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## Does seeing in viewpoint perspective require awareness?

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Drawing in perspective seems to involve a prolonged development and is not usually present in children's drawings before about age nine - at least as found in previous research. This is why psychologists think that seeing in perspective requires awareness. In the present study, we built several 3D spatial models to simulate the developmental stages of children's spatial drawing systems, a simple platform without spatial constraints (stage 1), a platform with walls and a skylid (earth model) (stage 2). Stage 3 (orthogonal) and stage 4 (perspective) models had explicit boundaries around the spatial field to denote areas, and a matched control that controlled for the surround area outside the boundaries. Four age groups from seven to 10 years of age drew five non-overlapping figures. All age groups adapted the average figure size to the level of the spatial system (stage) of the models, but only when explicit spatial field boundaries were available: The more advanced the spatial system, the smaller the average figure size. Strikingly, 7- to 8-year-old children drew in perspective as often as 9- to 10-year-olds when the spatial models had a trapezoid field with converging diagonal sides. This *early perspective mapping* may have occurred because of the agreement between retinal image (appearance) and design (identity) of the perspective models (embodied perspective). Hence, this is the first study to show that typically developing young children can access low-level visual information and draw in viewpoint perspective without awareness of the visual-mathematical concept of perspective construction.

### Biography

Christiane Lange-Küttner obtained her Ph.D. at the Max Planck Institute of Human Development, Berlin, and worked thereafter as a post-doc in Cognitive Science at the Free University of Berlin. Since 1994, she holds an academic faculty position in the UK, initially at the University of Aberdeen, and up to now at the London Metropolitan University. From 2009-2011 she was Professor of Developmental Psychology at the University of Konstanz, Germany. She is also affiliated faculty at the University of Bremen, Germany.

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