

Age and Saccadic Reaction Time in Persons with Intellectual Disabilities

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Abstract

Age related change of saccadic reaction time (SRT) in persons with intellectual disabilities (PWID) was investigated. A total of 34 PWID participated in this research. Participants were divided into Group I ($IQ \geq 34$) and Group II ($IQ \leq 33$). For both groups, SRT reduced through adolescence. However, after the thirties, there was a difference between 2 groups. In Group II, SRT increased after thirties, while SRT of Group I stabilized after adolescence. That is, although a U-shaped relation was found between SRT and age in Group II, an L-shaped change was found in Group I. SRT of Group II was slower than that of Group I. The negative correlation between IQ and SRT underlies this result. It is thought that this relationship between IQ and SRT is due to the reduction of information processing speed and the lapse in attentional function associated with the decrease of IQ. A detailed explanation of the influence of these factors on age related change of SRT in PWID warrants further study.

Introduction

Little is known about the age related change of SRT in persons with intellectual disabilities (PWID). The current study examined the relationship between age and SRT in PWID. The hypotheses tested were as follows. 1) SRT of PWID decreases with age, at least throughout adolescence. 2) The age-related change in SRT is affected by the degree of intellectual disability.

Method

Participants were 34 PWID aged 13-34 years (23.74 ± 7.83) whose IQ was 14-70 (34.50 ± 15.54). Participants were split into 2 groups (Group I: $IQ \geq 34$; Group II: $IQ \leq 33$). The visual target was moved on the horizontal plane rectangularly at a frequency of 0.5 Hz. Participants pursued the target as quickly as possible. The mean SRT of five saccades was calculated.

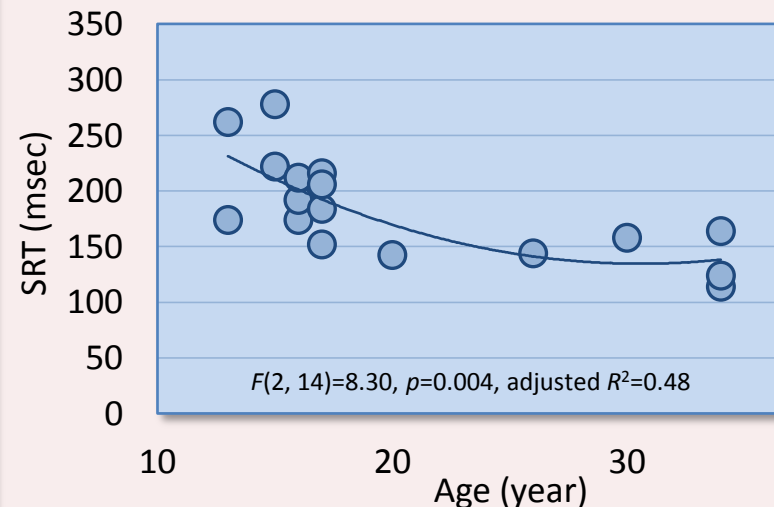


Fig. 1 Age related change of SRT in Group I

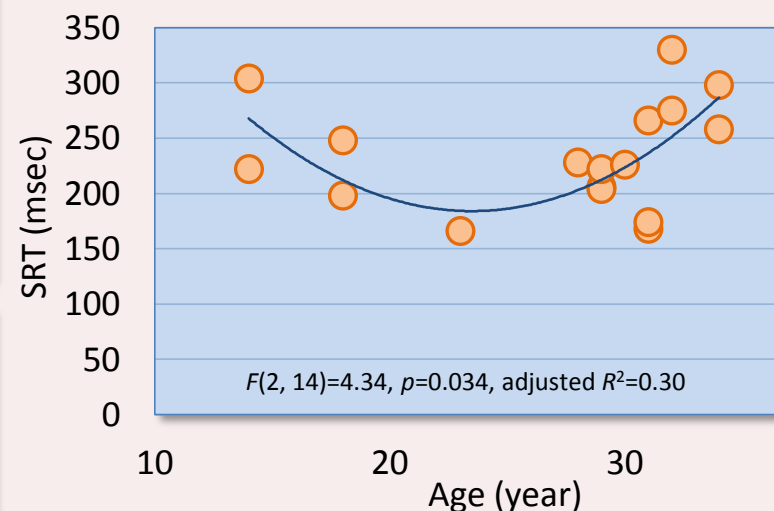


Fig. 2 Age related change of SRT in Group II

Results

Among each group, a consistent relationship between age and SRT was found. SRT in Group I decreased with age throughout adolescence. The same was true of SRT in Group II. Nevertheless, SRT in Group I stabilized after the twenties, although it increased in Group II after the thirties. That is, a U-shaped relation was found between SRT and age in Group II, while SRT in Group I demonstrated an L-shaped change with age. Quadratic regression was conducted to analyze the relationship between SRT and age for each group. Both quadratic fits were found to be statistically significant (Group I: $F(2, 14)=8.30$, $p=0.004$, adjusted $R^2=0.48$; Group II: $F(2, 14)=4.34$, $p=0.034$, adjusted $R^2=0.30$). SRT of Group II was slower than that of Group I. SRTs of participants in their twenties and early thirties in Group I reached within the range of the mean SRT $\pm 1SD$ of typically developing adults (mean SRT 143.90 msec, $SD=38.20$), though the SRTs of most participants of the same age in Group II did not.

Conclusion

SRTs in Group I and II shared the common tendency in both to continue to decrease throughout adolescence. This result suggests that the developmental decrease of SRT in PWID progresses slowly in comparison with typically developing persons. The differences of age-related changes of SRT after adolescence between Group I and II were as follows. 1) SRT of Group II was longer than that of Group I. 2) The difference of SRT between the two groups increased with age. The negative correlation between IQ and SRT underlies these outcomes. It is thought that this relationship between IQ and SRT is due to the reduction of information processing speed and the lapse in attentional function associated with the decrease of intellectual function (Haishi, Okuzumi, & Kokubun, 2011). A detailed explanation of the influence of these factors on age related change of SRT in PWID warrants further study.