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Relationship Between Executive Function and Postural Control

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RELATIONSHIP BETWEEN EXECUTIVE FUNCTION AND POSTURAL CONTROL

by

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Abstract

While it has been established that postural control is affected by executive function, research is lacking in identifying if specific executive function components are most responsible or if certain aspects of postural control are more affected than others (e.g., proprioception, vestibular, visual). The current study examined the role of inhibition, processing speed, and visuospatial ability in postural control under conditions affecting visual, proprioceptive, and vestibular sensory input. Cognitive assessments consisted of the Flanker Inhibitory Control and Attention Test, Digit Symbol Substitution Test, Clock Drawing Test, Trail Making Test – Part B, and simple reaction time. Standing Balance was used to assess postural sway. Analyses revealed that average balance was significantly associated with simple reaction time ($r(88) = -0.31$, $p < .01$) and the clock drawing test ($r(88) = -0.25$, $p < .05$). Further analyses revealed a significantly stronger relationship between pose #1 (eyes opened, firm) and average balance ($r(88) = -0.845$, $p < 0.1$) when compared to pose #2 (eyes closed, firm), and pose #3 (eyes opened, foam) and average balance $r(88) = -0.8015$, $p < 0.1$) when compared to pose #4 (eyes closed, foam). The significantly stronger relationship between these two measures demonstrates that visual input in both conditions #1 and #3 was associated with better postural control. The findings of this study demonstrate that reaction time and visuospatial abilities are associated with overall postural control in healthy older adults. Results suggest that reaction time should be more thoroughly researched to determine the extent of its influence on EF and physical function.

Dedication

This thesis is dedicated to my parents, who, through everything, have provided me with unfaltering support and love. This thesis is also dedicated to my grandparents; without their sacrifices, my freedom and purpose would not exist.

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Introduction

By 2030, all baby boomers will be older than 65 years, making 20% of the U.S. population retirement age (U.S. Census, 2018). By 2035, older adults are projected to outnumber children for the first time in U.S. history. Many other countries are headed down the same path, if not already there. Consequentially, incidents of dementias, mild cognitive impairment (MCI), and other neurodegenerative diseases will be seen to rise, though there is currently no cure and pharmaceutical drugs only offer symptomatic relief. Therefore, attention turns to identifying preventive measures for dementias, mild cognitive impairment, and overall cognitive decline.

Despite cognitive and structural decline in prefrontal regions as one ages, executive functioning becomes increasingly important for maintaining cognition. Research shows that executive functioning might also be important for maintaining sensorimotor processing and physical function. Past studies have revealed associations between physical and cognitive functions through the effectiveness of exercise interventions on cognitive functioning, neuroimaging studies comparing structures associated with higher-level processing and sensorimotor function, and investigations into the relationship between cognitive and physical function measures (Colcombe & Kramer, 2003; Davis et al., 2008; Muir-Hunter et al., 2014; Papegaaij et al., 2014; Fernandez et al., 2019). While there is much evidence backing this relationship, more research is needed to further understand it. There are various physical function measures that may be used to observe this relationship. One that is particularly important due to its association with falls and other mobility issues among the elderly population is postural control. Exploring the relationship between cognitive functioning and postural control will supplement the current literature aiming to understand the fundamental relationship between cognitive and physical function, which is necessary in order to develop physical programs that work preventively against cognitive decline, MCI, and other neurodegenerative diseases.

Postural Control

Postural control is the ability to keep one's body in an upright position. This requires the integration of proprioceptive, vestibular, and visual information (Hansson et al., 2010). Proprioception is the awareness of the position and movement of the body through information from sensory receptors in the skin and mechanoreceptors in the muscles (Hansson et al., 2010). The vestibular system, found in the ear, provides information on the movement and placement of the head. Proprioceptive, vestibular, and visual information is processed and integrated in a matter of milliseconds in the occipitotemporal and parietal regions of the brain. Because this is an ongoing process, the body is in constant motion known as postural sway. Good postural control is observed by measuring the amount of postural sway: a smaller amount of postural sway indicates better postural control, while a greater amount of postural sway indicates poorer postural control. Postural control can be measured using a force plate under various conditions that isolate the three sensory components affecting postural control. By isolating each sensory component, one can observe how effective the isolated component is at managing postural control on its own as well the importance of the absent component(s) to good postural control. A quiet stance measures postural sway under normal conditions; one would stand with feet together and facing forward with eyes open. To measure the importance of vision to postural control, one would stand with feet together and eyes closed. To measure the importance of proprioception to postural control one would stand with feet together, eyes opened, and on foam. To measure the vestibular sensory component, one would stand on foam with feet together and eyes closed.

