Give some, keep some, put some: The language of sharing in children

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A R T I C L E   I N F O

A B S T R A C T

Sensitivity to linguistic cues, in theory, can change the interpretation of social and game theoretical behavior. We tested this in a pair of experiments with children aged 4 and 5 years. Children were asked to *give some, keep some,* or *put some* stickers for themselves or for another player (a puppet) after collaborative activities. We found that the direction of the verb did influence how selfish the younger children were. We also had children tidy up the toys after each activity to determine their interpretation of *some*. Children could derive the pragmatic scalar implicature linked to *some* (i.e., interpreting it as meaning *not all*), and they did so particularly when it affected them personally. These findings have important implications for the stability of other-regarding preferences and the importance of instructions in games.

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Introduction

Sharing and communicating are essential components of human sociality. Sharing is a costly activity that plays a key role in social relations (Hill, 2002), and effective communication requires cooper-

ation (Grice, 1975, 1989). How sharing develops in childhood is an area of active investigation that will inform our understanding of other-regarding (social) preferences in adults. Furthermore, during early development, children's understanding of language, notably their proficiency with pragmatic inferences, is maturing. By looking at the interplay between prosociality (sharing) and inferences about linguistic interpretations, we will better understand the development of human sociality.

Contextual sensitivity can influence the social decisions people make; framing effects have an effect on behavioral economics and decision making more generally (e.g., Camerer, 2003). Linguistic cues such as how games are described (e.g., calling a prisoner's dilemma a community game) can influence how much people cooperate (Ellingsen et al., 2012). In addition, how the action is labeled could—theoretically at least—influence the choices people make. To date, there has been only one test of the effect of labeling the action; Dreber and colleagues (2013) found that the action label had no influence on how much money adults shared with recipients. Yet, attention to labels is considered to be important. For instance, studies sometimes use neutral words, such as *transfer* and *access,* rather than directional verbs, such as *give* and *take,* based on the intuition that these directional verbs would influence the outcomes (Chowdhury et al., 2014).

There has been a great deal of recent interest in sharing in children (e.g., Blake et al., 2015; Fehr et al., 2008; Gummerum et al., 2008). This research has important implications for understanding how social preferences in adults develop; children are still learning the norms of their societies and are likely to be more sensitive to how tasks are framed. Yet studies of children—who are highly sensitive to linguistic frames—have not paid attention to this detail. Some studies used both verbs; for example, McAuliffe et al. (2017) told children they could *keep* the candies they were given or *give* them to an imaginary partner, but the emphasis in the instructions was on giving. Others, such as Blake and colleagues (2015), used only the verb *give.* Still others used the potentially more normative verb *share,* which might implicitly prime equitable distributions (Moore, 2009; Smith et al., 2013). Finally, some studies—particularly those that use apparatuses allowing binary choices—used neutral verbs such as *choose* (e.g., Fehr et al., 2008) that would minimize normative expectations.

In addition, given the relevance of giving up and acquiring desired rewards, children might be especially sensitive to the valence of particular verbal frames. In a Gricean account of pragmatic reasoning (Grice, 1975, 1989), a conversational implicature refers to the inferred implicit meaning of the utterance. Of particular relevance to fairness considerations of sharing is the scalar implicature linked to the quantifier *some.* This term can have two interpretations: a literal one and a pragmatic one. The literal meaning is *at least one,* which is compatible with *all.* However, according to Grice's maxim of quantity, a speaker is unlikely to say *some* when they know *all* to be true. In other words, when asking for *some,* a speaker is unlikely to intend *all* when he or she could simply unambiguously use the latter. Adults typically interpret *some* to mean *not all* in such contexts, but children as old as 10 years are less likely to derive the implicature from *some* to *not all* (Huang & Snedeker, 2009; Noveck, 2001; Papafragou & Musolino, 2003). In all of these studies, scalar implicatures were abstract in the sense that the children had no personal stake in their interpretation. However, they might be more likely to interpret *some* pragmatically when doing so would influence how much of a reward they can have. This has implications for studies on sharing given that the term is widely used when asking children to share or give something away (Benenson et al., 2007; Chernyak & Kushnir, 2013; Paulus et al., 2013).

