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Perceptual Features in Visual Representations: A Content Analysis of Inheritance Diagrams

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Abstract

Within-species variability is a fundamental biological concept, essential in understanding advanced concepts like evolution. Students formally encounter variability in their study of genetics in 4th grade; however, children's cognitive biases can constrain their learning of variability. Diagrams are often used to facilitate learning of biological concepts, so it is important to understand how genetic inheritance diagrams depict variability. We analyzed 647 diagrams collected from textbooks and websites to examine how much variation diagrams present. We coded (1) depictions of within-species variability, and (2) other perceptual features implicated in learning (e.g., concreteness, richness). Preliminary findings indicate that many diagrams depict some within-species variability. Additionally, most diagrams used abstract representations of organisms and traits, which research suggests may be less optimal for younger students' learning but may encourage transfer in older students. We will discuss how diagram features may reinforce children's cognitive biases and may influence students' learning of inheritance and variability.