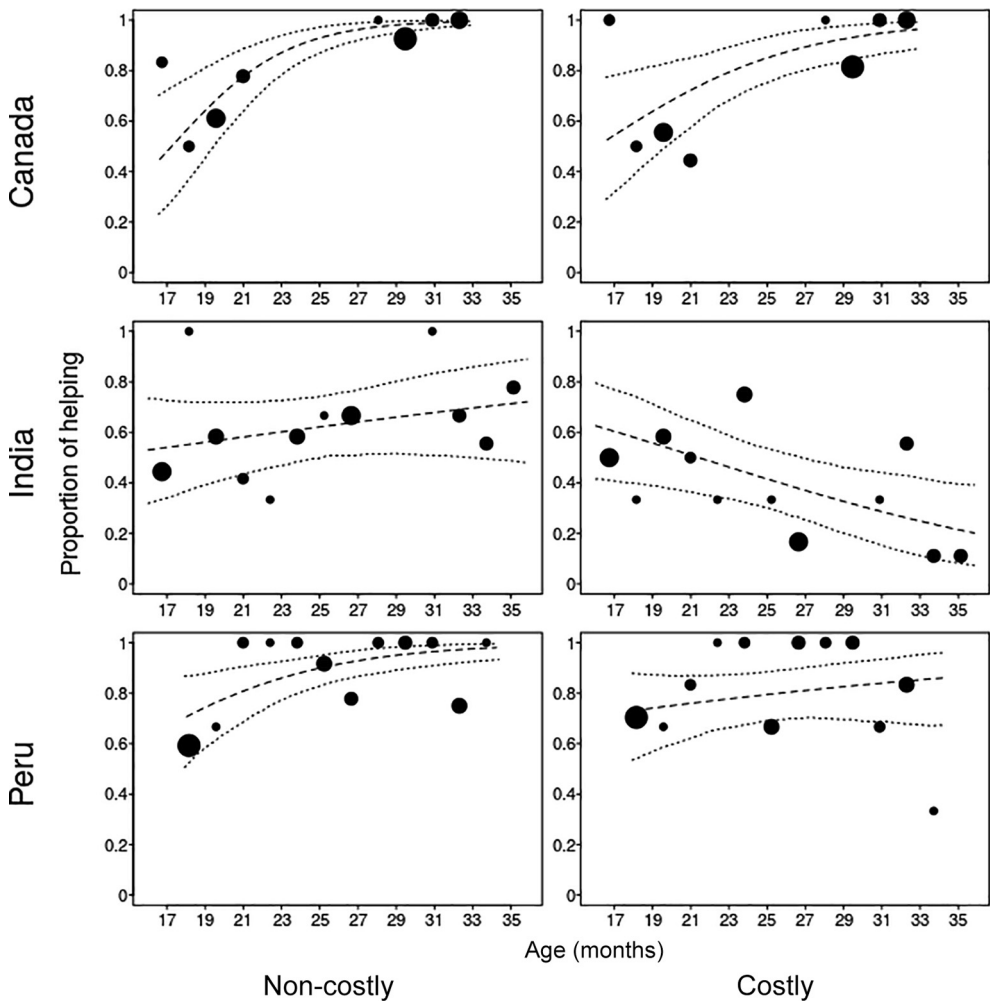


Fig. 1. Proportion of helping (out of 3 trials) as a function of age, plotted separately for each society and condition. Shown are the observed proportions per age and the fitted model (dashed line) with its confidence intervals (dotted lines). The size of the points in this graph depicts the number of children in each of nine age bins.

Table 2

Results for the final model predicting number of cues required to elicit help on trials on which children helped.

Term	Estimate	SE	Lower CI	Upper CI	χ^2	df	p
Society: India	-0.881	0.241	-1.450	-0.318			
Society: Peru	0.082	0.219	-0.324	0.588			
Condition: Non-costly	0.239	0.171	-0.002	0.531			
Age	0.441	0.144	0.155	0.839			
Sex: Male	0.348	0.155	0.030	0.722	5.114	1	.024
Order	0.396	0.104	0.184	0.628	13.184	1	<.001
Trial: Cup	0.061	0.123	-0.204	0.315	8.529	2	.014
Trial: Scarf/Fan	-0.287	0.128	-0.573	0.007			
Society: India \times Condition: Non-costly	0.572	0.270	-0.013	1.242	7.237	2	.027
Society: Peru \times Condition: Non-costly	-0.115	0.239	-0.552	0.288			
Society: India \times Age	-0.709	0.184	-1.230	-0.312	14.477	2	.001

Note. CI, confidence interval.