In this study, we presented children with a sharing task as part of a collaborative activity. We used a collaborative task to elicit more sharing than in a standard windfall dictator game because each player would be equally deserving (Hamann et al., 2011; Kanngiesser & Warneken, 2012; Warneken et al., 2011). (In a windfall dictator game, participants are given money—the windfall—rather than needing to earn it, for instance.) That is, children would feel that they "earned" the rewards while collaborating. However, in our experiments the number of stickers was fixed and not linked to actual effort. Therefore, we expected more equitable sharing. We tested children aged 4 and 5 years, a period when selfishness begins to give way to equal sharing (Benenson et al., 2007; Blake & Rand, 2010; Fehr et al., 2008; Rochat et al., 2009; Thompson et al., 1997). This is also the period when children can first be found to interpret the scalar *some* pragmatically as excluding *all* (Katsos & Bishop, 2011; Pouscoulous et al., 2007).

Children were presented with a request to either *give some* of the rewards to a puppet or *keep some* of them. We predicted that all children would be more generous when asked to *give some,* because the

direction of the action is toward the recipient, and would be more selfish when asked to *keep some,* because the children would be the recipient. As a benchmark for sharing, we compared amounts shared against parity (50:50 divisions). Younger children were expected to be more selfish than older children (e.g., Thompson et al., 1997). In a second experiment, we predicted that removing the directionality of the verb would reduce differences in amounts shared; that is, by using the neutral verb *put,* as in *put some in your box* versus *put some in another individual's box,* children would not be primed to depart from norms of parity. Furthermore, we predicted that in the sharing context, where children's decisions affected them personally (i.e., when they stood to lose or gain a resource), all children would be more sensitive to the scalar implicature linked to *some* and would interpret it pragmatically more often than when the implicature had no consequences for them.

Experiment 1

Method

Children worked together with a puppet in various joint activities (see online supplementary material [SOM]). Once the activity was completed, children were given an even number of stickers (6) that they could share with the puppet. In three test trials they were told that they could *give some* of the stickers to the puppet, and in three test trials they were told that they could *keep some* of the stickers for themselves. After each test trial, there was a tidy-up task in which the children were asked to *put some* or *put all* of the toys away. Two experimenters (E1, the moderator, and E2, controlling the puppet) ran the study.[1]

Participants

Sample size was specified based on the pilot data (see SOM) and was consistent with other social decision making in children (e.g., Gummerum et al., 2010). We ran a power analysis in G*Power 3.1 (Faul et al., 2009), which indicated that we would need a sample size of 20 children per age group to have >80% power to detect a main effect of a difference between the *give some* and *keep some* conditions (two-tailed, α = .05, medium to large effect size d > 0.65). We tested 20 4-year-olds (mean age = 4;3 [years;months], range = 3;10–4;9; 9 boys) and 20 5-year-olds (mean age = 5;4, range = 4; 10–5;9; 10 boys). All were monolingual English-speaking children without any language and speech impairments or special educational needs. An additional 3 children were tested but excluded from analyses due to lack of understanding the procedure during familiarization or lack of interest in the rewards. Children were tested in a single school in a large city in the UK (|Manchester). Participants' parents provided informed consent, and the study was approved by the the University of Manchester Research Ethics Committee (#13301).

Materials

Materials were a giraffe hand puppet (named Alex) and six different building and counting toys: wooden building blocks, a memory game with matching pairs of round cards, a threading beads game, stacking rings, stacking cups, and a counting rocket (a peg with numbered stacking rings). Rewards were colorful stickers. Metal tins were used to keep the stickers until the end of the game, with one tin for the puppet and the other for the children. Children were given six stickers per trial. The tidy-up task included a yellow box and a blue box, with corresponding yellow and blue bags (see SOM Fig. 1).

Procedure

Before testing, children were given three familiarization trials to introduce the tidy-up task. They were given an activity where they would decorate the envelopes in which they would put their stickers at the end of the experiment. After decorating the envelopes, E1 would ask the children to put one

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[1] A pilot study was run, and several changes were made to the procedure before running Experiment 1 (details in the online supplementary material).

of two types of envelopes (white or brown) into one of the two tidy-up boxes (yellow or blue). The same was done for short and long crayons and small or large stamps. For details, see the SOM. If needed, E1 corrected the children. When children had correctly distributed the materials between the two boxes, E1 asked the puppet to transfer the objects from the yellow/blue box on the table into the corresponding yellow/blue bag to emphasize the distinction between the two tidy-up boxes and to make the children feel that the distinction was relevant. These tidy-up familiarizations served as a general check for the children's language comprehension. Two children who, despite being corrected, failed to put objects into the correct boxes on more than one of three trials were excluded from the analyses.

