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ACTIVEMIND SCHOOL PARTNERSHIP: EVIDENCE-BASED PRACTICE

Milana Abramova RN BSN

Presented by Fun and Function, March 2015

Abstract

The following is a survey of published research from multiple disciplines that provides the evidence-based foundation of Fun and Function’s Active Minds Program. The presented research focuses on the relationships between physical activity, chewing and fidgeting, use of weighted tools, self regulation and their respective positive effects on cognitive function. Each of the studies demonstrates that engaging in one of the aforementioned activities results in an ultimate increase of positive intellectual performance, including concentration, retention, attention and/or other forms of cognitive ability. The literature review is organized in titled sections based on each grouping of evidence in order to be readily accessible to the reader.

Physical Activity & Movement

There are many studies that explore the relationship between physical activity and its positive effects on learning. One such article by Phillip D. Tomporowski reviewed a large range of studies on the relationship between physical activity and cognitive processes (2003). The author relays that aerobic physical activity facilitates “complex problem solving, and attentional



processes that are involved in response inhibition”(Tomporowski, 2003, p.312). His findings further develop an earlier study conducted by Arcelin, Delignières & Brisswalter (1998).

Throughout the analysis it is concluded that physical activity improves performance directly by influencing cognitive functions, and indirectly, by facilitating the individual’s response to incoming sensory information (Tomporowski, 2003; Arcelin et al., 1998). Additionally, in Tomporowski’s final section on the surveyed research, he notes that according to a sizable portion of the studies reviewed, moderate-intensity aerobic exercise of durations between 20 and 60 minutes enhances many cognitive functions that are central to information processing (2003). Based on his analysis, the author substantiates that individuals are more prepared to concentrate and problem solve after physical activity (Tomporowski, 2003). According to the cited studies, it is clear that there is a strong positive correlation between physical activity and cognitive processes.

Similar to the previously mentioned findings, the Educational Psychological Review published a meta-analysis on contemporary studies linking many types of physical activity and their effects on a child's academic achievement. In the article’s review of literature, the author includes more evidence, positing that “the type of exercise training did not appear to matter; positive effects were found following resistance training, motor skills training, physical education interventions, and aerobic training programs. The effect of physical activity was greatest for middle school and young elementary age children”(Tomporowski, Davis, Miller & Naglierei, 2008, para 10). It is evident that moderate intensity physical activity in children can have positive effects on many aspects of cognitive function. In addition, this indicates that there



are many things to be gained from children engaging in physical activity during the school day in order to boost academic performance.

Fidgeting and Chewing

Oftentimes, it is assumed that if a child is performing any sort of secondary concurrent task aside from an assigned primary task that they are not paying adequate attention. However, more and more studies have been conducted to affirm that secondary concurrent tasks may help children stay alert and focused and improve their academic outcomes. One such study by Pine, Bird and Kirk presented a report of their findings on the prohibition of a child's gesturing in relation to their lexical abilities in a 2007 Edition of *Developmental Science*. The results of their report show that allowing children to gesture while they are speaking aids "throughout all stages [of the lexical process,] from thinking to speech production" (Pine et al.,2007, p. 752). The authors cite many articles that exhibit similar results to their report. In a 2003 publication by Ravizza, it is suggested that all motor movement can facilitate activation of the linguistic system (Pine et al.,2007;Ravizza, 2003). In a 2004 review of Golden-Meadow's book, the author summarized that gesturing helps free cognitive capacity in the brain, thus, reducing the demands on the speaker's mental resources and allowing for success in performing other tasks (Kendon, 2004 ; Pine et al.,2007). In the conclusion of the article, the importance of gesturing in aiding children's conceptualization and speech production is delineated. The study showed that when children were prohibited from gesturing, aspects of verbalization were more difficult for them.



When asked to verbalize a word seen in a picture the children who were prohibited from gesturing had more difficulty recalling the correct word and named fewer pictures correctly, while the children who were allowed to gesture were able to retrieve the correct word more quickly and resolve any other lexical issues better than the gesturing prohibited children (Pine et al., 2007). It is clear from these findings that gesturing plays an important role in helping children express themselves verbally. It can be extrapolated that any positive attributes that can be ascribed to gesturing can likewise be applied to fidgeting with the hands as well.

