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Importance of Active Play

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Abstract

Historically, the value of children's play activity has long been held; physical activity (PA)-based or active play (AP), exceptionally, contributes to holistic health and serves in the optimal growth and development of children. Aside from all of the physical benefits, play in child development/education is important because of the other numerous benefits that it is viewed to provide children. However, despite the supposed value and decades of research documenting the critical role that play serves in children's optimal growth and development, evidence related to the AP component and its direct effects on particularly academic achievement is somewhat limited. This lack of direct evidence of developmental and academic success often spurs intense debate related to the need for play. All AP, including that in the educational setting, must be continually defended and supported. This descriptive research is focused on the role of PA-based play and purposed to highlight and advocate the importance of AP, especially as it relates to academic achievement including the: value; evidence of effectiveness; as well as not only the prevalence, but also recommendations for further promotion and application of such in primarily the educational setting.

Keywords: Play; Active play; Childhood development/education; Academic achievement

Importance of Active Play

Play can be depicted by a number of varied attributes. It is often considered a form of physical activity (PA) that is voluntary, spontaneous, and childlike. Facilitated under a mood of enthusiasm, it is accompanied by feelings of exhilaration and motivation to act freely during, and followed by mirth and relaxation. However, most importantly, play is believed to be necessary for the physical, emotional, cognitive, and social development in youth and even conducive to good mental and spiritual health in adults [1]. Aside from all of the widely accepted characteristics, researchers acknowledge the challenge in formulating a formal definition of play. Pellegrini even states that there are many instances in which children and adults have difficulty recognizing play. In addition, there are four identified

domains of play: locomotor (e.g. running), object (e.g. constructing block configurations), social (e.g. play fighting), and pretend (e.g. enacting roles) [2].

PA-based or active play (AP), including the locomotor, object, and social domains as listed above, plus non-locomotor and manipulative skill-based movements is the focus of this research. In particular, this descriptive research delves into the role of PA-based play and purposed to highlight and advocate the importance of AP, especially as it relates to academic achievement including the: value; evidence of effectiveness; as well as not only the prevalence, but also recommendations for further promotion and application of such in primarily the educational setting.

Value of Active Play

The International Play Association (IPA), an interdisciplinary agency that provides an international forum and advocacy for the promotion of play, has helped organize the United States (US) Play Coalition to promote the value of play throughout life. Its efforts include communication, education, and research. Historically, the value of children's play activity has long been held, including serving as a trademark activity of the early childhood period [3]. It is widely believed that AP, exceptionally, directly impacts the cultivation of physical literacy and development (which is reserved to be discussed in further research); however, aside from focusing on the physical aspects of its contribution to holistic health and development, play serves a nearly infinite number of functions. Play in child development/education is important because of the numerous benefits that it is viewed to provide children including positive physical and emotional outcomes [4], cognitive development [5,6], social skills [7], language learning [8,9], and the combination of cognitive and social skills [10].

However, despite the supposed value and decades of research documenting the critical role that play serves in the optimal growth and development of children, evidence related to the AP component and its direct effects on particularly academic achievement is somewhat limited. This is likely due to the lack of clarity or differentiation among the various domains of play. Another consideration could be based on the reasoning that children's academic success is hard to measure or possibly because of the pressure felt toward achieving short-term

academic outcomes [11-15]. This lack of direct evidence of academic success often spurs intense debate related to the need for play. While school administrators and teachers know that children learn best in meaningful contexts and need to learn playfully, AP has been often viewed as a waste of time, as class time has been devoted more so recently to the preparation and undertaking of standardized assessments associated with the No Child Left Behind programming. Hence, many schools have reduced or eliminated recess time [16]. Paradoxically, as this academic pressure has increased, children's abilities to relax and have fun through play have been restricted [17]. In addition to the emphasis on academics resulting in school administrators and teachers limiting time for AP, evidence also suggests that the concept of play has been reduced at the teacher education level, as well. It seems that early childhood teachers have demonstrated less understanding of play in the past couple of decades [18] and preservice teachers' attitudes of valuing play as part of the educational experience appear to be decreasing [19,20].

Though there is hope that the recently introduced Every Student Succeeds Act, which highlights the need and funding for 'well-rounded education' including the recognition and support for health and physical education, arts, music, civics, science, and more will provide a revitalized purpose and incentive to focus on holistic student development including opportunities for PA/AP in the school day. In addition, the Society of Health and Physical Educators (SHAPE) America has developed and advocates inclusive programming through its Comprehensive School Physical Activity Program (CSPAP) (SHAPE) [21]. However, AP must be continually defended and supported. Aside from parents and caregivers, especially educators are charged with the task of advocating children's right to play [22].

