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Latent Structure of Individual Differences in Time Perception: Stability and Dynamics

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Temporal bisection tasks are widely used to assess interval timing, but standard behavioral indices cannot easily distinguish changes in temporal discrimination from shifts in response bias. In this study, 194 adolescents completed a visual temporal bisection task with two consecutive blocks. Using hierarchical Bayesian psychometric modeling, we decomposed binary duration judgments into temporal sensitivity and decision bias, and examined how these parameters changed during task progression. At the group level, temporal sensitivity declined in the second block, whereas decision bias remained relatively stable. Despite this decline, individual sensitivity estimates showed strong short-term rank-order stability across blocks. Sensitivity changes also varied across individuals and were systematically related to baseline sensitivity, with higher baseline sensitivity associated with smaller declines. Model-derived sensitivity changes corresponded to changes in conventional psychophysical indices, including the difference limen and Weber ratio. These findings highlight within-session dynamics in adolescent temporal discrimination and demonstrate the utility of hierarchical modeling for separating sensitivity and bias.