The lack of validity hinders research in animal cognition

Ádám Miklósi^{1,2} · Judit Abdai²

Accepted: 11 December 2020 / Published online: 8 February 2021
© The Psychonomic Society, Inc. 2021

Summary

Comparability of specific behavioral skills in diverse animal species is of central importance in animal cognition. Yet, as the present analysis of “rescuing behavior” shows, the lack of validity analysis may lead to contradictory results.

Researchers in comparative cognition seem to have a craving for challenging themselves wherever they can. Producing behavioral definitions that provide little chance for verification is one such case. Let’s take the definition for “prosocial behavior” referred to by many authors as *occurring when individuals voluntarily act to benefit one or more individuals other than themselves* (Van Bourg, Patterson, & Wynne, 2020). Reading this definition, one may wonder what is meant by “voluntarily” and how “benefit” would be measured. The problem becomes even more significant when some researchers add that the prosocial actor should demonstrate *“concern for the receiver and, thus, an understanding of the receiver’s emotional state.”* How could anyone provide experimental proof for the presence of “concern” and “understanding” of the other’s emotional state?

So Van Bourg et al. (2020) made a very brave case when they aimed to collect observational data of companion dogs to provide evidence for prosocial behavior. They opted for the so-called “rescuing” paradigm, in which the donor’s actions lead to the riddance of the partner from a trap (see also Nowbahari, Scohier, Durand, & Hollis, 2009, for very clear evidence in ants). Van Bourg et al. (2020) correctly identified some issues with earlier published attempts, where important factors were not controlled, like the dogs’ physical skills to intervene or the effects of social facilitation of the (trapped) partner (Bräuer, Schönefeld, & Call, 2013; Carballo et al., 2020). In the present experiment, dogs participated in three

test conditions one after the other in balanced order: (1) the experimenter dropped a piece of food into the closed restrainer apparatus (box) to test whether the dog has the skill and willingness to remove the door and get to the food (food test). In the other two conditions, the owner restrained in the box was (2) either loudly reading a book (controlling for social facilitation; reading test) or (3) vocalizing the words “help” or “help me” in a nervous manner (distress test).

Based on this arrangement, one could hypothesize that the “rescue behavior” of dogs is supported if the majority of dogs remove the door of the box in the distress test, and they react faster in this context compared to the reading condition. In line with earlier published observations, one would also expect that faced with the nervous behavior of the owner (distress test), dogs display more stress-related behaviors compared to the other test conditions (food and reading tests). While there was evidence for the latter effect, dogs did not differentiate the two situations when the owner was restrained in the box. Dogs that were skillful in removing the door and obtaining a piece of food (32% of the tested dogs) were not more likely to open the door for the owner when she/he called for help or read loudly. Actually, regarding the first test of subjects, dogs that encountered the nervous owner entered the box later compared to those who faced an owner reading loudly. Thus, similar to previous findings, companion dogs did not show much evidence of “rescuing behavior,” despite the fact that some individuals in the distress test could have been motivated to enter the box by reacting to the emotionally loaded vocalizations emitted by their owner. Alternatively, dogs stressed by their owner’s nervous calling for help may have sought social support by approaching the owner (see also *safe haven effect*).

The studies of comparative cognition, especially in the case of studying socio-cognitive phenomena, often suffer from a lack of *validity analysis* that would be necessary to establish the evolutionary and functional connection between specific

✉ Ádám Miklósi
amiklosi62@gmail.com

¹ Department of Ethology, Eötvös Loránd University, Budapest, Hungary

² MTA-ELTE Comparative Ethology Research Group, Budapest, Hungary

cognitive skills in different species. It is important to acknowledge that the origin and formulation of hypotheses on socio-cognitive skills have a strong anthropocentric bias that should be counterbalanced by a critical analysis of the comparability of the phenomena.

Ecological validity would be required to collect data on the nature of the behavior/skill under study. In the present case we would need to know how likely it is that (untrained) companion dogs are rescuing people, and in what contexts it may happen. How much experience do these dogs have in “helping” people in everyday interactions, and what is the likelihood of intervening? The results of the present and previous studies also indicate that this “rescue” situation may not be an appropriate (ecologically relevant) context to test for prosocial behavior in dogs.

