

Solitude breeds aggression in spiders (rather than vice versa)

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Spiders start out social but later turn aggressive after dispersing and becoming solitary, according to a study publishing July 2 in the open-access journal *PLOS Biology* by Raphael Jeanson of the National Centre

for Scientific Research (CNRS) in France, and colleagues.

Many species display sociality only transiently during their life cycle. For example, spiderlings at their earliest developmental stage show mutual attraction and social tolerance before they disperse. This strongly contrasts with post-dispersal, solitary adult spiders that behave aggressively toward—and sometimes even cannibalize—other spiders. The onset of dispersal coincides with a sharp decline in social tolerance in many animals, but the [causal relationship](#) still remains poorly understood.

To address this question, Jeanson and his colleagues used a combination of behavioral, chemical and modeling approaches in spiderlings of a solitary species (*Agelena labyrinthica*, the labyrinth spider) to investigate the mechanisms controlling the developmental switch leading to the decline of social cohesion and the loss of tolerance.

They found that the process of maturation naturally causes an increase in mobility, which is itself sufficient to trigger dispersal without requiring any change in social behaviors. After spending an initial period of about five days in [close proximity](#), spiderlings progressively dispersed without any change in the [social context](#), that is, no aggressive interactions were observed before dispersal. By contrast, the [social isolation](#) that inevitably followed dispersal triggered aggressiveness by altering the way that individual spiders perceived others from the same species. For example, spiderlings that experienced social isolation were much more aggressive toward siblings than those reared socially. According to the authors, the findings provide strong evidence that aggression is a consequence, not a cause, of [dispersal](#) in spiderlings.

"We are now exploring the mechanisms explaining why spiderlings exposed to social isolation behave aggressively," said Dr. Jeanson. "Our favorite hypothesis, currently under testing, is that isolation leads

spiderlings to forget the social cues emitted by siblings. We believe that our findings open interesting perspectives to understand how permanent sociality, which characterizes about 30 out of the almost 50,000 species of spiders described thus far, has evolved."

More information: Chiara V, Ramon Portugal F, Jeanson R (2019) Social intolerance is a consequence, not a cause, of dispersal in spiders. *PLoS Biol* 17(7): e3000319. doi.org/10.1371/journal.pbio.3000319

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