Vision appears to be significantly important to postural control (Hansson et al., 2010). In healthy older adults, sway velocity increased significantly when participants had their eyes closed than with eyes opened, regardless of whether they were standing on a firm surface or foam. Vision (eyes closed condition) was also seen to have a greater effect on sway than whether position of the vestibular organ (participants' heads were extended or neutral) (Pociask et al., 2016). In patients with Parkinson's disease (PD), those with poorer visuo-spatial ability and contrast sensitivity also had poorer postural control (Hill et al., 2016). When assessing fall risk, older adults who experienced multiple falls over a 12-month period demonstrated worse performance on measures of visuospatial ability and greater mean postural sway (Martin et al., 2013). Further, postural sway showed to be a significant predictor of falls especially during eyes-closed trials in which postural control was worse than in eyes-open trials (Johansson et al., 2017).

Postural control has also been observed under dual-task conditions in which both sensorimotor and cognitive performance are simultaneously assessed; typically, one is asked to perform a quiet stance while also completing an attentional cognitive task. Considerable research has demonstrated decrease in postural control among older adults in dual-task conditions when compared to single-task conditions regardless of age (Smolders et al., 2010; Coelho et al., 2016; Grobe et al., 2017). The predominant reasoning behind these results is that as cognitive resources are allocated towards performing one task, performance in the other task worsens; this is known as dual-task costs (DTC). This has suggested the involvement of cognitive resources in sensorimotor processing. If cognitive resources are in fact involved in sensorimotor processing, understanding how this relationship changes as one ages is necessary to develop physical programs that work preventively against cognitive and physical decline.

Cognitive Function

Executive function is a global construct involving various general-purpose mechanisms that are essential to higher-order cognitive processes involving problem-solving, decision-making, reasoning, and long-term memory (Reuter-Lorenz et al., 2016). These mechanisms, or components include working memory, inhibition (involving selective attention and interference control), and cognitive flexibility (also known as set-shifting, mental flexibility) (Diamond, 2013). Working memory allows for one to hold and manipulate information in one's mind for problem-solving and decision-making; for example, when solving a math problem in one's head or choosing the best between two products while shopping. Inhibition works to allocate and maintain cognitive resources/attention on a specific stimulus or task while suppressing irrelevant information, and resolve interference and conflict (Cabeza et al., 2005). Inhibitory processes would be employed if one were studying in a noisy café or trying to listen to a specific stream of conversation in a noisy room. Cognitive flexibility allows for one to switch attention from one task to another quickly and effectively, such as looking for a shirt in one's laundry pile to then looking for one's socks.

As one ages, the brain undergoes extensive structural changes that result in altered functional connectivity between networks associated with higher-order cognitive processing (Kranz et al., 2016). These age-related changes in prefrontal cortical structures have been extensively demonstrated to be associated with executive functioning (working memory, inhibition, and cognitive flexibility) and processing speed decline in older adults (Reuter-Lorenz et al., 2016). Paradoxically, research shows that the aging brain engages in compensatory processes that involve a higher dependence on the prefrontal cortex, a region heavily associated with higher order-cognitive processing (Reuter-Lorenz et al., 2016). The importance of executive function and associated cortical structures is also evident in behavioral studies where higher levels of executive function in both healthy older adults and individuals with mild cognitive impairment is related to better behavioral performance (Chang et al., 2010).

Notably, older adults also experience age-related increases in frontal- and parietal-activity while also experiencing a decrease in occipital activity (Davis et al., 2008). These changes underly an age-related decline in sensory processing and an increased reliance on higher-order processes as a compensatory mechanism. Research shows that sensorimotor processes also undergo an age-related decline, and thus increasingly rely on higher-order processes to compensate, though further investigation is needed to understand the full extent of the relationship between higher-order cognitive processes, sensorimotor processing, and physical function.

