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Children's Developing Commitments to Joint Goals

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This study investigated young children's commitment to a joint goal by assessing whether peers in collaborative activities continue to collaborate until all received their rewards. Forty-eight 2.5- and 3.5-year-old children worked on an apparatus dyadically. One child got access to her reward early. For the partner to benefit as well, this child had to continue to collaborate even though there was no further reward available to her. The study found that 3.5-year-olds, but not 2.5-year-olds, eagerly assisted their unlucky partner. They did this less readily in a noncollaborative control condition. A second study confirmed that 2.5-year-old children understood the task structure. These results suggest that children begin to appreciate the normative dimensions of collaborative activities during the 3rd year of life.

Many of the most important activities in all human cultures are joint actions in which two or more individuals work together toward some mutual benefit. Such shared cooperative activities are underlain by skills and motivations of shared intentionality (e.g., Searle, 1995). Most fundamentally, the partners must establish the joint goal that they perform the action together, with mutual knowledge that they both have this joint goal (Bratman, 1992). Importantly, the joint goal is satisfied for one partner only if it is satisfied for the others as well. This requires that each partner be committed to seeing the activity through until the end, such that each gets her appropriate share of any resulting rewards or benefits (Tuomela, 2007).

Young children begin engaging in simple collaborative activities with one another typically in the period from around 18 to 24 months of age, becoming relatively skillful only by the end of this period (Eckerman & Peterman, 2001). For example, peers of this age can each operate one part of an apparatus to retrieve an otherwise inaccessible reward or to make a musical sound (Brownell & Carriger, 1990, 1991; Brownell, Ramani, & Zerwas, 2006). By 3 years of age, they are able to coordinate in more complex situations (Ashley & Tomasello, 1998). Whether children in these joint activities create with one another a joint goal, in the manner of adults, is still an open question, however. They may, but it is also possible that each is acting individually and simply reacting to the other's actions as needed. Following the lead of Ross and Lollis (1987), Warneken and colleagues (Warneken, Chen, & Tomasello, 2006; Warneken & Tomasello, 2007) approached this question by engaging 14- to 24-month-old children in a collaborative activity with an adult and then had the adult simply quit interacting. Children at all ages then quite often actively attempted to reengage the adult in the activity by, for example, handing her a relevant toy or pointing to the place on the apparatus where she should be acting.

One interpretation of this reengagement behavior is that children of this age do indeed form joint goals (at least with adults), and thus they expect their partner to play her role as she should. Another possibility may be that children this young simply know that the other is needed to complete the collaborative activity successfully; that is, they are primarily focused on their own outcome,

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thereby using the partner only as a ''social tool.'' In either case, neither of these possibilities answers the question of whether children are also concerned with *their own* commitment to the joint activity. The only study addressing this issue asked whether 3- and 4-year-old children excuse or acknowledge to their adult partner when they break off a joint game established by an explicit agreement to collaborate (Gräfenhain, Behne, Carpenter, & Tomasello, 2009). But explicit agreements to collaborate may not be common among child peers, and communicating to a partner concerning one's commitment is a very demanding measure (and may only occur with more powerful adult partners). To our knowledge, no study has attempted to measure commitments to joint goals in peer collaboration.

In this study, therefore, we attempted to assess 2.5- and 3.5-year-old children's understanding of one of the key aspects of collaborative activities: the mutual commitment to the joint goal by following through in one's own role (including any and all subgoals) until all partners have obtained their respective rewards or benefits (Tuomela, 2007, calls this the collectivity condition). We did this by designing a task in which two children collaborated, but then the reward for one became available before the reward for the other. For the second child to receive her benefit from the collaboration, the first child had to continue collaborating even after she had received her own benefit from the joint activity. Importantly, we compared children's behavior in this situation with a noncollaborative baseline in which the first child had the opportunity to help the second child obtain a reward in the same way but without any prior collaborative efforts. By comparing children's propensity to help the other both inside and outside the context of a collaborative activity, we aimed to assess the degree to which the collaborative activity engendered in the children a commitment to follow through until both partners received their respective rewards.

