Anybody watching? How others affect helpful actions

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A new study by Havlik et al. reveals that rats are less likely to help a conspecific in need in the presence of passive bystanders, but that they are more likely to help when there are active bystanders that engage in helping. This study highlights the social skills of rats and the role of bystanders on cooperation, raising a range of interesting questions that should be explored both theoretically and empirically.

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Main text

In contrast to their rather bad reputation, rats are extremely social and show a range of amicable behaviours as well as complex cognitive skills. In recent years, their eagerness to help and cooperate with conspecifics has been studied in more detail, revealing that rats are highly sensitive to the needs of other rats. For example, they help their conspecifics by donating food to them, grooming them at spots that are difficult to reach and freeing partners from traps. Especially over the past decade, rats have been tested in various paradigms to understand underlying psychological and evolutionary processes that can explain their high level of cooperation. Thus, rats turned into an important novel model organism for various research disciplines.

A recent study by Havlik and colleagues (2020), published in *Science Advances*, adds to this knowledge by asking whether rats show the 'bystander effect', a phenomenon well established in Social Psychology that describes a reduction of help in the presence of passive bystanders (Fischer et al., 2011). For this, the authors created a rat in need (i.e. the victim) by locking it into a small trap. This individual could be freed by another rat (i.e. the subject) by opening the trap from outside. To assess their general willingness to help, subjects were tested alone with the victim. Over multiple days, subjects learned to open the trap to help the victim. In addition, the subjects faced the same situation when surrounded by bystanders that were either unable to help due to a low dose of a sedative (passive bystanders) or able to help (active bystanders). The authors assessed how quickly subjects learned to help the trapped victim.

In comparison to when tested alone, the subjects freed the victim less often when there was one passive bystander. Being surrounded by two passive bystanders further decreased the subject's helping levels and thus the bystander effect was more pronounced. In stark contrast, when subjects were tested with active bystanders, who could help, the rat team showed higher helping levels than when the subjects were tested alone. As in the passive condition, the effect was stronger the more bystanders were present. One difficulty is to determine whether the chances that anyone helps are higher just

because more individuals are present, which does not mean that individual helping levels are indeed increased. The authors found an elegant way to test this issue. They combined the individual helping behaviour of subjects in the 'alone' condition and created hypothetical duos and trios of a subject with active bystanders. An opening occurred in these hypothetical duos and trios when one of the rats opened the trap in the respective trial. Overall, the rats opened the trap earlier when they were in a real team compared to when data from separate individuals was combined, suggesting that active bystanders had an enhancing effect on the helping behaviour beyond the sum of actions.

The authors created passive and active bystanders by treating the passive bystanders with a sedative. This is a great way of controlling the physical presence of bystanders in both situations. However, the drug may have changed the behaviour and smell of bystanders in a way that might have distracted the subjects, leading to lower helping levels. An interesting additional experimental condition partly mitigates this concern. When the subjects were tested with a passive bystander from an unfamiliar strain, the inhibiting bystander effect was reduced, and the subjects behaved more like when being alone. This finding suggests that ingroup members elicit a more pronounced effect and that the drug does not generally distract subjects from helping. Still, rats from unfamiliar strains might simply be ignored independently of whether they behaved or smelled differently. Future studies, which could make use of direct behavioural observations or trained bystanders, might clarify whether this might be the case.

Nevertheless, this study demonstrates that bystander(s) affect helping behaviour in rats. At the same time, the study shows that this effect is more complex than previously thought. While active bystanders increase help, passive bystanders reduce help, but only when they belonged to a familiar strain. Understanding the role of bystanders is important since many species, which show helpful behaviours, live in social groups and their behaviour is therefore likely to take place in presence of bystanders. Further, the findings raise several questions about the psychological and evolutionary origins that should be addressed in future studies.

For example, bystanders can be an important selective force acting on the evolution of cooperation by increasing help. By helping others in the presence of bystanders, helpers can honestly signal their trustworthiness and therefore gain extra benefits for future interactions, e.g. by being chosen as co-operation partners (Roberts, 2020). Interestingly, when subjects from the active bystander condition were later tested alone, they showed lower levels of help than subjects that were only tested in the alone condition. This suggests that help in presence of others might be associated with higher rewards. Thereby this study stands in a seemingly contrast to an earlier study that showed no effect of bystanders on helping levels (Schweinfurth & Taborsky, 2016). However, the two studies differ in an important aspect. The rats in the earlier study were observed while they were reciprocating favours. In a reciprocal context, cooperation is less likely to be influenced by bystanders because helping defectors independently of the presence of bystanders is unlikely to create evolutionary stable levels of cooperation.

Still, if individuals can increase their reputation by helping a conspecific, why do rats and humans show a decline of help particularly when being observed by others? Only one rat needs to help the victim and if help is costly, bystanders should avoid helping and wait until someone else pays the costs. This is known as the volunteer's dilemma and might explain the decreased helping levels in presence of passive bystanders. Future studies could investigate this underlying evolutionary explanation by increasing and decreasing the costs of helping, for instance, by varying the force needed to open the trap. Given many sad real-life examples and this being a strong effect in humans and rats, the evolution of bystander-induced helping apathy should be explored further.

This study not only raises questions about the evolutionary, but also about the psychological origins. A range of different psychological processes have been proposed in the field of Social Psychology, like diffusion of responsibility, evaluation apprehension and pluralistic ignorance (Hortensius & de Gelder, 2018). Havlik and colleagues propose that the underlying psychological process in rats is social learning. In an addition experimental condition, the authors demonstrate that rats who saw others opening

the trap, but never did so themselves, were able to open the trap once tested alone. But can this process be compared to spontaneous emergency situations in humans? Interestingly, a recent review challenges whether human helping others in such situations is reflective, i.e. a cognitive decision, but rather reflexive or a combination of both (Hortensius & de Gelder, 2018). It would be interesting to see how conserved these underlying psychological processes are. For example, if rats show such reflexive helping, how do their personality traits impact their helping behaviour? In addition, future studies could modify the settings slightly in order to understand how the rats perceive the situation and whether they are making a reflective decision to help. For example, can the bystander effect be eliminated, if all the rats would come from one housing group, if only the subject would be skilled to help, or if there would be reciprocal turn-taking between the victim and the subject?

In summary, this exciting study highlights once more the great social skills of rats. At the same time, the study stimulates a range of fascinating questions that should be addressed to provide a more nuanced understanding of why and how bystanders affect cooperation. Rats are highly social animals that live in groups of up to 200 individuals. They can be easily kept in the lab and various cooperation paradigms for rats have been developed and validated over recent years. Thus, rats are the ideal candidate to test these ideas further.

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