Postural Sway and Cognitive Function

There is much evidence to show that integration of sensorimotor information from the proprioceptive, vestibular, and visual systems responsible for postural control involves cortical structures responsible for higher-level information processing (Papegaaij et al., 2014). Further, these sensorimotor abilities are affected by age-related changes in brain structure and function leading to a heavier reliance on higher-order neurological processes for movement coordination and control as one ages (Heuninckx et al., 2005; Davis et al., 2008; Zwergal et al., 2010; Papegaaij et al., 2014; Swanson & Fling, 2018). Older adults activate additional higher level sensorimotor cortical areas suggesting that they rely on cognitive input and additional sensory areas as a compensatory mechanism (Zwergal et al., 2010); for example, if both a young and older adult were asked to walk across a room, the older adult would need to activate additional regions of the brain, mainly in the frontal and parietal regions, to perform the same walking task as the younger adult. Further evidence of this is seen in Swanson and Fling’s (2018) study in which reduced cortical inhibition in younger adults allowed for the maintenance of lower extremity coordination, while increased cortical inhibition in older adults allowed for better walking performance. Older adults appear to rely on higher-level processing, such as cortical inhibition, for proper integration of sensorimotor integration in order to achieve the same coordinated movements as younger adults. This relationship between sensorimotor processing and activation of cortical areas responsible for higher-level processing can also be observed in the association between postural control and executive function.

Studies have consistently demonstrated a relationship between postural control and executive function. In a study performed with healthy older adults, those with poorer performance on executive function measures also showed poor performance on measures of postural control (Muir-Hunter et al., 2014). In populations with impaired cognitive function, postural control was significantly worse even during quiet stance with eyes opened (Szczepanska-Gieracha et al., 2015). When measuring day-to-day variability of postural sway in older adults, more variability in sway distance and area were associated with poorer cognitive function (Leach et al., 2018). In patients with Parkinson's disease (PD), those with poorer visuo-spatial ability and contrast sensitivity also had poorer postural control significantly worse than the healthy control group. Notably though, some participants showed poorer postural control despite better visuo-spatial ability. For these participants, attention was below the group median, suggesting an additional relationship between executive function and postural control (Hill et al., 2016). It is clear that in the absence of proper executive functioning, basic physical functioning such as postural control begins to fail. This is most notable in the incidents of falls among older adults with poor executive function.

Studies have also shown an interaction between falls, postural control, and cognitive impairment. In Martin et al.'s study (2013), along with poorer visuospatial ability and postural control, older adults who experienced multiple falls over a 12-month period demonstrated worse function on measures of executive function and reaction time. In another study investigating the relationship between fall risk and visual impairment, the association between visual impairment and falls became non-significant when excluding participants with mild cognitive impairment (MCI) (Gopinath et al., 2016), indicating a relationship between intact executive functioning and sensorimotor function . Taylor et al.'s study which also investigated falls found that poorer executive function was more strongly associated with multiple falls than other cognitive domains. Of note, these participants also had poor vision, reaction time, and balance (increased postural sway/poor postural control). Ultimately, simple reaction time and postural sway appeared to mediate the relationship between executive function and falls (Taylor et al., 2017). This further points to an important relationship between executive function and postural control, and a dynamic relationship between executive function, sensorimotor input, and postural control.

With respect to specific components of executive function and their associations with physical function measures, greater mean gait variability is associated with poorer processing speed and greater postural sway (Jayakody et al., 2018). Further, brain regions recruited by older adults with greater variable gait were shown to be exactly the regions recruited during conflict trials of the Flanker Task (measure of inhibition and attention) (Fernandez et al., 2019). This indicates a relationship between inhibition and gait in older adults with a high risk of falling, and as demonstrated above, older adults with a higher risk of falling and who experience more falls also have poor postural control. More directly related to postural control, better dynamic balance has been shown to be significantly associated with working memory and inhibition, as well as processing speed (Muir-Hunter et al., 2016; Zettel-Watson et al., 2017). There is substantial evidence of a relationship between processing speed, executive function components, and postural control; a more precise analysis of executive function components and postural control components is needed.