Experiment 1

Method

Participants

Participants were twelve 2-year-old dyads (seven male, mean age = 32 months, range = 31–34) and twelve 3-year-old dyads (six male, mean age = 44 months, range = 42–46). Five additional 2.5-year-olds and one 3.5-year-old dyads were excluded due to either shyness (n = 1), loss of motivation (n = 2), or experimenter error (n = 3). All children were native German speakers, recruited in urban day-care centers, and came from mixed socioeconomic backgrounds.

Materials and Design

The rewards were colorful, wooden toy blocks. Once gathered, children could use them to play with the ''jingle machine,'' which was a colorful box with a xylophone inside (from Warneken, Hare, Melis, Hanus, & Tomasello, 2007). When a toy block was thrown into the ''jingle machine,'' it produced a ringing sound and disappeared. The two jingle machines (one for each child) were approximately 1 m away from the test apparatus and from each other. To retrieve more blocks, children had to manipulate the test apparatus (see Figure 1), which in each trial contained two blocks, one for each child. The blocks rested in bowls on a long rod stretching across the apparatus—visible through a transparent screen but out of reach. Children had to move the rod towards holes in the screen by holding its handles and lift it up the stairway steps together until the bowls were accessible through the holes. Moving the rod on one's own was technically impossible. By opening and closing the holes, we could vary children's access to the toy blocks depending on procedural phase and condition.

After a demonstration phase (see below), we conducted two conditions in a within-subjects design (collaborative condition, baseline), administered in sets of four trials each. The order of conditions was counterbalanced across dyads. Between conditions, a motivational trial was inserted with the two toy blocks being accessible immediately (see Figure 2). This trial was included to ensure that children stayed motivated if they had not succeeded in the previous trials and to avoid possible perseveration errors between conditions.

The dependent measure was identical in both conditions (see Figure 1 and bottom part of Figure 2): One child (A) was advantaged by having access to her block first, whereas the other child (B) needed A's participation. In the *collaborative condition*, the blocks had to be moved up the steps jointly all the way from the bottom of the apparatus before A had access (see Figure 1, left picture). That is, children collaborated and expected to be both rewarded, but then A gained her reward but not B. In the *baseline condition*, in contrast, no joint action preceded A's retrieving of the block (1, right picture). Thus, A gained her block ''for free'' without having to manipulate the rod, while B had not

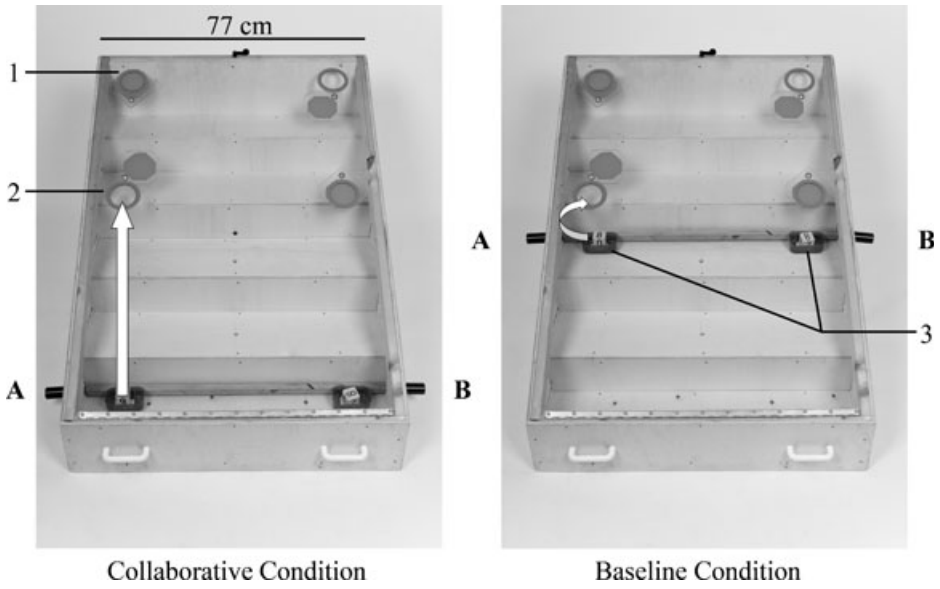

Figure 1. Setup used in the collaborative condition (left) and baseline condition (right) in Experiment 1.
Note. (1) Upper level of holes (left hole closed, right hole opened), (2) lower level of holes (left opened, right closed), (3) bowls with rewards (one block each).