Cognitive validity assumes that the subject can be attributed with the necessary basic skills to solve the problem and possesses comparable mental representations. Here, the dogs should be able to open the box but in order to be comparable to the human case, they would also need to show some evidence of representing the difference between the present state of the owner in the cage versus being outside (i.e., they need to represent in some way the goal of the captive person). This has not been proven because a tendency to approach the restrained owner (especially in the distress test, see above) can explain the opening of the door.

Effort validity means that the actor’s investment in executing the action has similar (harmful and/or beneficial) consequences on him as in the case of humans. While definitions on prosocial behavior often remain neutral, whether the actor should pay some cost for its support toward the other (cf. altruism) is actually a typical case of anthropomorphism suggesting that the actor may not suffer any short-term loss. Any action is costly in terms of energy and time. Not just sharing food, but any interaction described as helping or rescuing is costly for the actor. Thus, a much stronger case could have been made if the dogs had to interrupt some enjoyable ongoing activities (e.g., playing with a ball) in order to help the owner in need. Also, the dogs may approach the owner/food/restrainer box simply because they do not have any specific task or activity to carry out in the experimental situation.

Developmental validity ensures that the skill needed for successful prosocial behavior emerges in a similar fashion in the species under study. It was an important insight in the present study that dogs should be able to open the box a priori rather than being trained to do this just before the experiment, but only about 30% of the dogs could actually remove the door to reach the food. When compared to human (children)

it should be also noted that in our species any form of prosocial behavior may receive positive feedback, whereas this may not be the case for dogs. The lack of similar experience could inhibit the independent action on the part of the dogs (actually only one-third of the dogs opened the box for the distressed owner).

In a rescue scenario applied here, dogs would need to (1) respond differentially or recognize the emotional state of the owner, (2) recognize that the owner is trapped and is not able to solve the problem on his/her own, (3) realize that the owner’s state is caused by the situation she/he is in, and (4) realize that the owner *wants* to get out of the box (although relying on the first three representations might be sufficient to elicit the behavior without goal/intention attribution). All this assuming that the dog has the skill and willingness to remove the door.

We propose that applying a scenario where (1) the dog needs to rely on its existing skills, (2) the aim of the owner (or other individual) can be inferred based on behavioral cues, (3) the obstacle/problem is clear, and (4) dogs have to “pay” some cost for helping would be more advantageous to test prosocial behavior in dogs. For example, the method applied by Warneken and Tomasello (2007) where the experimenter needed help to obtain an out-of-reach object may be a better example of a helping context that could be applied to dogs.

References

- Bräuer, J., Schönefeld, K., & Call, J. (2013). When do dogs help humans? *Applied Animal Behaviour Science*, 148(1–2), 138–149. <https://doi.org/10.1016/j.applanim.2013.07.009>
- Carballo, F., Dzik, V., Freidin, E., Damián, J. P., Casanave, E. B., & Bentosela, M. (2020). Do dogs rescue their owners from a stressful situation? A behavioral and physiological assessment. *Animal Cognition*, 23(2), 389–403. <https://doi.org/10.1007/s10071-019-01343-5>
- Nowbahari, E., Scohier, A., Durand, J. L., & Hollis, K. L. (2009). Ants, *Cataglyphis cursor*, use precisely directed rescue behavior to free entrapped relatives. *PLoS ONE*, 4(8), e6573. <https://doi.org/10.1371/journal.pone.0006573>
- Van Bourg, J., Patterson, J. E., & Wynne, C. D. (2020). Pet dogs (*Canis lupus familiaris*) release their trapped and distressed owners: Individual variation and evidence of emotional contagion. *PLoS ONE*, 15(4), e0231742. <https://doi.org/10.1371/journal.pone.0231742>
- Warneken, F., & Tomasello, M. (2007). Helping and cooperation at 14 months of age. *Infancy*, 11(3), 271–294. <https://doi.org/10.1111/j.1532-7078.2007.tb00227.x>

Publisher’s note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.