In the test, children were given both *give some* and *keep some* conditions, with order counterbalanced between participants. They were given six test trials blocked for condition (either three *keep some* followed by three *give some* or vice versa). Each trial consisted of a different activity done jointly with a puppet operated by E2. Children were told that they would play games in collaboration with the puppet, who really likes stickers, and that upon completion of each game they would get stickers that they could take home in their decorated envelope. The sticker boxes were introduced and placed in front of the children and the puppet at roughly equal distances. E1 would then explain the first game to the children and the puppet. During the games, E2 would speed up or slow down the puppet's contribution to ensure equal involvement. Order of presentation of the games was randomized for each child. To make sure that the children heard the phrase, the verbs were repeated: "Keep some of the stickers for yourself. Can you keep some of the stickers for yourself?" and "Give some of the stickers to Alex. Can you give some of the stickers to Alex?" If children did not do anything with the stickers after a long pause, they were prompted by first asking them "What would you like to do with the stickers that are still on the table?", then "You can decide who gets the stickers that are still on the table. Can you decide who gets the stickers?", and finally "Who do these stickers go to? Go ahead." Care was taken to never use the words *give, take,* or *some* outside of the test context, and the word *share* was never used. The script is available in the SOM. The dependent variables were how many stickers the children then gave to the puppet and to themselves and the proportion of trials in which they kept all of the stickers for themselves. To minimize any possible reputation effects and to maintain anonymous choices as far as possible during the test (e.g., Engelmann et al., 2012) sticker distributions were surreptitiously observed by both experimenters, who pretended to be distracted. It is important to note that the observations were done discretely (experimenters did not look directly at the children when they made their choices, and E1 announced the number of stickers discretely).

Following each joint activity, children were given tidy-up trials to determine their understanding of the quantifiers, *some* and *all,* and whether they interpreted *some* as compatible with *all* (literal reading) or exclusive of *all* (pragmatic reading with a scalar implicature). After the joint activity with the puppet, six of the items (matching the number of stickers) were left on the table with two boxes (yellow and blue) to put them in. Children were then asked by E2, "Can you put some of the pieces in the yellow/blue [tidy-up] box?" or "Can you put all of the pieces in the yellow/blue [tidy-up] box?" The color of the box the children were supposed to use was randomized across trials (three trials for each color), and the *some/all* terms were also presented randomly, with three of each. If children had put pieces into one box and there were still pieces on the table, E1 told them to put these pieces in the other box. Next, E1 asked the puppet to finish tidying up by putting the things in the boxes into their corresponding bags, mirroring the puppet's actions during familiarization. The dependent variables were how many objects they put in the target box and whether or not they put in all objects.

Data coding and analysis

Coding was done live by the experimenters. To avoid ethical issues around video-recording in schools, we did not record any of the test trials. For the test, inter-observer reliability was determined online by both experimenters. Both E1 and E2 observed each trial. E1 would verbally announce the number of stickers the children gave to the puppet (*give some*/*keep some* trials) and the number of blocks put in the designated box (*put some*/*put all* tidy-up trials). E2 would record the results if this agreed with her own observations. If there was a disagreement, E2 would inform E1 nonverbally (via eye contact and gentle head movements) and they would double-check the distribution of stickers or blocks before E2 would record the correct result. There were no instances of disagreement. Further-

more, one of the principal investigators was present for approximately 15% of the sessions to supervise the student researchers and independently record data online. Agreement was again perfect.

To model children's behavior in the trials and capture how condition interacts with age to determine behavior, we estimated a generalized linear model (GLM) in Stata (Version 15) for each of the six outcomes of interest. To account for persistent behavior over time, clustered standard errors were calculated at the individual level. To take into account small sample distortions in our tests, *p* values were calculated using a wild-score bootstrap method for clustered data (Kline & Santos, 2012). Effect sizes were computed using Cohen's f^2 based on the GLM deviance (Pierce & Schafer, 1986). Following Cohen (1988), we interpret values of the *f*-square as small (f_x^2 = .10), medium (f_x^2 = .25), or large ($f_x^2 \geq$ .40). The full set of results and a more detailed description of the statistical methods are provided in the SOM. Wilcoxon tests were used for the comparisons against parity. For all tests, significance was set at .05 and was two-tailed.