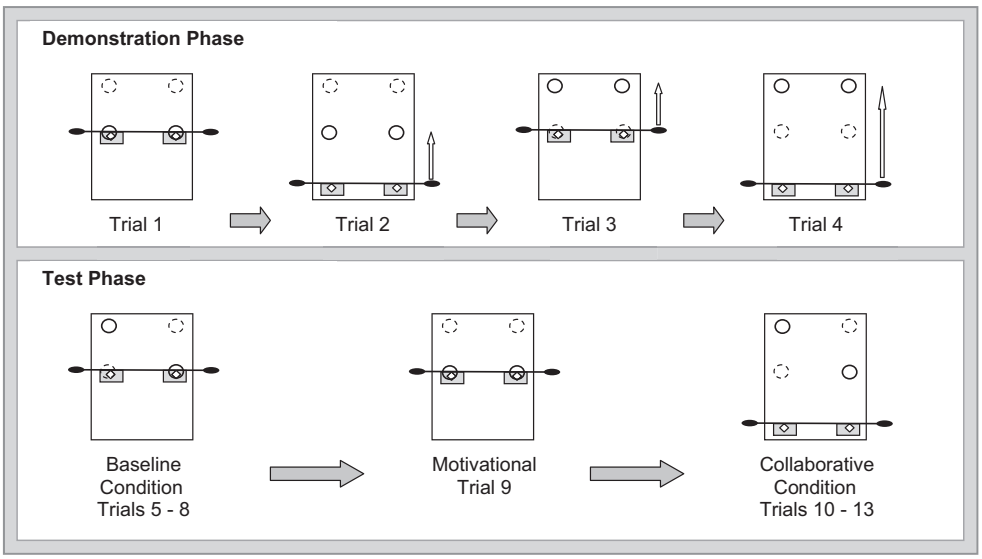

Figure 2. Setups administered in the demonstration and test phases.
Note. The schematic drawings depict the apparatus as viewed from the top, with solid circles representing open holes and dashed circles closed holes. During the demonstration phase, we pretested children in the four different types of setups to ensure that children were familiar with all possibilities of reward retrieval. In the test phase, the order of baseline and collaborative condition was counterbalanced. Please see text for further details.

obtained anything yet. We hypothesized that the joint work in the collaborative condition would establish not only the expectation of both being rewarded but also the joint *goal* that this should actually happen, and thus lead A to support B. The baseline condition, in contrast, provided a situation to help us assess children's general (altruistic) tendency to support the peer. Our concrete hypothesis was that A would provide help more readily when the children were in the process of collaborating (collaborative condition) than when they were not (baseline condition). Since children were assigned to one side of the apparatus in the very beginning and role A was alternated over trials, both children were supposed to have advantaged access twice per condition.

Procedure

We tested pairs of familiar children in a quiet room in their day-care centers. After a short familiarization period in their playgroup, children were brought to the testing room. All testing was done by two female experimenters, with Experimenter 1 (E1) guiding the children verbally and behaviorally, and Experimenter 2 (E2) providing behavioral demonstrations only. Each session was videotaped and lasted approximately 25 min.

Demonstration phase. The goal of the demonstration phase was to teach children the mechanism of jointly moving the rod to obtain the blocks. Additionally, they had to be familiarized with some features of the test phase, namely, that they would have access (a) either immediately or only after having collaborated, and (b) sometimes at the lower level of holes (see Figure 1, left picture, line 2) and sometimes at the upper level of holes (see Figure 1, left picture, line 1). However, the specific experimental event of one child having premature access was never demonstrated. The following demonstration trials were administered (see Figure 2 for a schematic illustration).

