

The Amount of Information Processing and Balance Performance in Children: The Dual-Task Paradigm

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Abstract : The purpose of this study was to investigate the effect of reaction time (RT) or balance performance as the number of stimulus-response choices increases, the amount of information processing of 0-bit and 1-bit conditions based on Hick's law, using the dual-task design. Eighteen children (age: 9.38 ± 0.27 years old) were recruited as the participants for this study, and asked to assess RT and balance performance separately and simultaneously as following five conditions: simple RT (0-bit decision), choice RT (1-bit decision), single balance control, balance control with simple RT, and balance control with choice RT. Biodex 950-300 balance system and You-Shang response timer were used to record and analyze the postural stability and information processing speed (RT) respectively for the participants. Repeated measures one-way ANOVA with HSD post-hoc test and 2 (balance) \times 2 (amount of information processing) repeated measures two-way ANOVA were used to test the parameters of balance performance and RT ($\alpha = .05$). The results showed the overall stability index in the 1-bit decision was lower than in 0-bit decision, and the mean deflection in the 1-bit decision was lower than in single balance performance. Simple RTs were faster than choice RTs both in single task condition and dual task condition. It indicated that the chronometric approach of RT could use to infer the attention requirement of the secondary task. However, this study did not find that the balance performance is interfered for children by the increasing of the amount of information processing.

Keywords : capacity theory, reaction time, Hick's law, balance

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