**Finish what you started:**

**Instrumental helping in two-year-olds motivated by a preference for completing unfinished actions**

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**Abstract:** In recent years, a considerable body of research in developmental psychology has documented the emergence of instrumental helping behavior in early childhood. Given the early emergence of this behavior, it is thought to reflect the operation of basic psychological mechanisms underpinning human cooperation. In the current study, we tested the hypothesis that one basic psychological mechanism motivating this behavior is a preference for completing unfinished actions. To disentangle this hypothesis from the hypothesis that two-year-olds are motivated by an altruistic concern for others, we designed a paradigm in which two-year-olds could help an adult even when the adult no longer wanted to complete the action he had initiated. The results showed that children continued the adult’s actions more often when an arbitrary goal had been abandoned (experimental condition) than when it had been reached (control condition), although in both conditions it was equally feasible for the children to continue the action. These results support the hypothesis that helping behavior in two-year-olds is motivated by a preference for completing unfinished actions.

**Keywords:** prosocial behavior, helping, altruism, goal contagion, cognitive development

As a species, we humans are characterized by the pervasiveness and flexibility with which we cooperate. In attempting to account for this hallmark of human sociality, comparative and developmental psychologists have increasingly become interested in the emergence in infancy and early childhood of prosocial behavior, i.e. of ‘behaviors benefiting another person without providing the helper an immediate payoff’ (Paulus 2014). In particular, it has been observed that toddlers spontaneously help others to achieve goals such as grasping an out-of-reach pencil, opening a cabinet door or stacking books (Warneken & Tomasello, 2006; Svetlova, Nichols, & Brownell, 2010; Hepach et al., 2012; 2016; 2017). Given that this behavior is exhibited prior to extensive enculturation, it may reflect the operation of basic psychological mechanisms underpinning prosocial behavior in humans (Warneken & Tomasello, 2009). Illuminating these mechanisms may therefore shed light on how human cooperation emerged in evolution and what basic psychological mechanisms sustain it today.

The hypothesis which is most commonly offered to explain instrumental helping behavior is that toddlers are motivated by an altruistic concern for the welfare of the recipient of the help (Warneken & Tomasello (2006). In other words, the *altruistic concern hypothesis* implies that genuinely prosocial motives are already operational in the second year of life. In support of this hypothesis, Warneken et al. (2007) were able to show that rewarding the infants for helping did not increase their helping behavior (experiment 1), and also (experiment 2) that 18-month olds were no less likely to help if it was made more costly for them (they had to get by an obstacle in order to do so). Building on this, Warneken & Tomasello (2008) reported the same pattern of findings when helping required the infants to resist the attractive option to play with interesting toys in a different part of the space.

Carrying this logic further, Svetlova, Nichols, & Brownell, 2010) raised the cost of helping by implementing a scenario in which toddlers had to (temporarily) give up a cherished object brought from home (such as a favorite hairclip) in order to help. The finding was that 30-month-olds were still willing to help, albeit to a lesser extent than when the help was not costly; 18-month-olds, in contrast, rarely helped in this condition. This pattern of findings raises the possibility that genuinely prosocial motives may develop around the second birthday, and that instrumental helping behavior may initially be driven by other more basic motives.

Building upon this suggestion, one hypothesis which has been advanced in the literature is that instrumental helping in toddlers is motivated by a preference for completing unfinished actions. The core idea behind this *goal completion hypothesis* is that the identification of an agent’s goal leads toddlers to take up that goal as their own, and accordingly to be motivated to complete unfinished actions (Barresi & Moore 1996; Kenward & Gredebäck 2013; Paulus, 2014; Köster et al., 2015; Michael, Sebanz & Knoblich, 2016). Such a preference might have evolved to support social learning (Michael & Székely, 2017) and affiliation (Baumeister & O’Leary, 1995; Over, 2016), and may, if reinforced, provide a foundation for the development of genuinely prosocial motives.

To tease the goal completion hypothesis apart from the altruistic concern hypothesis, we devised a scenario in which an adult experimenter (E) initiates a sequence of actions directed towards a clear goal (i.e. filling a container with toys up to a red finish line), but then abandons the goal and leaves the scene, no longer requiring help. Insofar as toddlers are motivated by a preference to complete unfinished action (goal completion hypothesis), E’s abandonment and disavowal of the goal should not deter their helping behavior. In other words, they should help even though E no longer wants to complete the goal and accordingly does not need their help. This is in contrast to the altruistic concern hypothesis, which does not predict that toddlers should help at all when the potential recipient no longer wants to complete the goal.

In the experimental condition, E abandoned the action prior to reaching the finish line, leaving the goal incomplete. In the control condition, E abandoned the goal after reaching the finish line, having completed the goal. Crucially, the containers were designed such that it was nevertheless equally feasible to place one further toy in the container in both conditions. We reasoned that insofar as toddlers are motivated by a preference for completing unfinished actions (goal completion hypothesis), they should continue placing toys in same container as E more often when E stops prior to reaching the finish line (experimental condition) than when E stops after reaching the finish line (control condition). In contrast, the altruistic concern hypothesis provides no reason to predict any difference between these two conditions, and

**Method**

The hypotheses, sample size, methods, exclusion criteria and planned analyses were pre-registered before data collection, and can be accessed at: <http://aspredicted.org/blind.php?x=qz8dy6>. All aspects of the study were carried out in accordance with the pre-registered protocol unless otherwise stated.

***Participants***

In expectation of a small-to-medium effect, we pre-registered a target sample size of 40 toddlers between 24 and 30 months of age, with replacement for exclusions. However, as the SARS-CoV-2 pandemic has compelled us to close our lab for the foreseeable future, we have decided to declare data collection complete with the current sample of thirty-four participants (X females, average age: 2X;2X, range: 2X;XX-30;00). In addition, X participants were tested and excluded from final analysis according to pre-registered drop-out criteria (see the *Coding and drop-out criteria* section below). X participants were excluded because they helped to place toys in the same box on each test trial, and X participants were excluded because they did not complete at least two trials in each condition due to fussiness (X), shyness (X), or taking too long to help E on too many test trials (X). All participants were recruited from a database of families in the Department of Psychology at the University of Warwick and from nurseries in the surrounding area. The majority of participants came from middle class backgrounds and were Caucasian.

***Materials/apparatus***

Participants sat approximately 1.5m away from the apparatus on their caregiver’s lap. There were four separate games *(See Figure 1)*, each of which was used once per participant per condition. For each game, there was a central workspace with three toys at the start of each trial, and three containers (‘homes’) into which the toys could be placed. The toys were small round balls or small cubes with pictures of trees, cars or trains affixed to them. The three containers were equidistant from the central workspace (see *Figure 2*). Each container could hold up to three toys. In the experimental condition, this limit was indicated by a red mark indicating the finish line. In the control condition, the red mark indicating the finish line was lower down on the container, such that it would be reached by placing two toys.

*Figure 1:* PANEL OF EACH OF THE 4 LOCATIONS IN BOTH CONDITIONS

*Figure 2:* Apparatus from the perspective of participants.

***Design***

We implemented a within-subjects design, with participants performing eight test trials in total. To control for order effects of condition, the eight trials were split into two blocks of four trials each: an experimental block and a test block (counterbalanced). The location of the container E acted upon differed from one trial to the next this sequence was counterbalanced across participants (participant 1: left on the first trial, right on the second trial, center on the third trial, left on the fourth, etc.; for participant 2: right on the first trial, center on the third, left on the fourth etc.).

***Procedure***

Participants were tested individually in the child lab at the University. Caregivers gave informed written consent, and participants received a gift for taking part. Sessions lasted approximately 20-minutes. The experiment was conducted in accordance with the Declaration of Helsinki, and was approved by the Humanities & Social Sciences Research Ethics Sub-committee (HSSREC) at the University of Warwick (approval number: 01/16-17), as part of the ERC-funded project ‘[679092: Sense of Commitment]’.

