

Reduced flexible behavior in autistic individuals is driven by less optimal learning

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Individuals with autism spectrum disorder (ASD) show reduced flexible behavior on a probabilistic reversal learning task, underpinned by less optimal learning within each developmental stage, according to a study published October 27 in the open-access journal *PLOS Biology* by Daisy Crawley of King's College London and Lei Zhang of University of Vienna, and colleagues. As noted by the authors, these findings provide novel insights into reduced flexible behavior in relation to clinical symptoms in ASD.

Flexible behavior requires learning from feedback to guide decisions, and adapting responses when such feedback changes. Studies of neurotypical individuals show that the cognitive processes underlying flexible behavior and reinforcement learning change as people pass through childhood and adolescence into adulthood. Despite the link often made between inflexible behavior and restricted, repetitive behavior—a core feature of ASD—evidence has been mixed and it has not

been clear how this behavior changes developmentally in [autistic individuals](#). To address this question, Crawley, Zhang and colleagues used a developmental approach and examined flexible behavior on a probabilistic reversal learning task in 572 children, adolescents and adults (ASD N=321; typical development, TD; N=251). In probabilistic reversal learning paradigms, participants typically must learn using feedback and adapt their responses when the rule changes to maximize favorable outcomes.

Autistic individuals showed on average more perseveration and less feedback sensitivity than TD individuals, resulting in poorer task performance. Computational modeling revealed that dominant learning mechanisms underpinning flexible behavior differed across developmental stages and reduced flexible behavior in ASD was driven by less optimal learning. In [autistic children](#), perseverative errors were positively related to anxiety symptoms, and in autistic adults, perseveration was positively related to restricted, repetitive behaviors. According to the authors, this study is the first to elucidate a potential learning mechanism by which behavioral rigidity manifests in autistic adults.

More information: Daisy Crawley et al, Modeling flexible behavior in childhood to adulthood shows age-dependent learning mechanisms and less optimal learning in autism in each age group, *PLOS Biology* (2020). [DOI: 10.1371/journal.pbio.3000908](https://doi.org/10.1371/journal.pbio.3000908)

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