First, in Demonstration Trial 1, the blocks and the ''jingle machine'' were introduced, together with the test apparatus containing the rewards. Specifically, the rod with the rewards was placed directly underneath the lower level of holes, which were open at this point. This setup familiarized children with the situation of the baseline condition (role A for both children). In Demonstration Trial 2, the two experimenters showed how to move the rod successfully and that lifting on one side only was useless. Additionally, they assisted the children in their first attempt to solve the problem together. The current setup presented children with the situation of the collaborative condition in that the rod had to be carried from the bottom of the apparatus to its top (role B for both). Next, in Demonstration Trial 3, children were invited to retrieve the blocks, with experimenters providing verbal cues only if necessary. The setup familiarized both children with role B of the baseline condition. Demonstration Trial 4 was a pretest trial: Children were left alone while operating the apparatus (resembling role A in the collaborative condition). If they retrieved the blocks successfully, they entered the test phase. If not, trials 2–4 were repeated up to two times until they succeeded (this was necessary in approximately 40% of cases for the 2.5-year-olds). Throughout demonstration trials, both children retrieved their block at the same time. Between trials, E1 set up the apparatus while E2 and the children waited outside the room.

Experimental phase. Like in the pretest trial, children were invited to retrieve the blocks. Children were told to pay attention to where they might have access (and so to realize that one child was disadvantaged but nevertheless had a chance to get her block) as pilot testing had shown that children often did not even notice that their second hole was open. Trials started once children had entered the room. During all nine trials (four trials in the first condition administered, one motivational trial, four trials in the second condition; see Figure 2), the experimenters monitored children from outside the room via a video screen that was connected to a camera inside. Trials ended after both children had thrown their blocks into the jingle machines, or a predefined time had elapsed (30 s without clear attempts to move the rod by A). Then E1 came in, asked them to leave the room and set things up for the next trial.

Coding and Reliability

All sessions were videotaped and coded by one observer. Overall, 188 of the 192 administered trials could be used for final analyses. Twenty percent of sessions were coded independently by a second observer for interrater reliability. Of main interest was whether and when children provided *collaborative help* for their partner: Did A lift the rod all the way until B was able to access her reward? The rationale for this measure was that providing support *immediately* is indicative of the child prioritizing the joint goal over the individual goal. Providing support *after* having played the jingle box indicates that their individual goal has at least temporal priority over the joint outcome. Thus, we scored A's support for B after having retrieved her block: A could either (a) provide support immediately, (b) play with the jingle machine first and help thereafter, or (c) not provide support at all. These codes assess the temporal sequence in children's behavior rather than mere latencies. Dyads received one code per trial (a maximum of four codes per condition, i.e., eight per session) resulting in an interrater agreement of $\kappa = 1$.

In order to assess to what extent A's helping was elicited by B, we coded B's *communicative acts* toward A. The critical time period began after A had retrieved the reward, and ended either the moment she continued to collaborate, or else at the end of the trial after 30 s. We coded requests (e.g., ''Help me!'' ''Lift it up''), state descriptions

(''My hole is not open!'' ''This one is closed''), referential utterances (''Here!''; often with pointing to the hole or reward), and signs of discontent (e.g., ''I can't!''; groaning in response to the task). If children displayed multiple behaviors during a given trial, they received the higher score (priority as listed). Inter-rater reliability was $\kappa = .77$.

Results and Discussion

Preliminary analyses revealed no effects of gender or order of conditions for any measure, and so these factors were collapsed in all analyses.

Primary Analyses

A first set of analyses addressed two major questions. First, did children in both age groups provide collaborative support for the partner in the collaborative condition? This would show their commitment to the joint goal, which is supposed to be satisfied only if *both* participants had received her share (Tuomela, 2007). Second, we hypothesized that operating with a joint goal is different from understanding the other's individual goal and wanting to help. Hence, children's assistance behavior should be different for the baseline and collaborative conditions.