Data archiving

Data and statistical models are available online (https://figshare.com/s/946a2e7728690c91f41c).

Results

There was no effect of gender, order of condition, or trial order on any of the outcomes (see SOM Table 1). There was an overall trend for number of stickers shared by age category (*Coef* = −0.251, *SD* = 0.145, *p* = .080, Cohen's *f* = 0.012), indicating that, overall, 5-year-olds tended to give away fewer stickers than 4-year-olds. Importantly, condition (*Coef* = −1.556, *SD* = 0.323, *p* < .001, Cohen's *f* = 0.400) and age group by condition (*Coef* = 1.368, *SD* = 0.335, *p* < .001, Cohen's *f* = 0.158) were highly significant. The 4-year-olds gave significantly fewer stickers to the puppet when asked to *keep some* than when asked to *give some.* This was not the case for 5-year-olds. See Fig. 1A and SOM Table 1 (column 1).

To determine whether children showed a preference for parity, namely for an equal split of the stickers, we looked at whether the number of items differed from 50% in the *some* conditions. There was a significant difference from parity for 4-year-olds when asked to *keep some* (*N* = 20, 1 tie, *z* = −3.774, *p* < .001, *r* = .844), but not when asked to *give some* (*N* = 20, 5 ties, *p* = .089, *z* = −1.408, *r* = .315), indicating that the younger children shared equally in the latter but not in the former. The 5-year-olds shared equally in both the *give some* condition (*N* = 20, 15 ties, *z* = −0.272, *p* = .938, *r* = .061) and the *keep some* condition (*N* = 20, 12 ties, *z* = −1.701, *p* = .102, *r* = .380). In the tidy-up trials, 5-year-olds followed the principle of equal divisions as well: they put half of the toys away in the *put some* trials (*N* = 20, 7 ties, *p* = .190, *z* = −1.328, *r* = .297), whereas 4-year-olds put more than half of the toys away (*N* = 20, 5 ties, *p* = .007, *z* = −2.575, *r* = .576).

Sharing had an effect on the interpretation of the scalar implicature. There was an effect of age in the *keep some* condition (*Coef* = −2.772, *SD* = 1.084, *p* = .001, Cohen's *f* = 0.158; see SOM Table 1, column 2). The 4-year-olds kept all of the stickers for themselves when asked to *keep some* in 47% of trials, whereas the 5-year-olds rarely did (5% of the time). There were not enough observations to run a GLM for all stickers given when asked to *give some;* the 4-year-olds gave away all of them when asked to *give some* 10% of the time, and the 5-year-olds never did. The reverse, namely giving all when asked to *keep some* and keeping all when asked to *give some,* never occurred in either group of children.