Evidence of the Effectiveness of Active Play

Self-regulation

Play is considered an important facilitator for learning and development across domains, and reflects the social cultural contexts in which children live [23-26]. Specifically, AP has been revealed to have positive effects on the development of self-regulation and children's ability to manage their behavior and emotions. A study conducted by Berk et al. [27] suggested that self-regulation is essential to one's being; it serves as the foundation for morality, choice and decision-making, and the mastery of higher cognitive processes. The benefits of higher order cognitive functioning derived from play can be attributed, in part, to brain development. Recent brain research supports the important role of play in building and strengthening neural connections [28-30]. Further, Brown et al. [28] postulated that play serves as one of the most advanced methods in nature, allowing for a complex brain to create itself.

Cognitive- and social-related skills

Along with self-regulation, play has been described as an important means by which children develop cognitive, language,

symbolic thinking, social competency, and conflict resolution skills. All of which have been hypothesized to improve due to the opportunity to practice life skills during play which include sharing, cooperation, and problem-solving [31-34]. Additional research and theory posits the assertion that plays in a child's life is important for a multitude of developmental and educational reasons [35-37].

Academic achievement

The degree of evidence recognizing the benefit of AP and its specific contributions to the learning process is difficult to discern as some of the research that is available is focused on imagination/role play or positive classroom related-behavior, though there have been a few studies related to PA-based play. Two studies witnessed improvements in on-task behavior, attentiveness, and concentration through physically active lessons. Mahar et al. [38] assessed the PA levels of 243 students during school hours. An intervention group (N=25) received a classroom-based program called Energizers while a control group (N=108) did not receive Energizers. On-task behavior was also observed before and after activities. Results included the Energizers intervention group taking significantly more in-school steps (5587 ± 1633) and improving their on-task behavior by 8% above the control group students (4805 ± 1543). In a more recent study in London, a 'Virtual Traveler' (VT) intervention consisting of a series of sessions integrating PA into primary school math and English was examined. Intervention students (VT group: N=113) were compared to control group students receiving regular teaching (Control group: N=106) at baseline, 2 weeks, and 4 weeks during the intervention, and 1 week and 3 months post-intervention. Results indicated that the VT students participated in significantly more school-day moderate PA during lesson time than the control students at 2 weeks only; the VT group also usually scored higher than the control for on-task behavior on the measures following baseline (1.86 vs. 1.77; 1.85 vs. 1.76; 1.76 vs. 1.77; 1.77 vs. 1.76), as well [39]. Mullender-Wijnsma et al. [40] examined the effects of PA integrated into the subjects of mathematics and language. The cluster-randomized controlled trial included 499 children from second and third grade classes; students were assigned to either the PA intervention or control group. The intervention group participated in the PA intervention for two years, 22 weeks per year, three times a week while the control participated in regular classroom lessons. Academic achievement testing which included two math tests (general skills and speed) and two language tests (reading and spelling) indicated that intervention students had significantly improved in the math speed test ($P < 0.001$; effect size [ES] 0.51), general math ($P < 0.001$; ES 0.42), and spelling ($P < 0.001$; ES 0.45) scores. It was estimated that these differences equated up to four months more learning gains in the PA intervention in comparison with the control group. Kibbe et al. [41] researched a program entitled TAKE 10!, which focuses on integrating movement with academics in elementary classrooms to find that after 10 years of implementation and study, the programming helped students improve motivation and focus on learning while enabling them to achieve enhanced PA levels. Variations of TAKE 10! were implemented in 3 smaller, separate studies: HOPS, PASS &

CATCH, and PAAC. The HOPS initiative examined the scores from 1197 students who took the Florida comprehensive Achievement Test and the intervention group using TAKE 10! materials scored significantly higher math scores over time than the control during the 2004-2005 and 2005-2006 school years ($P < 0.001$) [42]. The PASS & CATCH study investigated the association between increased PA during the school day and academic achievement among 932 third and fourth graders. Students receiving the intervention, including the TAKE 10! materials, scored significantly higher in math than the control students ($\beta_1 = 6.58$ vs. 4.93; $P = 0.02$); reading scores in both intervention and control groups increased at similar rates [43]. The PAAC study which looked at PA, body mass index, and academic achievement, and found that math, reading, spelling scores and a composite score all witness between-group differences [44]. A later study by Donnelly et al. [45] revealed that significant improvements in scores were still shown from baseline to 3 years during the PAAC intervention; students who participated in moderate PA-integrated academic lessons improved their overall performance on a standardized test of academic achievement by 6% compared to a decrease of 1% for controls ($p < 0.02$). An additional area of interest, classroom exercise breaks, also indicated improved on-task behavior during academic instruction, as well as moderately improving math performance. One study conducted by Howie et al. [46] used a within-subjects experimental design dividing students into four conditions: 10-minutes of sedentary classroom activity, and 5-minute, 10-minute, and 20-minute classroom breaks. The change in math scores was statistically higher after 10 minutes (estimated difference of 1.07, 95% CI [0.03, 2.12], $p \leq 0.04$) and 20 minutes (1.2, 95% CI [0.15, 2.26], $p \leq 0.02$) of exercise compared with the sedentary condition.

