



Reply to the letter



We are thankful for the valuable comments of Dr. Plourde on our article “The neurocognitive nature of children with ADHD comorbid sluggish cognitive tempo: Might SCT be a disorder of vigilance?” The author criticized two important issues in our study. First, it was underscored that commission errors were found to be statistically higher in both CPT and Stroop tests in SCT + ADHD group when compared to the ADHD-only and control groups (10.14 ± 13.93 vs. 4.34 ± 4.66 , $p = 0.016$ for CPT test; 6.76 ± 5.97 vs. 3.68 ± 2.89 , $p = 0.017$ for Stroop test). The CPT test is used to measure vigilance and or sustained attention (Gualtieri and Johnson, 2006). Importantly, the significant difference for the Stroop commission errors was not survived after Bonferroni correction ($p = 0.017$). However, the commission errors on CPT test was significantly higher in those with SCT relative to ADHD-only group even after Bonferroni correction ($p = 0.016$). The commission errors in a given cognitive task is one of the indicators of impulsive behavior, which is one of the core features of ADHD symptoms (APA, 2000). From this point of view, higher numbers of commission errors in CPT test do not seem to be compatible with SCT construct. To better understand and explain our CPT results, we employed logistic regression analysis and revealed that CPT commission error lost its significance ($p = 0.106$) but only the statistical significance for CPT reaction time was retained after regression analysis ($p = 0.026$). These results indicated those with SCT displayed worse vigilance and sustained attention relative to ADHD-only and control counterparts. However, we found no significant difference between those with SCT and ADHD-only subjects with regards to omission errors but there are findings reporting the association between omission errors and SCT (Willcutt et al., 2014). There might be several explanations for this results. In our study, the mean omission error score was significantly greater in both SCT + ADHD and ADHD-only group when compared to subjects. Since ADHD is associated with impulsive behavior and inattention, the ADHD comorbidity in our SCT subjects might cause increased commission errors in the SCT + ADHD group relative to ADHD-only group as well as the lack of significant difference for omission errors between ADHD subjects with and without SCT. In parallel with this, the commission errors in both CPT and Stroop tests were also statistically significantly higher in ADHD-only group when compared to the control group ($p = 0.014$ and $p = 0.042$). Noteworthy, the significance for the commission errors in the CPT test in ADHD-only group

survived even after Bonferroni correction. Additionally, the mean omission error score was also significantly higher in ADHD-only group relative to control subjects ($p = 0.001$). Therefore, the inclusion of pure SCT subjects and comparison of those subjects with ADHD-only individuals in future studies are needed for two main reasons. To compare pure SCT subjects and ADHD only groups would provide better understanding for the neurocognitive similarities and differences of those diagnostic groups, and to disentangle the influence of ADHD symptomatology on SCT construct.

In another comment, Dr. Plourde indicated that impaired cognitive flexibility in those with SCT might be related to the disrupted executive functioning, that is, SCT might be relate to executive functions (EF). The cognitive flexibility domain is a component of the executive functions along with other cognitive skills such as planning, problem solving, decision making, self-regulation, working memory, attentional control, inhibitory control (Miyake et al., 2000). To date, several researchers have reported lack of significant association between EF-related problems and SCT (Barkley 2013; Bauermeister et al., 2012). In our study, the only EF related findings in those with SCT was impaired cognitive flexibility and attentional set shifting. But we revealed no pervasive disruptions in several EF-related aspects including psychomotor speed and processing speed. It would then be premature to conclude that SCT is a disorder of EF with the findings of our study. We definitely agree with the suggestion of Dr. Plourde to implement various EF focused neurocognitive batteries to enlighten the relationship between EF and SCT in future studies. In sum, we are again thankful for the comments of Dr. Plourde.

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