

Study shows cockroaches have individual personalities that impact group dynamics

February 4 2015, by Bob Yirka



Close up of a cockroach. Credit: Wikipedia/public domain

(Phys.org) —A team of researchers working at Université libre de Bruxelles has found that not only do cockroaches have unique individual personalities, but their differences can also have an impact on group dynamics. In their paper published in *Proceedings of the Royal Society B*, the group describes the experiments they conducted as part of their study and why what they learned might help explain why roaches are so good at surviving in different types of environments.

Prior research has shown that humans are not the only ones with unique personalities, other animals such as dogs and cats and many other mammals have been found to behave differently depending on their personality—also, scientists have found that a host of invertebrates also have unique personalities. In this new study the researchers sought to discover if the same was true for cockroaches.

To find out, the group assembled 19 groups of cockroaches with 16 individual same-age males in each. All had tiny transmitters attached so that their movements could be precisely tracked. Each group was released into a plastic arena (three times a week) from which they could not escape—which was initially completely dark. Just above the arena, the team placed several disks that would cast shadows down below when the lights were turned on. This allowed the researchers to track the roaches as they sought to hide in the shadows, or not, both individually, and when they were members of a group.

In analyzing the behavior of the cockroaches, the researchers found that there were clear differences in personality between individuals—when left alone, some would scurry to hide as soon as the light was turned on, while others dawdled or ignored the light altogether. They also found that some took a lot longer to work up the nerve to venture out after the light remained on for a long period of time. The researchers also found that the individual personalities tended to result in a group personality that was evidenced by how long it took a group as a whole to hide in the shade after the lights came on or how long it took to disperse. Notably, they also found that the behavior of the individual roaches was different depending on if they were alone or in a group—running to hide, for example when with a [group](#) when they would not do so when alone.

The team suggests that varying degrees of [personality](#) differences in individuals is likely part of what allows cockroaches to adapt to new surroundings so easily. Brave individuals may forge a new path, while

those that are shy remain behind, safe, should a nasty fate await those who venture out.

More information: Group personality during collective decision-making: a multi-level approach, *Proceedings of the Royal Society B*, rspb.royalsocietypublishing.org/.../1098/rspb.2014.2515

Abstract

Collective decision-making processes emerge from social feedback networks within a group. Many studies on collective behaviour underestimate the role of individual personality and, as a result, personality is rarely analysed in the context of collective dynamics. Here, we show evidence of sheltering behaviour personality in a gregarious insect (*Periplaneta americana*), which is characterized by a collective personality at the group level. We also highlight that the individuals within groups exhibited consistent personality traits in their probability of sheltering and total time sheltered during the three trials over one week. Moreover, the group personality, which arises from the synergy between the distribution of behaviour profiles in the group and social amplifications, affected the sheltering dynamics. However, owing to its robustness, personality did not affect the group probability of reaching a consensus. Finally, to prove social interactions, we developed a new statistical method that will be helpful for future research on personality traits and group behaviour. This approach will help to identify the circumstances under which particular group compositions may improve the fitness of individuals in gregarious species.

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