Investigating the Link between Language and Scene Knowledge: Insights from Eye Movements in Children with and without Developmental Language Disorder

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Humans are constantly exposed to a framework of rules and develop expectations about their environment. These rules govern our interactions with the world, and we rely on them to navigate our surroundings. For instance, we expect a toothbrush to be in the bathroom, not in the kitchen. The processing of visual scenes and language might be governed by similar rules based on semantic and syntactic regularities and it has been suggested that there are common cognitive mechanisms underlying these processes. To further investigate the link between language and visual cognition, we recorded eye movements of 11 children (age range: 6;7- 10;4) with Developmental Language Disorder (DLD) who show difficulties in either syntactic or semantic aspects of language development and 11 children with typical language development (TLD) (age range: 5;5- 10;4). They performed both a free viewing task containing consistent, semantically inconsistent, and syntactically inconsistent objects and a search task containing objects either consistently or inconsistently placed in the scenes. Results from the free viewing task partly replicated the consistency effect found for adults: Both groups showed more and longer fixations over semantically inconsistent objects compared to consistent objects, but contrary to adults they showed no such consistency effect for syntactically inconsistent objects. In the search task, the consistency effect was diminished for children with DLD: Their RTs for finding the target objects was not affected by the violations in the scenes which might suggest that they do not benefit as much from scene knowledge as TLD children do. In summary, our preliminary results imply that 6–10-year-old children show sensitivities for object-scene inconsistencies that vary with task and are modulated by language abilities.