

# Tracking the Developmental Trajectories of Semantic and Syntactic Aspects of Visual Cognition in Children

Poster Presentation 23.306: Saturday, May 18, 2024, 8:30 am – 12:30 pm, Banyan Breezeway

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Dilara Deniz Türk<sup>1</sup> ([dilaradeniz.turk@gmail.com](mailto:dilaradeniz.turk@gmail.com)), Daniela Bahn<sup>2</sup>, Christina Kauschke<sup>2</sup>, Melissa Le-Hoa Vo<sup>1</sup>; <sup>1</sup>Goethe University Frankfurt, Scene Grammar Lab, Germany, <sup>2</sup>Philipps University Marburg, Germany

Humans learn to associate objects and their locations in everyday scenes based on some rules and they develop expectations about what objects (semantics) should be where (syntax). For instance, we expect to find a pot in a kitchen rather than in a bathroom and we expect to see certain objects placed around a pot. The current study aims to explore the developmental trajectory of visual cognition in children. The eye movements of 39 children, aged 6-10, were tracked during a free viewing task involving scenes with consistent, semantically inconsistent, or syntactically inconsistent objects, as well as during a search task with objects at expected or unexpected locations. In addition to the implicit eye movement measures from these tasks, explicit measures were obtained as children furnished a dollhouse with 61 objects. Our findings replicated previous findings of consistency effect involving young adults and children aged 2-4, demonstrating a reduction in dwell time, first fixation time, and reaction time for consistent objects in both tasks. This reduction indicates strengthened predictions and faster attentional disengagement for objects in their familiar context or location. Moreover, as the dwell time for syntactic violations and first fixation time for inconsistently placed objects increased, the performance in the dollhouse task increased (i.e. smaller distance between related objects). No such relationship was observed between dwell times on semantic violations and placing the objects in correct rooms. Additionally, age-related trends were evident, with children exhibiting improved object placement performance, and also greater fixation delay on unexpectedly placed objects as they grew older. These findings suggest that scene knowledge still becomes more refined between 6 to 10 years. In summary, this study sheds further light on the impact of scene knowledge on implicit and explicit behaviors of children, providing valuable insights into the developmental aspects of visual cognition.

Acknowledgements: This work was supported by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation), project number 222641018 SFB/TRR 135 TP C7 granted to MLHV and the Hessisches Ministerium für Wissenschaft und Kunst (HMWK; project 'The Adaptive Mind').