# JA, multimodal behaviors and their relation to language acquisition

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Joint Attention (JA) between children and their parents, are often related to the child's later language skills (e.g., Carpenter et al., 1998). However, the definitions of JA, and the way it has been operationalized, differ between studies. Studies on similar cohorts and methodologies often end up with different results (Gabouer & Bortfeld, 2021; Astor & Gredbäck, 2022). It has been suggested that JA is a Western phenomenon rather than a universal prerequisite for language acquisition (Akhtar & Gernsbacher, 2007). The present study followed 14 Swedish child-parent dyads, longitudinally between 0;9 and 3;0 years of age, including the dyads' interactional use of vocal, gestural, gaze, touch, and facial expressions. The research questions address: i) which behaviors are involved in JA; ii) which behaviors predict JA, and iii) if JA can be detected through data-driven methods. We further investigate the relationship between multimodal variables and later language skills. The results indicate that some behaviors are more frequent in JA-sequences than outside of these; and, that parental behaviors predict JA during the period 9-15 months of age. We find a data-driven factor that summarizes behaviors that are related to JA; however, this factor seems to capture dyadic shared attention rather than triadic JA. The factor is predictive of two of the language measures (SCDI and PPVT), whereas JA predicts only one of these (SCDI). Furthermore, specific behaviors such as Child-gaze-at-object, carries the same - or higher - explanatory power for later language skills than does JA. The results are discussed in relation to previous findings and future goals.