Caregivers were present and played a largely passive role in test trials, with two exceptions: They were instructed to draw the participant’s attention to E (‘Look at what E is doing’) if participants were not watching E, and to encourage shy participants to help without giving specific instructions as to which container to help place the toy in (‘You can put it in the home you want’).

During warm-up participants were acquainted with the containers and toys, as well as helping to place the toys into the containers. After warm-up, caregivers were asked to sit on a chair with the participant on their lap, whilst E sat in behind the apparatus.

*Familiarisation phase*

There were eight familiarisation trials, one for each of the four games used in each condition. Participants were acquainted with helping E to place three toys in each of the containers. For the games used in the experimental condition, they were shown how to fill each container to the red finish line with three toys. For the games used in the control condition, they were familiarized with placing a third toy in the container even though the red finish line was reached after placing two toys in in.

*Test phase*

There were eight test trials in total (4 per condition). The number of times that E referred to each container, and the time E spent looking at each container, were kept constant in each test trial, though the type of reference, gesture, and facial expression made towards each container differed depending on condition. Each test trial consisted of three phases: (i) Goal establishment, (ii) E’s departure (iii) Participant helping:

***(i) Goal Establishment***

At the beginning of each trial, in both conditions, there were three toys in the central workspace. Two of the three containers already contained two toys each, and a third container contained no toys. E used gesture and verbal reference to indicate his goal: ‘I want to fill this home up to here [pointing to the red finish line] with these toys [pointing at the toys]’. Next, E placed two toys in the container, saying ‘One…two….’

***(ii) E’s Departure***

In the experimental condition, E then grasped the third toy and began to move it towards the container, but then stopped and said ‘No, I won’t. I do not want this ball [or ‘car’, ‘train’ or ‘tree’] in this home anymore.’ E then stood up and went behind a barrier.

In the control condition, when E placed the second toy in the container, he said ‘I’ve done it!’ He then grasped a third toy and continued as in the experimental condition.

***(iii) Participant Helping***

If the participant did not initiate the helping behavior, the caregiver gave the following prompt: ‘You can put it in the home you want’). When the participant placed a toy in a container, irrespective of which container, E said ‘Well done.’ The caregiver then took the participant up into their lap, and the next trial commenced.

**Coding and drop-out criteria**

For each trial, we coded whether participants placed the toy at any one of the three locations, and if so, whether they placed it at the target location.

All sessions were recorded using digital video recorders. Coding was carried out by a naïve research assistant. Coders assessed: placement behavior (yes or no), placement at same location as E (yes or no), and exclusion (whether individual trials should be dropped from analysis, for any of the reasons listed below). A second naïve research assistant coded a random 8 participants (23.5%) for reliability (placement of toy: Cohen’s *κ* *=* .X (95% CI: 0.X, X), *p* < .X; trial exclusion: Cohen’s *κ* = .X (95% CI: .X, .X), *p* = .X).

*Participant drop-out criteria*

We excluded participants who – e.g. due to shyness or fussiness – did not complete at least two trials out of four in each condition (X participants).

*Trial exclusion criteria*

We excluded trials on which the participant a)did not place the toy in one of the containers for 10s after the caregiver gave a prompt, (b) experimenter error (i.e. forgetting or mixing up relevant aspects of the protocol), (c) caregiver instruction as to where the participant should place the toy, (d) if the participant was not watching E when E established his goal or during the experimental manipulation.

1. **Results**

**3.1 Data screening**

Of the 34 participants included in our analysis, X test trials were excluded (X in the experimental condition and X in the control condition) due to a delay of longer than fifteen seconds between E’s initial invitation to help and participants’ helping. This left X test trials for further analysis (X in the experimental condition and X in the control condition). Of these, participants placed the toy at one of the three locations X times in the experimental condition, and X times at the same location as E. In the control condition, participants placed the toy at one of the three locations X times in the experimental condition, and X times at the same location as E.

