

An ERP study on the processing of gender features in Italian toddlers

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Italian nouns are preceded by articles, which change according to the noun gender and number. Nouns feature either a biological, transparent relationship between the referent's biological sex and the noun gender (*la_{def}fem nonna_{grandma}-a_{fem} the grandma*) or a formal gender, where the gender is assigned arbitrarily (*la_{def}fem sedia_{fem} the chair*). Previous studies on adults showed that a gender violation elicits typical ERP components: a posterior positivity (P600) sometimes preceded by a negativity (LAN/N400). However, little is known about how toddlers process gender. Here, we investigated biological and formal gender processing by Italian adults and 24-month-old toddlers. In each trial, participants were presented with a picture on the screen, associated with an auditory stimulus (“*Look at the_{masc/fem} big [noun_{masc/fem}]*”). This stimulus could correctly describe the image (Labelling condition), or not, creating a gender violation with the image (Mislabelling condition). Additionally, the nouns were divided based on the gender's type (Bio vs Formal). Analyses were conducted using a cluster-based permutation and showed that adults and toddlers detect the gender mismatch similarly, triggering an anterior negativity during the article processing. Concerning the gender's types, adults relied more on formal gender even though the results are not fully significant. During the noun time-window, both groups reveal a biphasic effect: adults showed a frontal negativity and a posterior positivity whereas toddlers showed the opposite polarity. In sum, these results indicate that the early processing of gender mismatch in noun phrases is already developed at age 24 months, even if some differences between children and adults emerged.