The Effect Physical Activity has on Selective Attention

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Selective Attention is crucial in our world today because we have so many extra inputs coming into our minds at one time, and we need to be able to focus on one (Lilienfeld, 2014.). Selective Attention is the process of focusing in on one channel and ignoring the others coming in at the same time that may not be as important (Lilienfeld, 2014). It is crucial in the lives of students because it helps students ignore the multiple sounds, and visual stimuli that may be distracting them, and helps them focus on their work or the teachings. However, students are never taught a way that they can improve on their selective attention skills. Because of the importance of selective attention in a student’s life, my research question is how is selective attention affected by physical activity? Physical activity refers to the level of difficulty in the physical exercise, and how long they are exercising as well. If students understand the importance of physical activity in connection with their selective attention skills, it will become something that they will make a priority in their lives, and it hopefully will improve their focus and work ethic in school.

# A Short Physical Activity Break from Cognitive Tasks Increases Selective Attention in Primary School Children aged 10–11

 Janssen, Chinapaw, Rauh, Toussaint, Mechelen and Verhagen (2014) studied effect that short amounts of physical activity had on children aged 10-11, and how it compared to a passive activity break and no activity break at all. Four elementary schools in Amsterdam were randomly selected, and they investigated 123 children aged 10-11. To start the experiment, they took a test called the Sky Search subtest before they started their day. In the test, students have to locate twenty pairs of matching space crafts as fast as they can, while there are other non-matching pairs distracting them (Janssen, Chinapaw, Rauh, Toussaint, Mechelen and Verhag, 2014.). The test was timed by both the students and researchers to make sure the students did not report false times. After they completed the test, the students went about their regular day, until their first 15-minute break (the equivalent to a recess break). Students were randomly assigned to three groups; a ‘no break’ group, a passive activity group (students would listen to a story), and a moderately intense physical activity break (Janssen, Chinapaw, Rauh, Toussaint, Mechelen and Verhag, 2014). Following the 15-minute break, students were asked to complete the Sky Search subtest again. The authors found that the passive group had improved selective attention scores compared to the ‘no break’ group, however, the group participating in physical activity had a larger improvement in their selective attention scores. The findings of this study help show that a break is completely necessary for young elementary school students because the students that did not get a break from school work had little-to-no improvement on their selective attention scores, while the physically active group had an very large improvement on their selective attention scores. One limitation to this study, however, is the lack of measurement of how vigorous the physical activity was to every child. There was no measure of physical fitness of the children in the physical activity group, so the children were being physical at their own pace, which may cause a problem when another study is done where children have to meet a certain level of activity.

**The Effects of a Physical Activity Program and a Cognitive Training Program on the Long-Term Memory and Selective Attention of Older Adults**

Some studies on the effect of physical activity and selective attention add a third group, to test what cognitive training will affect in accordance to selective attention. In this particular study, 72 adults over 65 years old participated in the research, and the aim was to measure the effects of cognitive training and physical activity training and highlight which of the two activities seems to be more effective (Candela, Zucchetti, Magistro, & Rabaglietti, 2015.). The participants were randomly assigned to either the cognitive group, physical activity group or the control group. All groups were given the attentional matrices test, which tests their selective attention by having them pick out certain numbers from a large group with varied distractions, and a test to measure long-term memory (Candela, Zucchetti, Magistro, & Rabaglietti, 2015.). The cognitive group activity took place once a week for 1.5 hours, the physical activity group trained two times a week, 75 minutes at a time, and the control group did not participate in either activity. (Candela, Zucchetti, Magistro, & Rabaglietti, 2015.) Before the 20-week period, the 3 groups were all equal in their average attentional matrices scores, but the post-test showed that there was a notable difference between the control group and the physical activity and cognitive group (Candela, Zucchetti, Magistro, & Rabaglietti, 2015.). The results of the study show us that older adults are positively affected by physical activity. Candela, Zucchetti, Magistro, & Rabaglietti (2015) explain cognitive training cannot reproduce the cognitive and physical functioning that physical activity can produce, so further research should be done to further investigate if physical activity programs are more effective than cognitive skill training.