**3.2 Placement of toy at same location as experimenter**

To investigate whether participants differentiated between the experimental and the control conditions, we compared the proportions of the trials on which participants placed the toy at the location at which the experimenter had been placing toys (see *Figure 3*).

**Experimental - Control**

A close up of a logo

Description automatically generated

*Figure 3*: The proportion of trials on which participants placed the toy at the location at which the experimenter had been placing toys, with 95% confidence intervals of the means adjusted for within-subject design (Cousineau, 2005; Loftus & Masson, 1994; Morey, 2008).

| **Paired Samples T-Test** | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | |  | | **t** | | **df** | | **p** | | **Cohen's d** | |
| Experimental |  | - |  | Control |  | 2.843 |  | 33 |  | 0.008 |  | 0.488 |  |
|  | | | | | | | | | | | | | |
| *Note.*  Student's t-test. | | | | | | | | | | | | | |

| **Descriptives** | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **N** | | **Mean** | | **SD** | | **SE** | |
| Experimental |  | 34 |  | 0.672 |  | 0.307 |  | 0.053 |  |
| Control |  | 34 |  | 0.473 |  | 0.247 |  | 0.042 |  |
|  | | | | | | | | | |

**3.3 Placement of toys at any location**

To investigate whether there were any differences in the physical affordances of the containers between the two conditions – in particular, whether participants found it more enticing to place toys in any container at all in the experimental condition than in the control condition – we compared which participants placed toys at any of the three locations at all at – i.e. as a proportion of total trials. The results show no significant differences.

**Discussion**

The results showed that toddlers resumed E’s action more often when E had stopped placing toys in the container prior to reaching the finish line (experimental condition) than when did so after reaching the finish line (control condition). This confirms our prediction, providing support for the hypothesis that toddlers’ instrumental helping behavior is motivated by a preference to complete unfinished actions. Crucially, these results cannot be explained by the hypothesis that toddlers are motivated by an altruistic concern for the welfare of the potential recipient of help. Indeed, given that E abandoned and disavowed his goal in both conditions, the altruistic concern hypothesis does not provide any reason to expect any helping behavior at all.

It is also important to emphasize that, although E filled the container up to the finish line in the control condition, but not in the experimental condition, the containers were designed to ensure that it was equally feasible in both conditions for toddlers to place one more toy in the same container as E. This ensures that our results cannot be explained by any differences in the physical affordances of the containers between the two conditions.

A further possibility is that toddlers may have been motivated to act in order to interact with E. Indeed, it has been suggested that toddlers may initiate helping behavior at least in part because they like interacting and are motivated to do so (Rheingold et al., 1982; Svetlova et al., 2010; Paulus & Moore, 2012), i.e. not because of any benefit that their contribution brings to anyone else. Although we acknowledge that such a motivation may explain some instances of helping behavior, there are two reasons why this hypothesis cannot explain the results observed here. First, the experimenter left the scene prior the test phase in each trial, ensuring that toddlers could not elicit his attention by engaging with the toys, and could not interact with him. Second, when E abandoned his action and the test phase began, there were always three containers, each of which contained two toys but had space for three. This means that if toddlers did attempt to initiate interaction by engaging with the toys, they could do so equally effectively by placing a toy in any of the three containers. Thus, the hypothesis provides no reason to expect a difference between the experimental and the control condition with respect to the frequency with which toddlers placed the toy in the same location as E.

It would be important for future research to further probe the hypothesis that a preference for completing unfinished goals provides a foundation for the development of prosocial motives. For example, it would be valuable to carry out longitudinal studies testing to what extent a tendency to complete unfinished goals in younger children (e.g. 18 or 24 months) predicts costly helping at subsequent ages (e.g. 30 or 36 months).

**Author Contributions**

All authors contributed to the development of the study concept and design, as well as to the testing, data collection and data analysis. John Michael drafted the manuscript. All other authors provided critical revisions. All authors approved the final version of the man- uscript for submission.

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The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

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