The Journal of Applied Cognitive Psychology featured an article by Jackie Andrade in 2010. She compiled an experimental test to determine whether doodling facilitates concentration. The experiment involved 40 participants listening to a monotonous audio recording. Half of the group was instructed to shade in boxes while listening to the tape while the other half did not doodle. The participants were then quizzed with a surprise memory test. The doodling group recalled 29% more information than the group that did not doodle. Andrade concludes that doodling does facilitate concentration as evidenced by her results (2010). The findings cited in this experiment show that performing a secondary concurrent task can often help one stay more focused on a primary task by preventing daydreaming and distraction.

Professor Andrew Smith of Cardiff University ran a crossover design study in 2009 to determine the effects of chewing gum on memory recall, test performance, short term memory tasks and alertness. The results of his research showed that chewing gum increased alertness and improved accuracy in participants' performance on an intelligence test (Smith, 2009). In addition, Smith concluded that "intellectual performance was improved in the gum condition" (p. 81). A more recent study published in The British Psychological Society in 2014 displayed



similar conclusions. Morgan, Johnson and Miles further solidify the evidence that gum chewing can facilitate multiple aspects of cognition (2013). Their study confirms that chewing gum can “act to attenuate the vigilance decrement in a task requiring continuous monitoring, and updating of order memory” (Morgan et al., 2013, p. 223). The evidence in their experiment and an earlier study conducted by Tucha and Simpson (2011) shows that chewing gum helps to both maintain and increase levels of self-rated alertness (Morgan et al., 2013). It is clear from a summary of research conducted that gum chewing significantly contributes to both alertness and testing performance. It is a prudent step of any educator to be aware of the increased alertness and focus that can be achieved through gum chewing or use of different forms of oral motor stimulation during test taking or class assignments.

Use of Weighted Tools

The American Journal of Occupational Therapy published a clinical report in 2014 on the effectiveness of using weighted vests for children with ADHD. The authors used the Conners’ Continuous Performance Test--II to measure results in a sample of 110 children. Their findings showed that when wearing a weighted vest, children were less likely to exhibit off task, out of seat and fidgeting behaviors. The authors make the following overarching statement based on the results of their testing “wearing weighted vests truly improves three aspects of behavioral performance (off task, out of seat, and fidgets) of children with ADHD, although this method is not a cure-all strategy for their behavioral deficits.” (Lin, Lee, Chang & Hong 2014, p.156)

When drawing from the data established in this study, it is clear that incorporating weighted



materials into curriculum can truly improve problematic behavior, especially in children who find it challenging to stay on task.

Self Regulation

Over the past decade it has been widely researched and accepted that self-regulation leads to self empowerment and increased positive academic performance in children. Boekaert & Corno presented a relevant discussion on the subject of self-regulation in the classroom, that sheds light on its many benefits to children (2005). In reference to Boekaerts' self-regulation model, the authors posit that when students are able to create good work habits through specific volitional strategies, they are more likely to put effort into learning and stay on track when a stress factor does arise (Boekaert et al., 2005). Especially for those students with “chronic stressors such as learning and emotional disabilities,” their use of self-regulation in the classroom primarily functions to maintain and restore well-being (Boekaert. et al., 2005, p.223). Boekaert stresses that “effective coping and self-management can be brought about through sound intervention focused on volitional strategy use by students who need help,” and ultimately leads to better adjustment to school (Boekaert et al., 2005, p.223). It is clear from these observations that self regulation is an invaluable tool for children to utilize, both in learning and coping with stressors in the classroom.

Cleary & Platten provided a case study analysis of the implementation of self regulation in a ninth grade classroom in 2013. Among their many findings, the author's mention that although they know the ultimate benefits of self regulation, many staff members of schools have “a strong desire to receive professional development training regarding implementing self-Regulation assessment tools and interventions.” (para.2) This finding solidifies the understanding



that teachers need adequate training in order to guide their students in properly implementing self-regulation and self empowerment strategies.

Conclusion

This compilation of published articles shows that there is an ever-growing body of evidence that bolsters the validity of the Active Minds Partnership. The program is designed to facilitate academic achievement and inclusion through a variety of outlets. The Action Room, Chill Spa, Sensory Break Box Kit and On-site staff training provide a host of resources for schools and clinics. The above interventions provide guided strategies to incorporate physical activity, fidgeting, oral motor outlets, the utility of weighted tools and an overall increase in self-regulation ability in children through tracking. As presented, multiple studies have continually shown an increased positive-correlation between these actions and different forms of cognitive processes.



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