**Effect of a 20-week physical activity intervention on selective attention and academic performance in children living in disadvantaged neighborhoods**

Larger studies of selective attention have been done that have also measured young students’ regular physical activity within their normal curriculum. Gall, Adams, Joubert, Ludyga, Muller, & Nqweniso, S. (2018) gathered 663 South African students ages 8-13 to participate in this study. The students were given a pre-test, called the d2 test which measured their selective attention skills. Using random assignment, researchers split the group into the control group and the physically active group. Gall, Adams, Joubert, Ludyga, Muller, & Nqweniso, S. (2018) wrote that the control group participated in their regular physical activity, and used self-report measures to explain the amount they had gotten, while the physically active group participated in their regular physical activity, along with weekly moving-to-music classes and short in-class breaks. After 20 weeks of this program, the d2 selective attention test was given to the students again, and the findings indicated that physical activity is possibly a way to improve academic performance and selective attention (Gall, Adams, Joubert, Ludyga, Muller, & Nqweniso, 2018.) The study did not however, take into consideration the number of children in disadvantaged schools or households. This may skew the results because their academic performance may already be low, and if they are not participating in extra physical activity, it will make the physical activity scores seem higher.

# Four minutes of in-class high-intensity interval activity improves selective attention in 9- to 11-year olds

 In this particular study, researchers wanted to discover if a quick 4-minute physical break from class could be beneficial in student’s selective attention skills. The purpose of this study was to examine how the high-intensity, short interval exercise (FUNtervals) affected selective attention (Ma, Le Mare, & Gurd, 2015.). There were 88 students involved in the study, 44 males and 44 females. The pattern of the study was each “FUNterval” (Ma, Le Mare, & Gurd, 2015.) break was 4-minutes in length, (plus 6 minutes to prepare to return to desks and finish the activity), and following the activity, a 10 minute of a lecture was taught, unrelated to the class material. On non-activity days, a lecture was also given to students to show them having a break in the learning material. After the lecture, the d2 test was given to the students. The d2 test tests concentration and attention, because students are asked to put dashes above or below the d’s on the page, while ignoring the p’s on the page (Ma, Le Mare, & Gurd, 2015.). One of the most compelling findings in the study is that less errors were made on the “FUNterval” days compare to the non-activity days (Ma, Le Mare, & Gurd, 2015.). It is suggested that the incorporation of short 4-minute physical activity breaks may be a way to increase a student’s daily physical activity and help improve attention and focus in the classroom (Ma, Le Mare, & Gurd, 2015.).

# Effects of one versus two bouts of moderate intensity physical activity on selective attention during a school morning in Dutch primary schoolchildren

Most selective attention experiments only test the effects of one session of physical activity a day, but this study wanted to explore the option of having two bouts of physical activity, and test more frequently. Altenburg, Chinapaw, & Singh, (2015) investigated the effect the effect of two 20-min sessions of physical activity a day. Researchers gathered thirty boys and twenty-nine girls, from ages 10-13, and randomly assigned them into three groups; the schoolwork group, one 20-min physical activity, and two 20-min physical activities. They used the Sky Search test, which children are told to detect 20 pairs of matching spacecrafts as quickly as possible, and tested them five times in the morning (Altenburg, Chinapaw, & Singh, 2015). The times included at the start of the day, after the first 20 minutes of exercise, 90 minutes after the first exercise, after the second exercise period, and then 90 minutes after that (Altenburg, Chinapaw, & Singh, 2015). Altenburg, Chinapaw, & Singh (2015) found that the students who had two 20-minute bouts of physical activity had much higher Sky Search results than the children who had one session of physical activity or remained in their desk all morning. This means that the two physical activity bouts had a significantly bigger effect on selective attention (Altenburg, Chinapaw, & Singh, 2015). Altenburg, Chinapaw, & Singh, (2015) conclude that the two 20-minute sessions of physical activity is more beneficial than one session halfway through the morning, although both groups did enhance the selective thinking skills more than the children who remained seated throughout the entire morning.

**Summary**

Based on the sources provided, it is clear that physical activity does affect selective attention skills, in a positive way. In young elementary school students specifically, there is an increase in their selective attention test scores after they have had some form of physical activity, but also if they have had any passive break in their work. Of the sources chosen, only one discusses people over the elementary school age, but goes to the other extreme of senior citizens. The findings are still consistent, and there is still a positive effect on selective attention skills because of physical activity. While doing research, I saw a lack of studies done on high-school students, and post-secondary students. These students face the hardest time with their selective attention because they have so many different classes, homework and projects to focus on. If the findings with both young elementary school students and senior citizens translate to high-school or post-secondary students, there may be a way to help incorporate more physical activity in the lives of these students to help them with their focusing ability. The future for this research is in doing long-term studies with physical activity and selective attention and doing similar studies to those done in elementary school, but in high schools or post-secondary schools.

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