Title: Testing the Subject Bias and Effect of Verb Transitivity on Pronoun Interpretation in Adults with Intellectual Disability

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Introduction: Pronouns are frequently used in everyday conversations, yet are inherently ambiguous and can be difficult to understand. Adults rely on several strategies to determine who or what a pronoun refers to, including the “subject bias,” in which a pronoun is interpreted as referring to the subject of the previous sentence (Gernsbacher & Hargreaves, 1986). However, several factors mitigate the subject bias, including verb transitivity. Verbs vary along a continuum of transitivity based on the extent to which the subject of a sentence impacts the object: a high-transitivity verb like kick involves the subject acting in an impactful way on the object, while a low-transitivity verb like hear involves a more incidental relationship between the subject and object. Pyykkonen et al. (2010) reported that when a verb is highly transitive, children consider both the subject and object as potential referents for the pronoun. For example, children thought the pronoun he could refer to either the panda or the parrot in the following story: “The panda hit the parrot near the hut. He wants to...” However when presented with a low transitivity verb, they were significantly more likely to interpret the pronoun as referring to the subject (e.g., the panda). The purpose of the present study was to examine: 1) if adults with intellectual and developmental disabilities demonstrate the subject bias, and 2) if verb transitivity impacts their pronoun interpretation.

Method: Twenty-two adults with mixed etiologies of intellectual and developmental disabilities (age $M = 44.80$, $SD = 12.02$; IQ $M = 51.64$, $SD = 13.16$, range = 40-88) participated in the study. After completing a standardized IQ assessment (KBIT-2; Kaufman & Kaufman, 2004), participants listened to 20 different mini-stories with ambiguous pronouns, while also viewing corresponding pictures on a computer screen. The first two sentences of each story introduced two animal characters, a verb, and a location. For example, “There are the panda and the parrot. The panda hit the parrot near the hut.” The third sentence began with a critical pronoun: “He wants to not do any homework today.” Participants were then asked to indicate who the pronoun referred to, e.g., “Who wants to not do any homework today?” by pointing to one of the animals on the computer screen. The independent variable was the transitivity of the verb (high vs. low; stimuli adapted from Pyykkonen et al., 2010). Performance was measured via participant response to the probe question and via eye-gaze using the Visual World Paradigm with Eyelink 1000+ eye-tracker. Trial order was counterbalanced across participants from one of four lists which were randomized for the grammatical role of the two animals and the order of presentation of stories.

Results: Results indicated a significant subject bias (61% subject responses) and that verb transitivity did not mediate this preference [$\chi^2(1) = .029$, $p = .87$], with participants preferring the subject in both the high (61%) and low (60%) transitivity conditions. However, the subject bias was mediated by IQ: like typically developing children and adults, participants with higher IQs were more likely to interpret the pronoun as referring to the subject of the previous sentence [$\chi^2(1) = 7.71$, $p < .005$].

Discussion: These findings suggest that adults with intellectual or developmental disabilities may not be sensitive to the degree of verb transitivity. Future work could focus on specific etiologies of intellectual disability, add typically developing comparison groups, test if other manipulations (e.g. prosody) impact ambiguous pronoun resolution, and compare eye-tracking vs. behavioral responses.

References/Citations: