

FEATURED ARTICLE ESSAY

On Need, Communication, and Cooperation in Rats (*Rattus norvegicus*)

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This second issue of Volume 132 of the *Journal of Comparative Psychology* continues the Featured Article Essays we began in the last issue. Our plan with these short essays is, on the one hand, to shine a light on a specific article in each issue. On the other hand, our hope is that over the course of several of these essays, it will become clear how strikingly diverse are the topics and taxa studied in the articles published in this journal (not to mention the wide range of countries of author origin). Our choice for this issue is an article by Schweinfurth and Taborsky (2018) on how food-based need affects the communicative and cooperative behavior of Norway rats, *Rattus norvegicus*; see Figure 1.

Communication in animals occurs when the signals of one individual affect the behavior of a second individual in a noncoercive way. A general view in the field of animal communication is that oftentimes both the individual producing and the individual perceiving the signals benefit from the communicative interaction. An alternative view in the field is that the primary beneficiary of signaling is the individual producing the signal, rather than the individual perceiving the signal. Under this latter view, signals are not necessarily honest or reliable but function to manipulate other individuals to the signal producer's advantage (for overview of this and other debates in animal communication, see Stegmann, 2013).

Can animals signal reliably about their own need, and can they help other individuals based on the signals of those other individuals? We humans clearly are able to do this, and recent evidence in nonhuman primates indicates many of them can do this as well. Schweinfurth and Taborsky (2018) tested this possibility in Norway rats. The authors used a methodology from earlier published work that involved a donor rat pulling an apparatus that provided food to a recipient rat in an adjoining cage but not to itself (Rutte & Taborsky, 2008). Earlier studies demonstrated that donor rats are more likely to help provide food for recipient rats when those recipients are more food-deprived (Schneeberger, Dietz, & Taborsky, 2012) and that individuals are more likely to donate to another individual who donated to them earlier (Dolivo & Taborsky, 2015). A key question in the featured article in this issue was whether donors and recipients communicate about their need—whether food-deprived individuals communicate differently than sated individuals and whether their partner responds to such communication.

Schweinfurth and Taborsky (2018) found that in the first “experience phase” of their study, food-deprived donors provided more food to recipients than sated donors. Importantly, both food-deprived and sated individuals were more likely to pull the apparatus to provide food to a recipient than they were to an empty adjoining cage. In the second “test phase,” when the roles were reversed, food-deprived former donors showed more reaching behavior (either a signal or a cue) and more ultrasonic and narrow-frequency-band calling (a signal) toward the former recipient than did sated former donors. During this test phase, furthermore, the sooner a former donor began to call, the sooner the former recipient returned the favor and pulled the apparatus to help the rat that had earlier provided it with food. In other words, by reaching and calling in ways that communicated greater need, rats were able to receive food from a partner more quickly.



Figure 1. Two female wild-type Norway rats jointly investigating their surroundings. See the online article for the color version of this figure.

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This work has important implications for our understanding of reciprocity in cooperation. Rats in this study were free to donate food or not and were free to donate as much food as they could pull—the authors did not constrain the amount a donor rat could provide a recipient. Rats use visual, auditory, and chemical information of another individual in determining whether to help that other individual with food donation. Schweinfurth and Taborsky (2018) have found communicative mechanisms of cooperation in this study.

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