Regarding the first question, we found that in the collaborative condition, 3.5-year-old children almost always provided support (98% of the time; see Figure 3). Importantly, they did so immediately (without playing with their rewards first) 76% of the time, thereby demonstrating that they wanted the other child to receive her share as well. The 2.5-year-olds provided support in the collaborative condition 26% of the time (immediate support: 7%). For statistical analyses, we computed the mean proportion of trials in which children demonstrated either immediate or delayed support. An analysis of variance (ANOVA) with the between-subjects factor age (2.5 vs. 3.5 years) and the two within-subjects factors condition (baseline vs. collaboration) and type of support (immediate vs. delayed) yielded a main effect of age, $F(1, 22) = 140.82$, $p < .001$, and a significant Age × Condition × Type of support interaction effect, $F(1, 22) = 5.75$, $p < .05$. Inspection of Figure 3 suggests a complex pattern responsible for this significant three-way interaction. Specifically, apart from the fact that the 2.5-year-olds provided support significantly less often than the 3.5-year-olds, the most relevant finding for our second question is that they did not discriminate between conditions. In contrast, 3.5-year-olds did discriminate, providing immediate support more often in the collaborative condition than in the baseline condition ($M = 76\%$ vs. 54%), $t(11) = -2.58$, $p < 0.05$. Moreover, in the collaborative condition, they chose providing immediate support over playing first, $t(11) = 3.76$, $p < .01$, whereas in the baseline condition, where children received their rewards without joint efforts, no such difference occurred. Nonparametric tests yielded similar results. This difference between conditions (plus the fact that there were no effects of order) suggests that collaborative and noncollaborative contexts evoke different cognitive and motivational states in 3.5-year-old children, leading to different actions with respect to others. Operating with a joint goal in collaboration is different from understanding the other's goal and acting upon it.

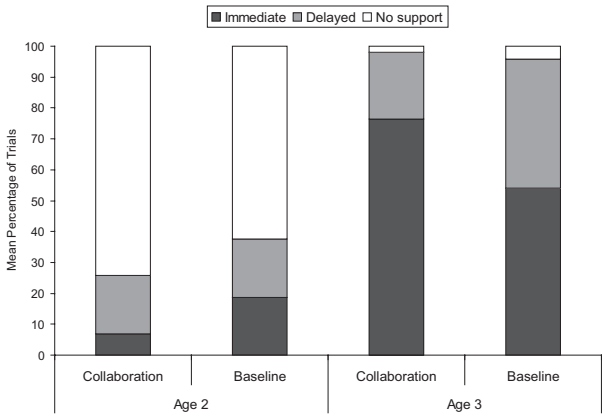

Figure 3. Children's tendency to provide either immediate or delayed support for their partner.

Secondary Analyses

One important aspect of children's behavior in the test situation was their *communicative interaction*. Descriptive analyses showed that in 59% of trials children tried to elicit a response from their peer using verbalizations: They asked their partner to help in 38% of trials, used state descriptions in 12%, referential utterances in 2%, and showed signs of discontent in 7%. All but 4 of the 48 individuals communicated at least once. From this we can conclude that children made sure that the other attended to their situation.

Next, we wanted to know whether there was a relation between B's request and A's provision of support: Did partners continue to collaborate spontaneously or because the disadvantaged child asked for help? To address this issue, we examined the relation between B's requests and A's support

(independent of its timing). The frequencies of co-occurrence of these variables indicate that there was no such relation ($\phi = -.002$, $p = 1$). Specifically, even though there were more cases of requests followed by support (mean proportion of trials = 0.25) than cases of requests followed by a lack of support ($M = 0.13$), most trials with support occurred in the absence of any solicitation ($M = 0.40$) Additionally, we analyzed children's requests with respect to age and condition in a 2×2 ANOVA and found no significant main effects or interactions (all ps > .4). Taken together, these results indicate that requests are unrelated to children's supportive behavior in the two conditions.

First trial analysis and reciprocity. One possible alternative explanation for children's supportive behavior may be that they were engaged in reciprocal exchange, which could explain their support both over repeated trials and within a given trial. In both cases, examining first trial behavior might prove informative: What were children's response patterns right after having been exposed to simultaneously accessible rewards (i.e., both right after the demonstration phase and the motivational trial without having to rely on their peer previously), and, presumably, with the expectation of a fair outcome? Figure 4 depicts children's responses in all four trials. The main point is that descriptively, the pattern for the 3.5-year-olds is already in place in the very first trial, with the tendency to help immediately more often in the collaborative condition than in the baseline condition. To assess whether children's behavior changed over the course of the experimental conditions statistically, we used generalized linear mixed models (Baayen, Davidson, & Bates, 2008; Bolker, 2007) with trial as a predictor (with condition and age as fixed factors and dyad as random factor) and either immediate or overall support as binary response variables. Neither analysis yielded significant effects of trial (all ps > .1), suggesting that the general response pattern was already in place from the first trial on and remained constant in the following trials.