When putting the toys away in a nonsocial tidy-up task, both 4- and 5-year-olds put more toys away when asked to *put all* of them away than when asked to *put some* of them away (*Coef* = 3.059, *SD* = 0.594, *p* < .001, Cohen's *f* = 1.146), and there was an interaction between age and condition (*Coef* = 16.052, *SD* = 0.647, *p* < .043, Cohen's *f* = 0.121), namely that 4-year-olds put more toys away when asked to *put some* of them away than did 5-year-olds (see SOM Table 2, column 1). Importantly, when it came to the interpretation of *some* and *all* in the tidy-up task, 4- and 5-year-olds did not differ in how often they put all of the toys away when asked to *put some* away (10% and 0%, respectively). There was an effect of condition; children of both ages put all of the toys away significantly more often when asked to *put all* away than when asked to *put some* away (*Coef* = 6.478, *SD* = 0.848, *p* < .001, Cohen's *f* = 2.720) (Fig. 1B and SOM Table 2, column 2). (There was a weak trend for gender, but
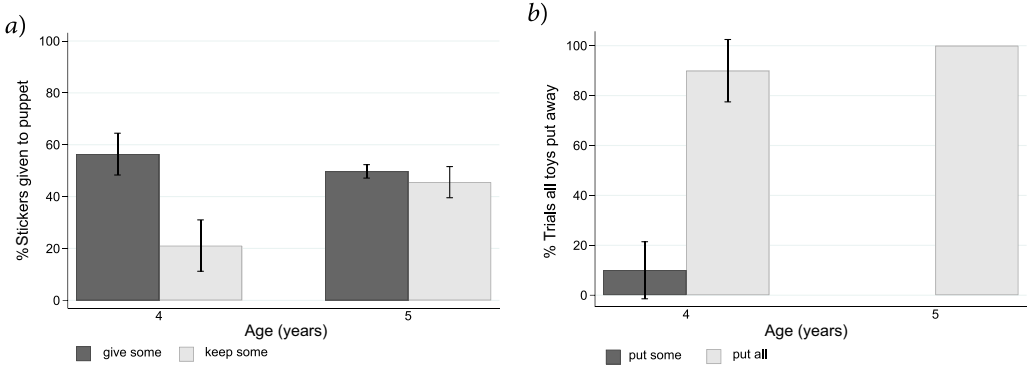
Fig. 1. Experiment 1. (A) Percentage of stickers given to a puppet when children aged 4 and 5 years were asked to *give some* (dark bars) or *keep some* (light bars). (B) Percentage of trials in which 4- and 5-year-olds put all of the toys away when asked to *put some* (dark bars) or *put all* (light bars) of them in the tidy-up box. Values shown are means ± 95% confidence intervals.

the effect was small and likely due to chance (*Coef* = −1.687, *SD* = 0.910, *p* = .092, Cohen's *f* = 0.069). Only 4 of the 4-year-olds put all of the toys away when asked to *put some* of them away in at least one trial, and 5-year-olds never did so.

In summary, the directional verb (*give/keep*) had an influence on sharing in 4-year-olds, whereas 5-year-olds adhered to the norm of parity. For the interpretation of the quantifier *some,* both groups of children typically used the scalar implicature reading; namely, they rarely put all of the toys away when asked to put some of them away. However, 4-year-olds used the literal interpretation of *some* when they would personally benefit from doing so.

Experiment 2

Method

To control for the directionality of the verb in a sharing context, Experiment 2 presented children with a neutral verb, *put,* with the scalar *some.* Children were asked to *put some* of the stickers in their own box or a recipient's box. The prediction was that the neutral verb would not have an effect on sharing. The tidy-up task used the *put some* instructions as in Experiment 1.

Participants

We tested English monolingual children without any language delay or special education needs: 20 4-year-olds (mean age = 4;2, range = 3;9–4;8; 8 boys) and 20 5-year-olds (mean age = 5;3, range = 4;9–5;9; 10 boys). An additional 4-year-old was tested but excluded from analyses due to poor performance during familiarization. Children were from the same school as in Experiment 1, but none of the individuals tested had participated in the first experiment.

Materials
Materials were the same as in Experiment 1.

Procedure
The procedure was nearly identical to that in Experiment 1, with the only change being the verb. Children were asked to *put some* stickers in either their own sticker box or the puppet's sticker box in a blocked design with three trials of each. The exact wording was as follows: "I would like you to put some of the stickers in your box. Can you put some of the stickers in your box?" and "I would like you to put some of the stickers in Alex's box. Can you put some of the stickers in Alex's box?" If children did not do anything, they were then prompted with "What would you like to do with the stickers

that are still on the table?", then "You can decide where these stickers go. Can you decide where the stickers go?", and finally "Can you put the stickers that are still on the table in the box that you want them to go in? You can put them there."

Data coding and analysis

Data were collected as in Experiment 1, and statistics were used as before.

Results

There were no gender differences or order effects (for condition or trial); therefore, pooled results are presented. There was no significant age difference in how many stickers were shared by 4- and 5-year-olds (*Coef* = 0.175, *SD* = 0.135, *p* = .215, Cohen's *f* = 0.007). There was a minor effect for condition, namely that there was a trend toward more stickers being given to the puppet when children were asked to put some of the stickers in the puppet's box and more stickers being kept for themselves when they were asked to put some of them in their own box (*Coef* = −0.303, *SD* = 0.152, *p* = .059, Cohen's *f* = 0.020). However, this was a weak effect, and there was no interaction with condition and age (*Coef* = −0.282, *SD* = 0.290, *p* = .343, Cohen's *f* = 0.009) (Fig. 2A and SOM Table 3, column 1).

