1. Introduction

- Response control refers to the processes involved in the decision to actually perform a prepared response or to refrain from executing the response (Van den Bergh et al., 2005).

2. Aim of the study

- To examine whether previously found questionnaire-based differences on response inhibition can be corroborated by direct, behavioral, neuropsychological computer tasks.

3. Participants

- 40 children (32 boys and 8 girls): 20 CWS (6;01 – 10;10; mean = 8;10) and 20 age- (± 3M) and gender-matched CWNS (5;10 – 10;11; mean = 8;10); all native Flemish speakers, with no known/reported neurological, psychological, developmental problems, and normal or corrected to normal vision.

4. Procedure

- Participants were all paid volunteers, recruited after initial contact with their fluency specialist (for the CWS) or through their schools (for the CWNS). All specialists who participated in this study and students Karen Remans and Sofie Sambre for their assistance in collecting part of the data.
- Stop signal task (Verbruggen, et al., 2008):
  a) go-trials (75%): square: press right/ circle: press left;
  b) stop signal-trials (25%): presentation of a stop signal (750Hz, 75ms) after presentation of the primary task stimulus: withhold responses; practice phase: 32 trials; experimental phase: 3 blocks of 64 trials. (Figure 2)
- Sustained attention task (De Sonneville, 2005): The stimulus is a house with one animal in one of the three windows; for a bee: press right, for a bird or butterfly: press left (in individuals with right hand dominance).

5. Results

- Independent-samples t-tests were employed to evaluate possible differences on chronological age, SES, IQ-score, and a simple reaction time task. No significant between-group differences were found (p > .05).
- One way ANOVAs were used to detect whether the two groups differed on the performance measures of the stop signal task. Although no difference was found for stop signal reaction time (SSRT, estimated speed of inhibition), significant differences were found for mean stop signal delay. F(1, 38) = 5.8, p < .05, signal respond RT, F(1, 38) = 5.8, p < .05, of missed responses on no-signal trials, F(1, 38) = 7.6, p < .01. One way ANOVAs were used to evaluate group differences on the sustained attention task. Significant differences were found for number of hits, F (1, 38) = 5.1, p < .05, number of misses, F (1, 38) = 5.1, p < .05, and number of correct responses after errors, F (1, 38) = 6.7, p < .01. (Figure 5). No significant RT differences were found.

6. Conclusions

- Although CWS and CWNS have a similar estimated speed of exogenously triggered response inhibition, CWS perform faster on both signal and nosignal-trials, resulting in shorter stop signal delays. Moreover CWS have less missed responses on nosignal-trials.
- On the sustained attention task, the response style of CWS, compared to CWNS, is less controlled (less hits & more misses).
- CWS, compared to CWNS, seem to perform better in tasks where response control is externally triggered while their performance is worse in tasks where response control has to be generated autonomously.

7. Acknowledgements

- This research was funded by Lessius U College. The authors would like to thank the families, schools and fluency specialists who participated in this study and students Karen Remans and Sofie Sambre for their assistance in collecting part of the data.

8. References