Correspondence: Chimpanzee helping is real, not a byproduct

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In their recent study, Tennie et al.1 argue that positive instances of chimpanzees helping others can be a byproduct of testing methods1. The study includes a new task where chimpanzees can behave prosocially toward a conspecific either through an action (GO-condition) or by omission (NO-GO condition). The study further aims to test whether stimulus enhancement or carry-over effects from prior experiences explain previous results. We agree that a helping-by-omission task could in principle provide intriguing new evidence for chimpanzee helping. However, here we raise a number of crucial methodological issues that question the current interpretation of the study’s results. Furthermore, the study fails to consider the evidence from prior work addressing these concerns.

First, in any study on animal prosociality, showing apparatus understanding is key. However, it is unclear whether chimpanzees understood critical aspects of the GO/NO-GO task used. One group of chimpanzees had access to an apparatus where releasing a peg provided access to food from a box (GO condition), while in another group releasing the peg blocked the box (NO-GO). However, chimpanzees failed a post-test designed to test apparatus understanding. Therefore, the only conclusion that can be drawn from Experiment 1 is that the physical causality of these apparatuses was too complicated for the chimpanzees to understand through observation, not anything about helping.

This lack of comprehension also undermines the conclusions from Experiment 2 where chimpanzees could learn about the apparatuses prior to the test phase. A closer look at the methods reveals that the knowledge probe from the NO-GO task does not actually demonstrate comprehension. This is because subjects were introduced to the NO-GO apparatus when it was already delivering peanuts in Steps 1 and 2 of the familiarization, so chimpanzees could ignore the peg, start feeding, and not learn the relevance of the peg blocking or unblocking the apparatus. Therefore, not releasing the peg does not provide clear evidence for apparatus understanding. A better test would have been to attach the peg before moving to the food-delivery room. This would have provided convincing evidence for subjects’ understanding of the instrumental relationship between the presence of the peg and the possibility to obtain food. Given the lack of evidence about chimpanzees’ comprehension of the NO-GO helping-my omission condition, the only validated data come from the action-version of the task (GO condition compared with a social control). This shrinks the usable sample to $n = 6$ participants, severely weakening the conclusions.

Second, it is unclear whether the need for help was obvious to potential donors. This is critical because signaling a need for help is the primary factor predicting whether chimpanzees help in all prior helping studies2-6. In fact, one theory is that chimpanzees engage in reactive prosocial behavior when recipients signal their need, but do not help proactively in the absence of overt cues3,7. We performed a meta-analysis to investigate whether signaling need predicted chimpanzees’ helping across six previous published studies (Table 1). The analysis revealed a strong effect of chimpanzees’ signaling of need on helping behavior (Cohen’s $d = 0.73$). It is unclear whether the chimpanzees would have been able to detect any signals of need in the setup used by Tennie et al.1. The recipients manipulated a box that, depending on condition, either did or did not dispense peanuts. Yet because the peanuts fell into an opaque trough away from the potential helper, it is unclear whether the helper even knew whether the recipient obtained food. The recipient’s need for help is therefore much less salient and clear than in prior work where recipients directly reached for inaccessible objects, failed to open a locked door, or tried to access a bag of food in full sight of the subject.

Third, the study provides evidence contradicting the stimulus-enhancement hypothesis, contrary to the study’s conclusion. This hypothesis states that chimpanzees provide help to conspecifics not in order to benefit others, but simply because their attention is drawn to the helping apparatus as a result of the recipient’s actions. In this view, helping is not prosocially motivated, but amounts to what the authors call ‘by-product helping’. In the current setup, the stimulus-enhancement hypothesis makes two key predictions: (1) there should be no difference in rates of peg releases for the GO and NO-GO groups, because subjects’
attention is drawn to the target action equally in both conditions and (2) peg release rates should differ between the test and social control conditions, for both the GO and NO-GO groups, because potential recipients are off to the side in the social control condition and cannot draw subjects’ attention to the food apparatus. Yet, critically, the present setup does not allow for a conclusive test of the first prediction given that there is no evidence that the NO-GO group understood the apparatus, as described above. The second prediction was tested, but is not supported by the actual results: Across both the GO and NO-GO subjects, chimpanzees do not show increased release rates in the test condition compared to the social control condition. Therefore, the results are not consistent with the stimulus-enhancement hypothesis.