Current Study

While it has been established that postural control is affected by executive function, research is lacking in identifying if specific executive function components are most responsible or if certain aspects of postural control are more affected than others (e.g., proprioception, vestibular, visual). Previous studies have looked at how overall executive functioning is related to sensory components of postural control (eyes-opened, closed), and likewise how overall postural control is related to components of executive functioning and processing speed. Though none seem to have performed a comparison between components of executive functioning such as inhibition, as well as processing speed, and sensory components of postural control. The current study will examine the role of inhibition, processing speed, and visuospatial ability in postural control under conditions affecting visual, proprioceptive, and vestibular sensory input. The following is hypothesized:

Hypothesis #1

There will be a positive correlation between executive function (Flanker Inhibitory Control and Attention task, Clock Drawing Test, and Trail Making Part B) and overall postural control (NIH Toolbox Standing Balance Test).

Hypothesis #2

When compared to other sensory conditions, conditions measuring postural sway that lack visual input (eyes-closed, eyes-closed/foam) will be significantly more associated with postural sway (postural control will be poorest).

Hypothesis #3

The difference in postural sway between eyes opened condition and eyes closed condition will be greater in individuals with poorer executive function.

Methods

Research Design and Participants

The current study is a retrospective analysis of data from a larger study. Data from 90 participants who were recruited locally within the greater Orlando, FL area was used. Inclusion criteria included above or at least 60 years of age with no maximum age, ability to walk at least 20 feet without an assistive device, and absence of significant cognitive deficits reducing ability to follow directions during assessment. Exclusion criteria involved the presence of any significant neurological or musculoskeletal disorder that would reduce the participants' engagement in the assessment.

Cognitive Assessments

To assess executive function and cognitive inhibition, the NIH Toolbox® Flanker Inhibitory Control and Attention Test was used. The Flanker requires the participant to focus on a particular stimulus (arrows) while inhibiting attention to the stimuli flanking it. Scores are based on accuracy. Test-retest reliability for Flanker is 0.89 (Zelazo et al., 2013). Processing speed was assessed using the Digit Symbol Substitution Test (DSST). The DSST requires the participant to identify symbols that match to a corresponding number. Test-retest reliability for the DSST is in the .82 to .88 range (Lezak, 2004). Executive function and visuospatial skills were assessed with the Clock Drawing Test. This test requires the participant to draw the numbers and hands of a clock on a blank circle. A normal score ranges from 0-3 and abnormal score ranges from 4-7 (Watson et al., 1993). A smaller score on the clock drawing test demonstrates better executive function and, importantly, visuospatial abilities. A 70% specificity to identify executive dysfunction has been reported using the Watson scoring method ((Juby et al., 2002). Executive function and set-shifting were assessed using the Trail Making Test (Part B). This test required the participant to connect 25 circles with the task of alternating between numbers and letters. Reported reliability coefficients are in the .80 range (Lezak, 2004). Simple reaction time was measured in milliseconds using the Psych101 iPad app. A smaller number for simple reaction time indicates better/faster reaction time.

Functional Assessment

The NIH Toolbox® Standing Balance Test was used to assess postural sway using the NIH Toolbox® iPad app and an iPod Touch. A Velcro gait belt was applied to each participant with the iPod Touch attached to the front of the gait belt. The participant then completed up to 5 poses, each held for 50 seconds. Pose #1 was on a flat surface with feet together and eyes open. Pose #2 was on a flat surface with feet together and eyes closed. Pose #3 was on a foam surface with feet together and eyes open. Pose #4 was on a foam surface with feet together and eyes closed. Pose #5 was on flat surface in a tandem stance with eyes open. To progress to the next pose, the participant had to successfully maintain balance for 50 seconds. A maximum of two trials was allowed. Postural sway for each of the 5 poses was measured in millimeters of anterior-posterior deviation from center, therefore a smaller number indicates better postural control. Because the uncorrected standard score was for measuring average postural sway, a higher average balance score demonstrates better postural control.

Statistical Analyses

This was a retrospective study using data collected by the IMOVE Lab from September 2018 through April 2019. A bivariate correlation analysis was performed on cognitive function measures (Flanker, Clock Draw, DSST, TMT-B, reaction time) and overall postural control to test Hypotheses #1. For Hypothesis #2, a bivariate correlation analysis was performed on each of the 5 poses and average balance. Significance was measured by using a test of the difference between two dependent correlations with one variable in common; “first, each correlation coefficient is converted into a z-score using Fisher's r-to-z transformation. Then, Steiger's (1980) Equations 3 and 10 [are used] to compute the asymptotic covariance of the estimates. These quantities are used in an asymptotic z-test” (Lee & Preacher, 2013). A single multiple linear regression analysis was performed between performance on eyes closed condition (DV) and performance on each of the executive function measures (IV), while controlling for performance on eyes open condition to test Hypothesis #3.