Looking at whether sticker distributions were equal, there was a nonsignificant tendency for both 4- and 5-year-olds to put more than half of the stickers in their own box in the *put some self* condition (4-year-olds: *N* = 20, 13 ties, *z* = −1.863, *p* = .078, *r* = .417; 5-year-olds: *N* = 20, 15 ties, *z* = −2.060, *p* = .063, *r* = .461), but there was no significant difference for *put some puppet* (4-year-olds: *N* = 20, 13 ties, *z* = 0, *p* = 1.000, *r* = 0; 5-year-olds: *N* = 20, 14 ties, *z* = −1.687, *p* = .125, *r* = .377). When tidying up, children of both age groups put more than half of the toys away when asked to put *some* away (4-year-olds: *N* = 20, 4 ties, *z* = 2.641, *p* = .005, *r* = .591; 5-year-olds: *N* = 20, 9 ties, *z* = 2.971, *p* = .001, *r* = .664).

Thus, sharing did not have a significant effect on the interpretation of *some* when used with the directionally neutral verb *put*. There was no effect of age between the *put some self* and *put some other* conditions (*Coef* = 1.734, *SD* = 1.171, *p* = .149, Cohen's *f* = 0.069) (see SOM Table 3, column 2). However, it is interesting to note that in the *put some self* condition, 4-year-olds kept all of the stickers for themselves in 8% of the trials and 5-year-olds did so 18% of the time. There were not enough observations to run a GLM for all stickers given in the *put some other* condition. In the *put some other* condition, 4-year-olds gave all of the stickers to the puppet once in 60 trials, and 5-year-olds did so 8% of the time. Giving all in the *put some self* condition and keeping all in the *put some other* condition never occurred in either age group.
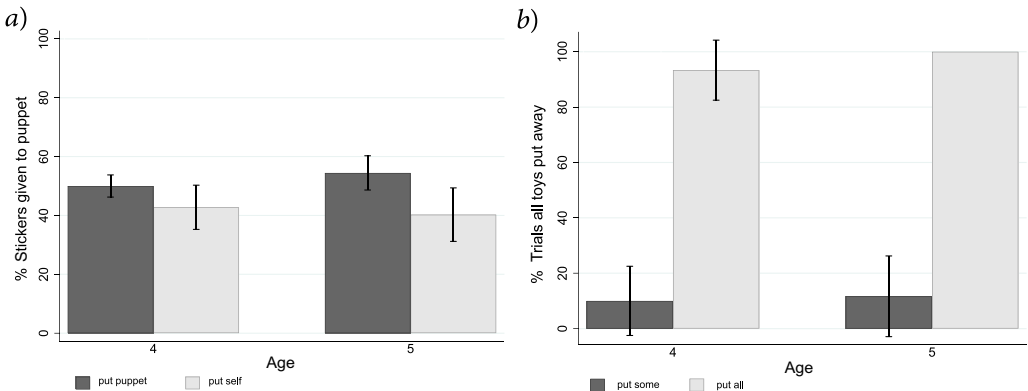

Fig. 2. Experiment 2. (A) Percentage of stickers given to a puppet when children aged 4 and 5 years were asked to *put some* of the stickers in the puppet's bag (dark bars) or *put some* of the stickers in their own bag (light bars). (B) Percentage of trials in which 4- and 5-year-olds put all of the toys away when asked to *put some* (dark bars) or *put all* (light bars) of them in the tidy-up box. Values shown are means ± 95% confidence intervals.

In the tidy-up trials, both 4- and 5-year-olds put more toys away when asked to *put all* of them away than when asked to *put some* of them away (*Coef* = 2.848, *SD* = 0.795, *p* < .001, Cohen's *f* = 0.803). There was no difference between the older and younger children (*Coef* = 0.021, *SD* = 0.202, *p* = .922, Cohen's *f* = 0), and there was no interaction between age and condition (*Coef* = 15.966, *SD* = 0.838, *p* = .135, Cohen's *f* = 0.091) (see SOM Table 4, column 1). Looking at how children interpreted the scalar implicature, they put all of the toys away in more trials when asked to *put all* of them away than when they were asked to *put some* of them away (*Coef* = 5.595, *SD* = 0.831, *p* < .001, Cohen's *f* = 1.869) (Fig. 2B and SOM Table 4, column 2). Most (*n* = 18) of the 4-year-olds and all of the 5-year-olds always put all of the toys away in the *put all* trials, whereas 3 of the 4-year-olds and as many of the 5-year-olds put all of the toys away in at least one of the *put some* trials.

