Jumping spiders reduce aggressiveness after perceiving mirror cues

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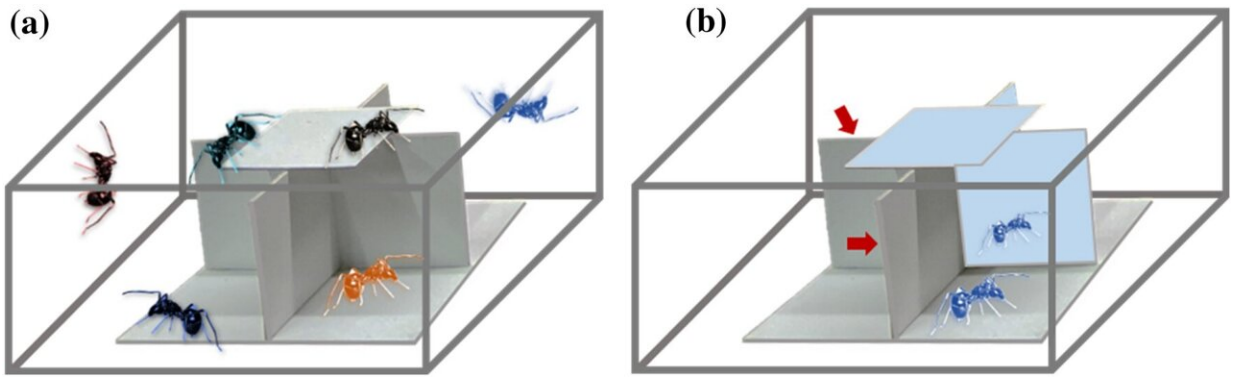

Resocialization and mirror-simulated resocialization. a. six spiders resocialized in one container with cardboards to avoid lethal fighting; b. one spider exposed to five pieces of mirrors. Credit: Dong Bing

Toxeus magnus is a species of ant-mimicking jumping spider. It shows prolonged cohabitation between the mother and her adult female offspring in the natal nest, suggesting an extremely high level of subsociality.

In high-level subsocial species, in which offspring disperse after sexual maturation, the variation in expression of aggression in response to different conditions remains largely uninvestigated.

In a study published in *Animal Cognition*, researchers from the

Xishuangbanna Tropical Botanical Garden (XTBG) of the Chinese Academy of Sciences have assessed the conspecific aggressiveness plasticity in response to the social environment (social living, isolation and resocialization) of Toxeus magnus. They further examined the proximate mechanism underlying the reversal to low aggression during resocialization.

Through a dyadic aggression test, they found that aggressiveness in T. magnus was dependent on group-living conditions but not kinship. When compared with isolated spiders, group-living individuals showed lower aggressiveness. They further found that isolation-induced aggression could be reversed by resocialization.

By using mirror cues to simulate resocialization condition, the researchers found that T. magnus could perceive the mirror cues and reduce their aggressiveness after simulated resocialization.

In the mirror-simulated resocialization experiment, the spiders could only observe one single conspecific (its mirror image), while spiders in the real resocialization experiment could observe five conspecifics.

The mirror-simulated resocialization experiment's results indicated that the visual signal of other individuals itself is crucial to induce conspecific tolerance in isolated spiders in T. magnus.

"Our findings suggest that group-living-based aggression plasticity also exists in high-level subsocial species. This study also presents an approach of using mirror cues to simulate group-living conditions in invertebrates," said Chen Zhanqi of XTBG.

More information: Bing Dong et al, Mirror image stimulation could reverse social-isolation-induced aggressiveness in the high-level subsocial lactating spider, *Animal Cognition* (2022). DOI:

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