A direct test of the stimulus-enhancement hypothesis would require testing if enhancing the stimulus also leads to more target behavior. We assessed this for a study in which it was found that chimpanzees release a chain to unlock a door for a conspecific when they try to open the door (but not when they ignore the door, Fig. 1). We found that the movement of the chain itself was not significantly more often in the Experimental than the Control condition.

In conclusion, converging evidence shows that chimpanzees are willing to help others by doing something7,13; whether chimpanzees also help by doing nothing is an interesting question for future research.

**Methods**

For the meta-analysis, we calculated Cohen’s $d$ from all studies that had assessed the occurrence of recipient cues and its effect on helping. We then calculated a weighted mean estimate of the effect size for each study to account for sample size. A previous study2 showed that chimpanzees unleashed a chain when it blocked a door that another chimpanzee tried to open in an Experimental condition (vs. a Control where the door was ignored). We coded the degree of chain movement of the Experimental condition on a 5-point scale, resulting in high inter-rater agreement (weighted $\kappa = 0.86$, see Supplementary Methods).

We coded the degree of chain movement of the Experimental condition from Warneken et al. (2007, Study 3), from a video, on a 5-point scale. From the total of 45 test trials, 37 trials could be included in this analysis. Five additional trials were missing due to problems with video recording and three trials could not be coded with our coding schema for chain movement because subject directly manipulated the chain. A second coder independently rated 50% of events blind to hypotheses and condition. Inter-rater agreement was high, Cohen’s weighted $\kappa$ (quadratic) = 0.86.

Received: 29 March 2017 Accepted: 20 November 2017
Published online: 12 February 2018

**References**

1. Tennie, C., Jensen, K. & Call, J. The nature of prosociality in chimpanzees. Nat. Commun. 7, https://doi.org/10.1038/ncomms13915 (2016).
2. Warneken, F., Hare, B., Melis, A. P., Hanus, D. & Tomasello, M. Spontaneous altruism by chimpanzees and young children. PLoS Biol. 5, 1414–1420 (2007).
3. Melis, A. P. et al. Chimpanzees help conspecifics obtain food and non-food items. Proc. R. Soc. London Ser. B 278, 1405–1413 (2011).
4. Warneken, F. & Tomasello, M. Altruistic helping in human infants and young chimpanzees. Science 311, 1301–1303 (2006).
5. Yamamoto, S., Humle, T. & Tanaka, M. Chimpanzees help each other upon request. *PLoS ONE* **4**, 1–7 (2009).
6. Yamamoto, S., Humle, T. & Tanaka, M. Chimpanzees’ flexible targeted helping based on an understanding of conspecifics’ goals. *Proc. Natl Acad. Sci. USA* **109**, 3588–3592 (2012).
7. Melis, A. P. & Warneken, F. The psychology of cooperation: insights from chimpanzees and children. *Evolut. Anthropol.* **25**, 297–305 (2016).
8. Melis, A. P., Hare, B. & Tomasello, M. Do chimpanzees reciprocate received favours? *Anim. Behav.* **76**, 951–962 (2008).
9. Engelmann, J. M., Herrmann, E. & Tomasello, M. Chimpanzees trust conspecifics to engage in low-cost reciprocity. *Proc. R. Soc. London Ser. B* **282**, 20142803 (2015).
10. Muller, M. N. & Mitani, J. C. Conflict and cooperation in wild chimpanzees. *Adv. Study Behav.* **35**, 275–331 (2005).
11. Gomes, C. M., Mundry, R. & Boesch, C. Long-term reciprocation of grooming in wild West African chimpanzees. *Proc. Biol. Sci.* **276**, 699–706 (2009).
12. Schmelz, M., Grueneisen, S., Kabalak, A., Jost, J. & Tomasello, M. Chimpanzees return favors at a personal cost. *Proc. Natl Acad. Sci. USA* **114**, 7462–7467 (2017).
13. de Waal, F. Putting the altruism back into altruism: the evolution of empathy. *Annu. Rev. Psychol.* **59**, 279–300 (2008).

**Author contributions**
All three authors contributed to writing and analyses.

**Additional information**
Supplementary Information accompanies this paper at https://doi.org/10.1038/s41467-017-02321-6.

**Competing interests:** The authors declare no competing financial interests.

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