In summary, Experiment 2 showed that a neutral verb, *put,* had no influence on how many stickers 4-year-olds shared with a puppet or on their interpretation of *some* in either the sharing or tidying context.

General discussion

We showed that preschool children are sensitive to labels in a resource division task and that the act of sharing influences the interpretation of scalar expressions. The 4-year-olds, and to a lesser extent the 5-year-olds, were primed by the verbs *give* and *keep,* with the latter leading to less sharing. It is worth noting that asking children to *give some* stickers did not lead to generosity; they did not reliably give more than half of their stickers away. Asking children to *keep some* of them, however, prompted them to behave more selfishly. The motivation to keep stickers is strong, at least in Western populations (Blake et al., 2016). When a neutral verb, *put,* was used, children did not differ from parity in their sticker distributions, supporting the importance of a directional verb on selfishness. The one study on adults that tested the effect of the label on dictator giving (Dreber et al., 2013) did not find an effect. It is quite likely that the norms of sharing are very firmly entrenched before adulthood, making adult other-regarding preferences to be less malleable to labeling. The fact that younger children were less generous than older children is consistent with other studies (Cowell et al., 2017; Lane & Coon, 1972; Rochat et al., 2009; Smith et al., 2013; Thompson et al., 1997; Wu & Su, 2014). Overall, children showed a preference for fair divisions, although younger children were more selfish when "licensed" to do so by the verb *keep.*

Regarding the effect of a sharing context on the interpretation of the scalar term *some,* the distributive task increased the relevance of the implied meaning *not all.* There were a few exceptions where children gave all of their stickers away when asked to *give some* of them to the puppet (10% of 4-year-olds but no 5-year-olds) or to *put some* in the puppet's box (1.5% of 4-year-olds and 8% of 5-year-olds). However, children were far more likely to interpret *some* as consistent with *all* when asked to *keep some* of them (47% of 4-year-olds and 5% of 5-year-olds in Experiment 1; 8% of 4-year-olds and 18% of 5-year-olds in Experiment 2). In a neutral task where there was no personal stake, children did distinguish between the quantifiers; that is, when tidying up, they would put all of the toys away when asked to *put all* of them away, but they would rarely do so when asked to *put some* of them away. Children comprehend and produce scalar terms from around 2 years of age (Eiteljoerge et al., 2018; Fenson et al., 1994). By the age of the children tested here, they have a good semantic grasp of the two quantifiers (although see Barner et al., 2009; Horowitz et al., 2018). Therefore, children are judicious in their interpretation of *some;* they use the literal interpretation compatible with *all* when there is no reason for paying particular attention to the term, but they use the literal or pragmatic interpretation as best suits their interests when there is something to be gained. Children as young as 4 years, then, are capable of deriving the scalar implicature associated with *some,* consistent with other work using age-appropriate act-out tasks (Katsos & Bishop, 2011; Pouscoulous et al., 2007). Besides explicit training (Papafragou & Musolino, 2003) and increasing the saliency of the alternative *all* (Skordos & Papafragou, 2016), the act of sharing rewards increases the relevance of the implicatures and better captures their abilities.

The liberal interpretation of *some* when asked to share might be due to the children ignoring the word completely. For instance, if the sound were masked so that it could not be recognized, children might still respond similarly. The effect we observed on the children's interpretation of *some* might not be limited solely to the directionality of the verbs *give* and *keep* but could result from the wider constructions in which these verbs are embedded: *Give some to …* and *Keep some for yourself.* There is a well-established approach in linguistic theory arguing that form–meaning mappings are learned for both individual words and wider constructions (Langacker, 1987; Goldberg, 1995). However, for the purposes of our studies, the distinction between the verbal and wider constructions still means that the directionality matters to the children's interpretation of *some.* Furthermore, children did distribute toys differently when asked to put *some* rather than *all* of them away, suggesting that they did attend to the quantifier in the absence of other cues. Similar implicatures linked to other quantifiers, such as *many* and *most* (for children's interpretation of *most,* see Halberda et al., 2008; Wellwood et al., 2012), might also be influenced by the use of the verbs *give* and *take,* and these could be investigated in future studies.