($\chi^2 = 5.96$, $df = 1$, $p = .015$). See Table 2 for the final model excluding nonsignificant interaction terms. Fig. 2 presents the findings from the survival analysis. The proportion of children who helped after each cue (1–7) is represented by the area of the pie symbols (black = helped, white = did not help), with crosses indicating the cue for which 50% of children helped across societies and conditions. Inspection of the lines fitted from the model and applied to each society and condition indicates that the number of cues needed before helping occurred decreased with age in the Canadian sample and remained stable in the Peruvian sample for both conditions. In the Indian sample, the number of cues needed to help remained stable across age in the Non-costly condition but increased with age in the Costly condition. Once again, excluding trials where helping did not occur until after Question 7 did not alter these results (see Section 4.2.4 in SOM).

Discussion

Children across three societies were found to have different developmental patterns of costly helping. Across all three societies, the level of non-costly helping was found to increase with age. As predicted, societal differences in the emergence of costly helping were observed. Specifically, within the societies we examined, costly helping was found to increase with age in the Canadian sample, remain stable across age in Peru, and decrease with age in India. These societal patterns were mirrored in the survival analysis of the number of cues required for children to help. Less cueing was needed across age in both conditions in Canada, the number of cues required was stable across age and condition in Peru, and more cueing was needed across age in the Costly condition in India.

Overall, our finding that non-costly helping emerged early in development and increased over age across all societies is consistent with a growing body of evidence showing synchrony in the development of non-costly helping across diverse cultural contexts (Callaghan & Corbit, 2018; Callaghan et al., 2011; Kärtner et al., 2010; Köster, Cavalcante, et al., 2016). In this first cross-societal examination of costly helping, we found that age-related trends varied across societies. Visual inspection of Figs. 1 and 2 reveals an age-related increase in the cost of helping in India (i.e., lower helping and more cueing in the Costly condition vs. the Non-costly condition) that is not observed in the other two societies. The developmental trends associated with costly and non-costly helping reported here suggest that whereas children show common trends across societies in the emergence of a prosocial motivation to help others achieve an internal state need, the introduction of cost (giving up an owned item) necessitates an altruistic response that is subject to the influence of children's early sociocultural environments.

The influence of ownership and abundance of resources

Our secondary hypotheses centered on the prediction that systematic variability in children's experience with ownership and abundance of resources across the societies we examined would predict

the development of costly helping. Prior research in Western societies has found that toddlers begin to understand ownership at the end of the second year of life (Blake et al., 2012; Blake & Harris, 2009; Fasig, 2000; Friedman & Neary, 2008; Hay, 2006; Ross et al., 2015). Several other studies conducted in Western societies have shown that the relative abundance of available resources influences the relative cost of giving resources to others and that children are more willing to give resources under conditions of abundance (Brownell et al., 2013; Hay et al., 1991; Paulus et al., 2013). Svetlova et al. (2010) argued that toddlers' growing understanding of ownership may contribute to an observed age-related decrease in costly sharing. Importantly, these studies left open the question explored in the current study of how ownership experience and abundance of resource may influence costly helping across societies where these factors vary naturally as part of children's sociocultural niche. As we argued above, natural occurrence of diversity in factors reported to influence helping provides a valuable test of the conclusions made in previous research.

The developmental trends across the three societies examined here converge with previous findings to support the inference of a relation between ownership experience and abundance of resources on the development of costly helping. Children from the society in India where we conducted this research presented an excellent test case for the influence of ownership experience in the current study; only 60% of Indian mothers reported that their children experienced ownership. Furthermore, Indian mothers reported that children in their community did not typically own things until the third year of life (i.e., after 24 months), at which time they own very few items (1.5 on average). The only case where helping decreased with age was in the Costly condition for Indian children, suggesting that as ownership experience emerged with age, the cost of helping with owned items increased. However, helping in the Costly condition was diminished only for older children in the Indian society and not for Peruvian and Canadian children, who had experience with ownership throughout the age range sampled here. These findings suggest that abundance of resources typically owned by children is another important factor that influences the cost of helping; here, abundance in these societies ranged from an extremely low level (1.5) in India, to moderate (5) in Peru, to extremely high (>50) in Canada. In the context of extremely low abundance (i.e., little or no possessions), older Indian children helped less in the Costly condition compared with the Non-costly condition. In the context of moderate abundance (i.e., owned 5 items on average), Peruvian children had similar helping levels across the Costly and Non-costly conditions and age. In the context of highly abundant possessions (i.e., owned > 50 items on average), Canadian children had similar helping levels across Costly and Non-costly conditions, which increased with age. Although the discrepancy in abundance is quantitatively small between India and Peru (1.5 vs. 5 on average), the finding that costly helping decreased with age in India suggests that even this relatively small quantitative difference may reflect a qualitatively distinct level of abundance in the Peruvian society relative to India.

