RELIANCE ON GOOD-ENOUGH PROCESSING ACROSS THE LIFESPAN

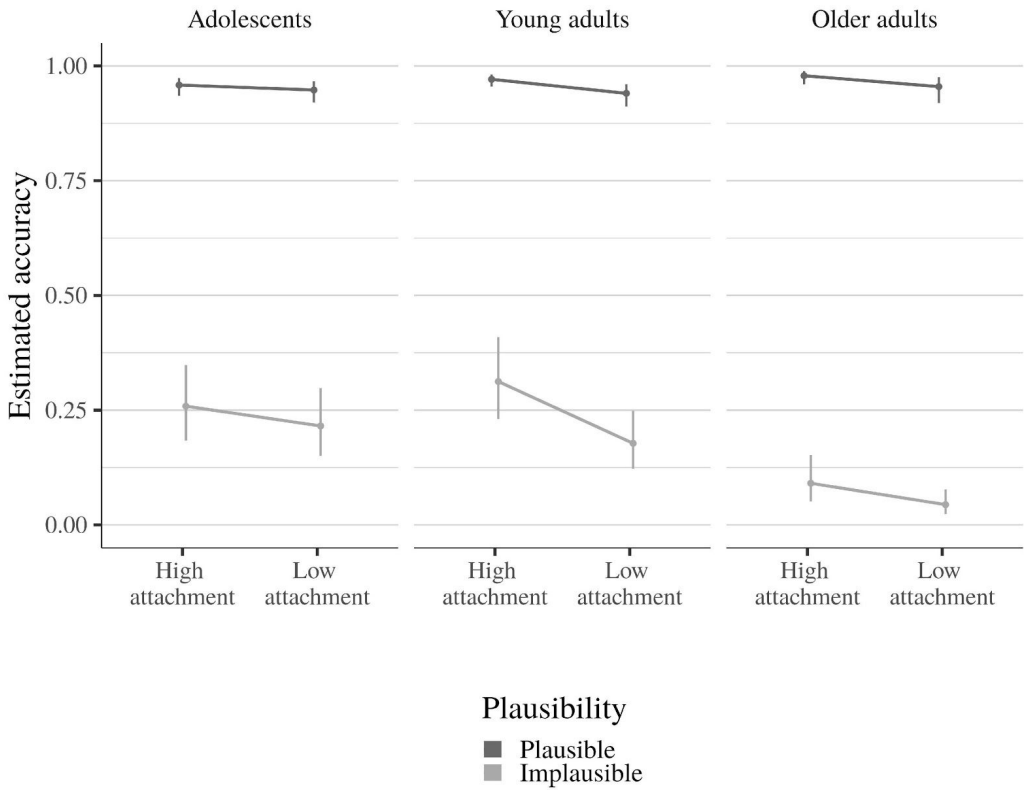
Anna Laurinavichyute (National Research University Higher School of Economics, Russia),
Anastasiya Lopukhina (National Research University Higher School of Economics, Russia),
Svetlana Malyutina (National Research University Higher School of Economics, Russia)
alopukhina@hse.ru

People sometimes arrive at incorrect representations of the sentences that they encounter. One possible reason for that is a competition between slow incremental bottom-up processing and "fast and frugal" top-down heuristics (also referred to as good-enough processing) that serve to support fast-paced communication but sometimes cause misinterpretations. Such heuristics can be both semantic, relying on the world knowledge and semantic frames (Ferreira et al., 2002), and structural, relying on the frequency of occurrence of certain structures. Heuristics can also differ in strength: suggestive heuristics guide parsing of locally and globally ambiguous structures (for example, minimal attachment or late closure principles), while prescriptive heuristics can mislead parsing of completely unambiguous structures. For example, prescriptive semantic heuristics may drive misinterpretations of passives (Ferreira, 2003). Prescriptive structural heuristics can promote parses that are ruled out within the global sentence context, such as the subject-verb parse of a string "the player tossed" in "The coach smiled at the player tossed a frisbee", where "tossed" requires a low-frequency past participle parse (Tabor et al., 2004).

Scattered experimental evidence suggests that reliance on heuristics may change from greater reliance on syntactic information in younger people to greater reliance on semantic information in older people. Several studies showed that children and pre-adolescents relied on syntactic information and structural heuristics while disregarding semantic and contextual information (Felser et al., 2003; Trueswell et al., 1999). At the same time, older adults were shown to rely more on semantic than syntactic information (Malyutina & Den Ouden, 2016).

To test whether semantic and structural good-enough processing depends on age, we tested three groups of Russian-speaking participants: 137 adolescents (87 female; age range 13-17 years, M=15), 135 young adults (99 female; age range 20–40 years, M=25), and 77 older adults (57 female; age range 55–91 years, M=64). They read 56 unambiguous high- vs. low-attachment sentences (for ambiguous sentences, Russian speakers prefer high-attachment interpretations) that were either semantically plausible or implausible, i.e., the syntactic structure either matched or contradicted the typical semantic relations, see Example 1. We chose this structure since it has been shown to elicit surprisingly low question response accuracies (Chernova & Chernigovskaya, 2015). Sentences were presented in a non-cumulative self-paced reading paradigm and followed by a comprehension question targeting the attachment site of the relative clause.

Question response accuracies were analyzed using Bayesian mixed-effects logistic regression. As expected, we found that young adults made more errors in the dispreferred implausible and low-attachment conditions. Older adults had lower accuracy than young adults across the board, and showed a greater decrease in accuracy in implausible sentences, thus demonstrating increased reliance on semantic heuristics. Adolescents did not differ from young adults in overall accuracy, but showed no reliable difference between high- and low-attachment conditions, thus demonstrating the lack of syntactic heuristics. In addition, we confirmed that heuristics were faster than incremental bottom-up processing: slower reading times were associated with greater accuracy in general, but there was an additional increase in accuracy specifically for implausible sentences. To summarise, we confirmed the general trend of greater reliance on semantic heuristics in older age, and greater reliance on structural heuristics in adults and older adults as compared to adolescents. This work was supported by the Russian Foundation for Basic Research, Project № 18-012-00640.



Example 1:

High attachment, plausible

Rimma dressed the child-ACC of the writer-GEN, who was babbling-ACC incomprehensibly.

Question: Who was babbling incomprehensibly? **Child** / Writer

Low attachment, plausible

Rimma dressed the child-ACC of the writer-GEN, who published-GEN a popular novel.

Question: Who published an interesting novel? Child / **Writer**

High attachment, implausible

Rimma dressed the child-ACC of the writer-GEN, who published-ACC a popular novel.

Question: Who published an interesting novel? **Child** / Writer

Low attachment, implausible

Rimma dressed the child-ACC of the writer-GEN, who was babbling-GEN incomprehensibly.

Question: Who was babbling incomprehensibly? Child / **Writer**

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