Whether children would give *all* of the stickers away when asked to do so (as opposed to keeping all of them, which we expect they would do without hesitation) remains an open question. Preschool children in a Western population are unlikely to be that generous in response to a subtle request. This pattern might be different in other cultures where adult authority is more important or in older children and adults where self-regarding preferences will have less of an influence over their choices than following conventional norms of sharing (Blake et al., 2016). For instance, even though adults have not yet been shown to be affected by the sharing frame (Dreber et al., 2013), it is still possible that they could be primed to share more or less by as simple a cue as the direction of the verb but that they might be inclined to share even more, rather than less, when asked to *keep* rather than *give* due to norms of politeness. In adults, politeness affects how people compute the scalar implicature linked to *some* (Bonnefon et al., 2009; Mazzarella et al., 2018), and this might also be the case for children. The influence of potentially more normatively laden terms such as *share* could be investigated. For instance, the verb *share* will primarily be used by parents in a context where children will be expected to divide something that they have, and in a resource division situation the norm will be sharing equally. *Give* and *take* are more generic verbs not linked strongly to parity. Although we know of no literature on this—and we think that this would be an interesting area for future work, namely a corpus analysis—our intuition is that *share* is more allied with equity than directional verbs.

This study explored how verbal cues influence sharing in a cooperative context. The cooperative context could be removed to make it a pure dictator game rather than a cooperative game. It would be particularly exciting in the future to examine how children would react in non-cooperative or even competitive situations. The investigation of utterance interpretation—and particularly scalar implicatures—in competitive contexts has recently started to be investigated in adults (Dulcinati, 2018; Franke et al., 2020). To the best of our knowledge, this has not yet been explored in the developmental literature.

The fact that children shared at all with a puppet is itself striking; to ensure the relevance of the sharing task, future work could have children interact with peers and adults. Interestingly, recent work suggests that using puppets does produce meaningful results. Rakoczy (2022) argued for the value of puppets in cognitive research. And Stengelin et al. (2023) showed that children treat puppets similarly with social-cognitive tasks such as helping while recognizing that peers and adults have more agency. Whether results differ among studies with puppets, peers, and adults (as well as live vs. imagined partners) in sharing tasks is still an important methodological question that bears further research.

Our experiments show that how games are framed does affect sharing in children and will contribute to our understanding of framing effects in general. Furthermore, we demonstrated that the relevance of a task improves children's pragmatic interpretation of scalar terms and that their interpretation of *some* might not uniquely depend on their semantic and pragmatic abilities but also on their social decision making. Linguistic cues are important for the interpretation of social actions such as sharing. Use of the verb *give* in sharing studies is likely to lead to higher levels of sharing than *keep* and may, as a result, lead to an overestimation of children's generosity. Overall, in the future it would be better for studies on sharing in children to use a neutral verb, *put,* to minimize this linguistic

influence. In summary, this work will help us to understand more about the development of other-regarding (social) preferences and will have practical implications for studies that rely on verbal instructions to prompt sharing.

CRediT authorship contribution statement

Keith Jensen: Conceptualization, Data curation, Investigation, Methodology, Project administration, Supervision, Validation, Writing – original draft, Writing – review & editing. **Lin Rouvroye:** Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Sarah Eiteljoerge:** Conceptualization, Formal analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. **Elena Lieven:** Conceptualization, Funding acquisition, Methodology, Supervision, Writing – original draft, Writing – review & editing. **Eduardo Fe:** Formal analysis, Writing – original draft, Writing – review & editing. **Nausicaa Pouscoulous:** Conceptualization, Investigation, Methodology, Project administration, Supervision, Validation, Writing – original draft, Writing – review & editing.

Data availability

Data will be made available on request.

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Appendix A. Supplementary material

Supplementary material to this article can be found online at https://doi.org/10.1016/j.jecp.2024.106066.

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