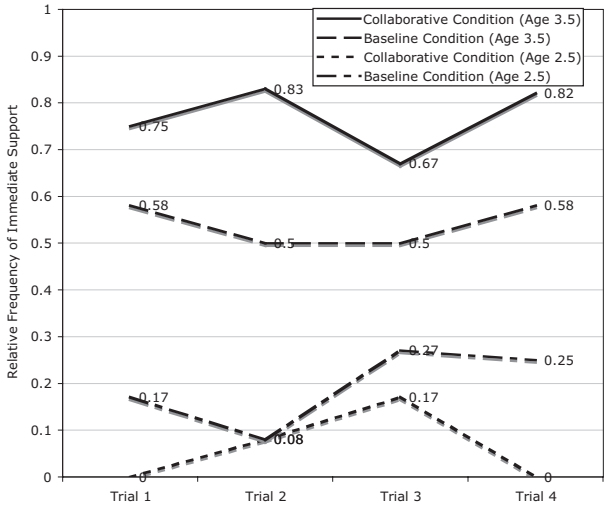

Figure 4. Relative frequency of children providing support immediately over trials.

Experiment 2

In Experiment 1, only the 3-year-old children were sensitive to our experimental manipulation, showing immediate support mainly in the collaborative situation but not in the noncollaborative baseline. However, to conclude from Experiment 1 that the 2.5-year-olds' behavior reflects their lack of commitment to the joint goal might be premature. Alternatively, they might not have understood the technical structure of the apparatus well enough. Passing pretest trials and collaborating in the first place until the first child reached her reward rules out the possibility that they were incapable of operating it in general. However, children were never presented with the problem of diagonally accessible rewards during the demonstration phase. Thus, they might have lacked the insight or planning skills to lift up the rod *twice* in order to access the second reward. Moreover, the younger children might have been focused on their own reward (and ignored the failure of the other to retrieve hers) not because of a lack of commitment but because of limitations in their ability to pay attention not only to their own side but also to the opposite side of the large apparatus.

To address these possibilities, we conducted a second experiment with 2.5-year-old children who were tested individually and confronted with a version of the apparatus that could be operated by one child alone. We hypothesized that if the technical structure or size was problematic for the younger children, they should retrieve only one reward and fail to retrieve the second one also in the individual version of the task.

Method

Participants

Participants were 12 two-year-olds (5 male, mean age = 33 months, range = 31–34) from the same population. Ten additional children had to

be excluded because of either shyness ($n = 3$) or experimenter error ($n = 2$), or because they did not reach criterion ($n = 5$).

Material and Design

The apparatus was similar to that used in Experiment 1 except that the rod with the rewards was lighter and had one handle only, so that one child could move it on his or her own. The design was equivalent to Experiment 1, including one condition *with work* necessary to retrieve the first reward (comparable to the collaborative condition in Experiment 1), and one condition *without work* (baseline condition). Individual children had to perform exactly the same actions as children with role A had to perform in Experiment 1, with the only difference, of course, that in Experiment 1 they had to move the rod jointly *with* the other child in order to retrieve the reward *for* the other child.

Procedure

We tested individual children in a quiet room in their day-care centers. All testing was done by one female experimenter. Each session was videotaped and lasted approximately 25 min. After a short familiarization period in their playgroup, children were brought to the testing room.

Both *demonstration* and *experimental phases* mirrored the corresponding phases of Experiment 1 with the following two exceptions: (a) in the demonstration phase, only one experimenter was present because a dyadic demonstration was not required, and (b) in the Experimental phase, E1 reminded the child to pay attention to the holes if he or she clearly did not see that there is another one actually being open (by E1 saying, ''And where on the other side is the hole open?''). This happened in 13% of all trials. In Experiment 1, children usually drew the attention of one another to the open holes (direct requests to help and state descriptions by the 2.5-year-olds in 51.5% of trials) so that this seemed unnecessary.