Results

Participants

The sample consisted of 57 females and 33 males with a mean age of 73.02 ±6.09 years. A majority, 91.1%, of the participants were white, non-hispanic. Participants were also very healthy. Participants displayed intact global cognition with mean MMSE scores of 26.43 ±2.37. When asked to rate their health "Fair", "Good", or "Excellent", 86 participants (95%) reported their overall health as being good or excellent (56.7% reporting "good", 38.9% reporting excellent). Further, only 5 of the 90 participants reported one fall in the past month. Participants were highly educated as well; 75 out of 90 participants had a degree, 46 of which were graduate degrees.

Hypothesis 1

The bivariate correlation analysis revealed that average balance was negatively correlated with simple reaction time ($r(88) = -0.31$, $p < .01$) and the clock drawing test ($r(88) = -0.25$, $p < .05$). A higher score for average balance demonstrates better postural control, and smaller scores on simple reaction time and the clock drawing test indicate better reaction time and visuospatial abilities, respectively. These results demonstrate that better postural control is associated with faster reaction time and visuospatial abilities. Correlations between other executive function measures (Flanker Inhibitory Control test and Trail Making test Part B) and average balance were not significant, indicating no significant relationship between postural control and inhibition and cognitive flexibility in healthy older adults.

Hypothesis 2

The test of difference between two dependent correlations with one variable in common revealed a significantly stronger negative correlation between pose #1 (eyes opened, firm) and average balance (r(88) = -0.845, $p < 0.1$) when compared to pose #2 (eyes closed, firm), and pose #3 (eyes opened, foam) and average balance r(88) = -0.802, $p < 0.1$) when compared to pose #4 (eyes closed, foam). The significantly stronger negative correlation that was observed between these two measures demonstrates that visual input in both conditions #1 and #3 was associated with better postural control. Though the analysis did not reveal an association exactly as hypothesized (conditions measuring postural sway that lack visual input were significantly more associated to postural sway), the analysis did reveal a relationship in support of a relationship between postural control and visual input. This indicates that postural control does suffer to a degree when visual input is not present, as in conditions #2 and #4.

Hypothesis 3

The multiple linear regression did not reveal significant results. The analysis was performed between performance on eyes closed condition (DV) and performance on each of the executive function measures (IV), while controlling for performance on eyes open condition (pose #1). Balance on the eyes closed condition (pose #2) was not significantly associated with any of the executive function measures (Flanker, Clock drawing test, TMT part B). Another analysis was performed with pose #4 (eyes closed, foam), and controlling for pose #3 (eyes opened, foam), and again found no significant associations between balance on eyes closed condition and executive function measures. This suggests that in healthy older adults, postural control may not be as affected as in older adults with poorer EF.

Discussion

The findings of this study demonstrate that reaction time and visuospatial abilities are associated with overall postural control in healthy older adults. Specifically, better postural control is associated with shorter reaction time and better visuospatial abilities. These findings are consistent with previous studies that also report a relationship between response time and postural control. Taylor et al. found that mediators of the relationship between EF and falls were RT and postural sway (2017).

Interestingly the current study did not support the previous literature indicating that inhibition, processing speed, and cognitive flexibility were associated with overall postural control. A possible explanation for this is that the sample consisted of very healthy older adults. These findings suggest that the relationship between certain components of EF and postural control might only be observable using these measures in older adults that have some form of cognitive impairment. This is the case in Taylor et al.'s (2017) study, which did find a significant association between EF and postural sway, but in older adults whose EF was significantly poorer when compared to a group with better EF.

The findings of the current study also demonstrated that lack of visual input affects postural control in healthy older adults, which supports the current body of literature. However, statistical analyses did not show that lack of visual input was significantly more associated with postural sway, but instead that presence of visual input was significantly more associated with better postural control. As previously stated, a possible explanation for mixed support could be that the sample consisted of healthy older adults leading to an increase in reserve capacity which could make it more difficult to identify deficits. Despite this, the presence of visual input was significantly more associated with better postural control. The correlation between postural control in conditions with visual input and average overall postural control was significantly stronger than the correlation between conditions lacking visual input and average overall postural control. The difference in the significance of these correlations suggests that, even in healthy older adults, postural control is not at its best in the absence of visual input and that visual input is important for good postural control.