This pattern of findings supports the hypothesis that once children experience and begin to understand ownership, the cost of giving resources in their possession shifts (Rochat, 2014; Svetlova et al., 2010). The cost of giving their possessions to help another person is high when children have few possessions (e.g., our Indian sample) and low when children have abundant possessions (e.g., our Canadian sample). Our interpretation of the different patterns of helping across societies reported here converges with previous findings that children tend to be more willing to give when resources are abundant (Brownell et al., 2013; Hay et al., 1991; Paulus et al., 2013) and when resources are of lower value (Blake & Rand, 2010).

The influence of parental socialization

A second component of children's early sociocultural niche that may contribute to the differences we report across societies is that parental socialization goals relevant to helping others may differ across societies, and factors associated with these goals (e.g., parent socialization practices, societal norms regarding gifts and whether children would give their belongings to another person) may influence children's costly helping. Previous research measuring early instrumental helping in these three societies found similar levels of helping and similar developmental trajectories in spite of differences in parental goals and practices relevant to socializing helping in children that were measured at the community level (Callaghan et al., 2011). A study by Kärtner et al. (2010) specifically explored the

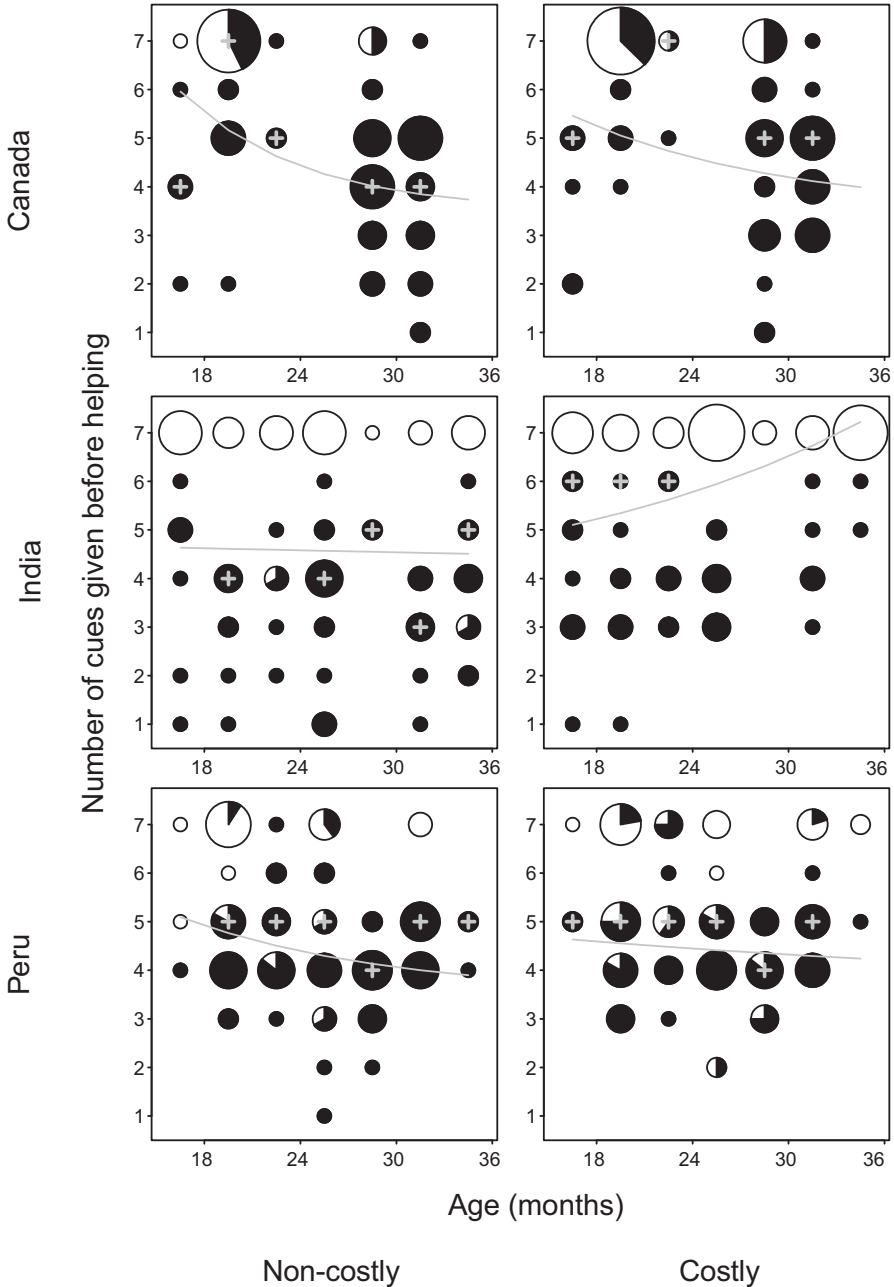


Fig. 2. Number of cues (out of 7) needed to help as a function of age, plotted separately for each combination of society and condition. Pies show the proportions of children who helped (black portion) within the age bin after a given cue and who terminated the trial without helping (white portion). The area of the pies within each column is proportional to the number of children for whom the trial ended with a given cue and is plotted across eight age bins. Gray crosses depict the cue after which 50% of the children within that age bin had helped (cumulatively). Gray lines represent the fitted model of the survival analysis indicating change over age in the number of cues needed before the helping response occurred.