Coding and Reliability

Of main interest was whether children retrieved both rewards for themselves. We coded whether children, after having obtained the first reward, (a) went on to move the rod to the second level of holes and took out the second reward or (b) did not attempt to access the second reward (assessed as above; interrater reliability: $\kappa = 1$).

Results and Discussion

Children retrieved both rewards in on average 82% of trials with no difference between conditions, $t(11) = 1$, $p = .3$. To compare the data of Experiment 2 with the data of the 2.5-year-olds from Experiment 1, we combined the conditions requiring previous work on the one hand, and conditions without previous work on the other hand. We used the proportions of trials children retrieved both rewards. A 2 (experiment) × 2 (condition) ANOVA yielded a main effect of experiment, $F(1, 22) = 17.4$, $p < .001$. Children were more successful in the individual context of Experiment 2 than in the dyadic context of Experiment 1: On average, they succeeded in 82% of individual trials versus 32% of dyadic trials. No other effects or interactions were found. This demonstrates that 2.5-year-old children do not encounter technical or visual problems when operating the apparatus.

General Discussion

Young children begin collaborating with peers in joint activities skillfully at around their second birthdays (Brownell & Carriger, 1990, 1991; Brownell et al., 2006). However, the current results with 2.5-year-olds suggest that at this young age children engage in such activities without being particularly concerned about their partner's situation. In the first study, the 2.5-year-olds did not help their partner more in the collaborative condition, after they had gotten their own reward, than in the baseline condition, again after they had gotten their own reward. And so while 2-year-olds can be clearly helpful in some contexts (see Warneken & Tomasello, 2009, for a review), collaborative activities do not seem to engender in them an additional commitment to help their partner. And the second study clearly demonstrated that the problem was not that the 2.5-year-olds did not understand or were somehow overtaxed by apparatus issues.

In contrast, the 3.5-year-old children in the collaborative condition of this study seemed committed to ensure that both partners got their deserved rewards, that is, much more so than in the baseline condition. One could say that the 3.5-year-olds felt a normative obligation or commitment to be especially helpful when in a collaborative activity with another person. This meets the so-called collectivity condition of Tuomela (2007), namely, that a truly joint goal is satisfied for one collaborator only if it is satisfied for all collaborators. In combination with

other findings (e.g., Gräfenhain et al., 2009), we thus think that 3.5-year-olds, but perhaps not 2.5-year-olds, understand that joint activities involve mutual commitments on the part of the two parties—both to the activity itself and to any rewards that result from their collaborative efforts.

An alternative interpretation of these findings for the 3.5-year-olds is that the time-intense work on the apparatus in the collaborative condition increased the likelihood of attending to the partner's plight. That is, they might have been more ready to provide support in this condition than in the baseline condition because they attended to their partner earlier and longer in the collaborative condition—and not because of their conception of joint versus individual goals. While we cannot rule out this possibility completely, the negative finding for the 2.5-year-olds is instructive here. Two-year-olds possess all of the prerequisites for attending to the plight of others and for helping them instrumentally if necessary, and indeed they help others spontaneously in the vast majority of cases when they note their plight (Warneken & Tomasello, 2009). And so if the collaborative condition led to extra attention to the partner and so more helping in the 3.5-year-olds, then there should have been more helping in the collaborative than in the baseline condition for the 2.5-year-olds as well. But there was not, demonstrating that increased attention to the partner in the collaborative condition, if indeed it occurred, was not sufficient to promote increased helping.