The findings of the current study did not find that the difference in postural sway due to the absence of visual input is greater in individuals with poorer EF. Again, a possible explanation for mixed support could be that the sample consisted of healthy older adults leading to an increase in reserve capacity which could make it more difficult to identify deficits.

The analysis also revealed no significant difference between pose #2 (eyes closed, firm) and pose #3 (eyes opened, foam) and their respective correlations to average balance. This suggests no significant difference in the importance of visuospatial ability and proprioceptive input to postural control in healthy older adults; in healthy older adults, visuospatial ability and proprioceptive input are equally important for good postural control.

A limitation of this study is the absence of a group or individuals with significantly poorer EF. It is possible that because the participants in this study were healthy individuals, results did not reveal all relationships between EF components and postural control components. Another limitation of this study is that we measured only static balance and not dynamic balance. Static balance is the measure of balance under unperturbed circumstances, usually during a quiet stance, while dynamic balance is one's ability to maintain or recover their balance, or control their posture, while in motion. Previous studies have found associations between specific components of EF and gait, namely that poorer inhibition and processing speed is associated with greater gait variability (Jayakody et al., 2018). Further, dynamic balance has been found to be significantly associated with EF components in healthy older women (Muir-Hunter et al., 2016). It is possible that the relationship between EF components and components of postural control are only observable in healthy older adults when measuring for dynamic balance, compared to observing older adults with mild to moderate cognitive impairment which does reveal an association between EF and static balance (Taylor et al. 2017).

In conclusion, this study has supplemented the current literature regarding cognitive and physical functions by demonstrating that reaction time and visuospatial abilities are associated with overall postural control in healthy older adults. This study further highlights the importance of analyzing the specific components of EF individually and not as a single construct. Analyses such as these may reveal relationships between cognitive function and physical function that would further supplement the current literature and enable the development of more precise interventions with the purpose of preventing cognitive decline, MCI, and other neurodegenerative diseases. Lastly, these results suggest that reaction time should be more thoroughly researched to determine the extent of its influence on EF and physical function.

Appendix

Figures 1 through 3

Participant Characteristics	
Mean age	73.02 ± 6.09
Sex (female)	63.30%
Race (white, non-hispanic)	91.10%
Mean MMSE score (out of 30)	26.43 ± 2.37
Falls in the past month (0 falls)	94.40%

Education Level of Participants (out of 90)		
Education Level	**Frequency**	**Percent**
HS graduate	3	3.3
Some college	11	12.2
College graduate	29	3.2
Graduate degree	46	51.1

Overall Health		
Health Rating	**Frequency**	**Percent**
Fair	4	4.4
Good	51	56.7
Excellent	35	38.9

Figure 4

Correlations between Average Balance and EF Measures	
	Average Balance
Clock Draw	-.256*
Traill Making - B	-0.133
Digit Symbol	0.182
Reaction time	-.306**
Flanker	0.138
**significant at 0.05 level (2-tailed)*	
***significant at 0.01 level (2-tailed)*	

Figure 5

Test of difference for correlations between poses and average balance	
Comparison 1	**Average Balance**
Pose #1 (eyes opened)	-0.845*
Pose #2 (eyes closed)	-0.793
Comparison 2	
Pose #3 (eyes opened, foam)	-0.801*
Pose #4 (eyes closed, foam)	-0.737
	**significant at 0.1 level (1-tailed)*

Figure 6

Regression Analysis of Postural Control and EF Measures						
Model		**Unstandardized B**	**Coefficients Std. Erro**	**Standardized Coefficients Beta**	**t**	**Sig.**
1	(Constant)	0.002	0.001		1.917	0.058
	NIH Balance AP 1	1.094	0.082	0.818	13.341	0.000
2	(Constant)	-0.008	0.009		-0.921	0.360
	NIH Balance AP 1	1.074	0.095	0.803	11.322	0.000
	ClockDraw	-3.532E-5	0.000	-0.011	-0.166	0.896
	Trail Making B	-9.212E-6	0.000	-0.053	-0.707	0.481
	Flanker	7.707E-5	0.000	0.071	1.003	0.319
	Digit Symbol	-7.891E-5	0.000	-0.012	-0.147	0.883
	Reaction time	1.477E-5	0.000	0.087	1.252	0.214

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