relation between parental socialization goals and children's prosocial behavior in India and Germany at the individual level, reporting a correlation between children's prosociality and one of three scales (i.e., obedience) measuring socialization goals (interestingly, there was no correlation between children's prosocial behavior and parents' prosocial socialization goals). In a more recent study, Köster, Cavalcante, et al. (2016) assessed toddlers' helping behaviors and mothers' socialization practices in three societal contexts (rural Brazil, urban Brazil, and urban Germany). Although the level of helping was similar across these groups, there were differences in socialization goals and practices across these societies (i.e., both urban and rural Brazilian mothers assertively fostered compliance, and German mothers scaffolded prosocial behavior with requests and negotiation). Taken together, these findings suggest that similar developmental outcomes can occur through divergent socialization pathways. However, these studies did not investigate the influence of cost on helping and, thus, cannot be directly applied to account for the differences across societies in costly helping observed in the current study.

Parental questionnaires from the current study provided general information about prosocial values and parental socialization practices across societies (see Section 2.2 and Table 2.1 in SOM). In the Indian society, mothers believed that their children needed to be explicitly told/taught to share, usually by a parent. Mothers in India reported that once their children were taught, the children would mostly share without being asked. In the Peruvian and Canadian societies, mothers believed that children sometimes needed to be told to share and that children learned through a combination of explicit teaching and observation of parents or extended family members. Responses indicated that although sharing was valued across all societies, different socialization practices were highlighted. Indian mothers reported adopting a more authoritarian style to ensure that their children share, and Peruvian and Canadian mothers reported a variety of techniques more representative of an authoritative style.

Limitations and future directions

An important limitation to research that compares developmental outcomes of a target behavior across societies that vary according to theoretically relevant factors that are hypothesized to contribute to a specific developmental outcome is that such evidence is correlational in nature. Thus, in such natural "experiments," it is not possible to control for the influence of other potentially important factors that may also vary across the societies but were not assessed. In the current study, the evidence we provide is consistent with the hypothesis that ownership experience and abundance of children's resources contribute to the development of costly helping. Although this interpretation converges with related findings from Western societies as noted above, it is important to acknowledge gaps in the evidence that need to be addressed in future research.

Although findings from the parental questionnaire allowed us to obtain a general sense of the levels of ownership that children experience in these societies and of parental beliefs about prosociality, they did not allow for a deeper exploration of the link between ownership experience and costly helping. Due to a lack of power in the questionnaire data, especially with only a third of Canadian mothers responding, it was not possible to adopt an individual differences approach to analyzing the impact of value of resources (as affected by ownership and abundance experience) on helping. However, future research could address this important relation in two ways: by developing a measure of the value of belongings used in helping tasks relative to belongings already owned and by manipulating the value of belongings within the study. In addition, sampling different groups within societies that vary across a wide range of abundance of possessions and closely tracking the number of possessions owned by participants would afford researchers the opportunity to adopt an individual differences approach to investigating the impact of ownership and abundance factors. Finally, a longitudinal approach may provide greater insight into the relation between the emergence of ownership understanding and costly helping. Together, these approaches could offer additional convergent evidence for the relation among ownership experience, abundance of resources, and costly helping that we propose in the current study.

We propose that the current findings and the potential for ownership experience and abundance of resources to affect costly helping have implications for our understanding of children's altruistic responding more broadly. Whether measuring altruism by eliciting helping by giving or sharing

owned resources, researchers need to consider ownership experience as a potential mediating factor in the levels and patterns of children's altruistic responses, especially when finding diversity in ownership experience across societies.

Conclusion

The current study contributes important new evidence to an emerging picture of early prosocial development. We found convergent evidence for an emergent theme of synchrony across societies in the emergence of non-costly prosocial behavior and societal variation in the emergence of costly prosocial behavior (Callaghan & Corbit, 2018; Callaghan et al., 2011; House et al., 2013). Costly helping increased with age in the Canadian society sampled here, remained stable across age in Peru, and showed a marked decrease with age in India. We contend that the variation observed across these societies provides convergent evidence for a relation between early experience of ownership and abundance of resources and costly helping while acknowledging that additional evidence of this relation is needed before a causal developmental pathway can be firmly established. Our findings highlight the value of cross-societal comparisons as a promising gateway to deeper understanding of the development of human altruism.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jecp.2020.104841>.

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