Yet another alternative interpretation is that reciprocal strategies account for the current findings: (a) children might reciprocate over trials, helping the other only when he or she has helped them previously, and/or (b) they might support him or her within a given collaborative trial more readily because he or she had just done so in the beginning of the trial. One way to approach the first point is to look at the first trials of every condition, which had been preceded by trials of equitable rewarding. Thus, in those trials children did not have direct prior experience with their peer's willingness to help them, but nevertheless, 3-year-olds still showed a tendency to support their peer more often immediately in the collaborative condition than in the baseline condition. The possibility that children engaged in within-trial reciprocity is more difficult to address, but again it is informative to consider children's situation in the first trial. In this trial it is likely that children expected to be rewarded equitably just as before, and thus they might at least not have conceptualized the task in reciprocal terms from the beginning. Moreover, 2-year-olds are sensitive to reciprocity to some degree (Levitt, Weber, Clark, & McDonnell, 1985), but they did not show the same pattern of results. We thus think that the 3.5-year-olds' increased helping in the collaborative condition was indeed due to their joint commitment to their partner. Future studies are necessary to investigate whether the difference in children's prosocial behavior holds for other cooperative tasks as compared to corresponding noncooperative situations, and to address the interplay of collaboration and reciprocity more directly.

How do our negative findings for the 2.5-year-olds relate to previous empirical evidence of 2-year-olds' successful collaboration? One answer to that question is that in previous experiments children's own and their partner's aims matched (e.g., retrieving a single reward from an apparatus), and so children might have simply coordinated with others toward their own individual end. Thus, under this interpretation, they did not cooperate in order to achieve a *joint* goal, but rather used the other egoistically as a ''social tool.'' A less drastic interpretation is that young children assume that their individual intention is shared among participants. In other words, instead of egoistically using others to achieve their private aim, children might egocentrically attribute it to others (cf. Piaget, 1950). In many early collaborative situations this assumption is valid, simply because the object or activity of reference is indeed the same—for example, when building a block tower together or being engaged in joint pretense scenarios (e.g., Howes, Unger, & Seidner, 1989; Rakoczy, 2006). Note, however, that this potential early understanding of sharing an activity is not quite congruent with Tuomela's (2007) definition of joint goals proper. Rather, this definition explicitly demands that *every* participant's aim should be satisfied and not only the child's. But even though the corresponding mutual commitments may not yet be adopted, 2-year-olds appear to maintain a more unidirectional approach we might call ''you-to-me'' commitment: The child understands that the partner should be committed to an activity he or she (sometimes mistakenly) assumes to be directed to a joint goal. This interpretation is in line with the finding of earlier studies that young children try to prompt their recalcitrant partner back into the game (Ross & Lollis, 1987; Warneken & Tomasello, 2007; Warneken et al., 2006), even if the partner had never actually agreed to play the game together and indeed carried it out in parallel to, but not jointly with, the child (see Gräfenhain et al., 2009, Study 1).

And so, in our view, this study is tapping into children's developing understanding of and commitment to joint goals in collaborative activities. Between 2 and 3 years of age, young children come to understand that if we work together, we should support each other until we both get our respective rewards. (To continue the above terminology, this may include both a ''you-to-me'' as well as a ''me-to-you'' type of commitment, the latter reflecting the realization about the importance of their own role in relation to the other and the joint outcome.) As general support for this view, it is noteworthy that young children show an emerging understanding of the normative dimensions of collaboration in other ways and in other behavioral domains at around the same age. For example, between 2 and 3 years of age young children begin to understand explicit agreements and the obligations they engender. Thus, if an adult suddenly stops collaborating, 3-year-olds but not 2-year-olds will reengage her much more often if they have previously agreed explicitly to play the game jointly than if they have not. Three-year-olds but not 2-year-olds will also ''take leave'' (make an excuse or acknowledgment before breaking off) from a partner with whom they have explicitly agreed to collaborate more often than some neutral partner (Gräfenhain et al., 2009). In a different experimental paradigm, again 3-year-olds but not 2-year-olds will protest normatively when someone is not following the conventional norms or rules of a game (Rakoczy, Warneken, & Tomasello, 2008).

Taken together, all of these findings suggest a developmental shift between 2 and 3 years of age in which young children come to understand and act with respect to the normative dimensions of collaborative activities, including an understanding of explicit agreements, conventional game rules, and commitments to others in joint activities. The precise cognitive and motivational mechanisms underlying this developmental shift as well as the potential influence of individual differences on children's commitment to dyadic collaborations are at this point not totally clear and should be the topic of future investigations.

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