Certainly, PA-based play outside of the classroom including that derived during physical education (PE) classes, recess, and extracurricular PA programs is just as impactful on the learning process, if not more, considering the extent to which students can vary and increase the PA intensity levels. Physical health and fitness, as well as improved levels of social skills, classroom behavior, alertness, concentration, productivity, and academic performance all increase in a dose-response manner to increased PA and exercise intensity associated with PE classes, recess, and extracurricular PA. Barros et al. [47] reported that among children assigned into two levels of recess exposure, those students having 1< recess period(s) of 15 minutes in length were reported as having a better teacher's rating of class behavior scores (3.60 vs. 3.44) ($P < 0.001$). A longitudinal study by Pellegrini et al. in 2002 [48] examined social competence and school adjustment variables. Findings indicated that participation in playground games helped predict boys' social competence with a p value of 0.0001, but not girls' with a p value of 0.7192; boys' social adjustment was predicted with a p value of 0.01 and girl's with a p value of 0.08. Another study in 2011 that analyzed the associations of physical fitness and academic performance found that cardiovascular fitness had the strongest direct associations with academic achievement, with a standardized mean difference effect size of 0.17 (95% CI: 0.15-0.19) for boys-reading, 0.34 (0.32-0.35) for boys-math, 0.27 (0.25-0.29) for girls-reading, and 0.33 (0.31-0.35) for girls-math

[49]. However, evidence of the effectiveness of recess has been considerably small. While much of the research on the standardization of recess has not taken place in the US, the United Kingdom has examined their recess, which generally occurs three times a day for up to 600 recess sessions each academic year. This research suggested that recess activity made up one-third of the 60 minutes per day of the recommended PA and boys participated in higher levels of moderate-to-vigorous and vigorous PA (MVPA) than girls during recess (26 vs. 20 minutes, respectively) [50]. Research conducted by Zask, et al. [51] investigated MVPA levels associated with school size, between boys and girls, and comparatively across recess periods. They found that MVPA decreased as school size increased from 100, 200, and 500 students: 47.48% average MVPA for 100, 43.97% average MVPA for 200, and 33.26% average MVPA for 500. Boys tended to have overall higher average MVPA levels than girls (46.49 and 36.99, respectively), and average MVPA for both boys and girls was greater during lunch recess than for shorter morning and afternoon recess periods (47.44 and 39.19, respectively). Verstraete et al. [52] examined students' MVPA levels when game equipment, activity cards, and teacher prompts were available and discovered that the mean proportion of MVPA participation increased by 13% in the equipment, activity card, and prompt intervention group (48-61%), and decreased by 10% in the control group (55-45%). A study in 2005 examining the inclusion of bright fluorescent playground markings designating sport- and game-related boundaries, courts, targets, trails, and locomotor games showed similar results that included MVPA in the intervention group increasing from 36.7-50.3% of playtime compared to a decrease from 39.9-33.4% in the control group. The nature of recess and children's PA/AP levels markedly changed from preschool to elementary school, demonstrating that recess length decreased by more than 11 minutes and moderate-to-vigorous PA increased from 41-47.5% (though recess periods were longer in preschool, resulting in the students expending twice as much energy); and while the presence of teachers and occurrence of teacher activity prompts decreased, activity prompts from peers increased [53].

Active play recommendations and policies

Researchers and policymakers both agree that active play is important to children's development, which has led to the presence of AP in a number of recommendations and policies, including educationally-based policy statements [54,55]. Overall, SHAPE America and the American Heart Association (AHA) support the US Department of Health and Human Services' (HHS) recommendation for 60 minutes or more of daily PA on all or most days of the week for children and adolescents (ages 6-17) [56]. The National Association of Early Childhood Specialists in State Departments of Education (NAECS/SDE) [32] has proclaimed a position that "recess is an essential component of education and that preschool and elementary school children must have the opportunity to participate in regular periods of active, free play with peers" [32]. The position of the Association for Childhood Education International (ACEI) recognizes play as a necessity for all children and affirms the essential role of play in children's lives [23]. Along with support from the Centers of

Disease Control and Prevention (CDC), the National Association of Sport and Physical Education (NASPE) has also come out with fairly recent position statements encouraging daily recess periods totaling at least 20 or 30 minutes [57,58].

Prevalence of Active Play in the Educational Setting

There are a number of AP opportunities in the educational setting including the previously indicated PE, recess, extracurricular activities, plus active classroom programming. While PE is considered the primary means of providing AP, only 17-22% of elementary schools have been shown to offer daily PE with a combined total of 85-90 minutes per week [59]. This is considerably short of SHAPE America/AHA recommendations, specifically for children to accumulate a minimum of 60 minutes of moderate-to-vigorous PA on all or most days of the week [56]. Pedometer counts of weekday PA indicated that lunch recess and other recess periods combined provided 23-25% of children's daily step count, while PE only provided 8-11% [60]. This leads to the realization of the need to lobby for the inclusion, retention, and/or expansion of recess in the school day.

Unfortunately, because PE has not been proven to provide sufficient PA in terms of the recommended duration and frequency, recess is another important consideration to provide these needed PA opportunities. Regularly scheduled recess has a multifaceted potential to directly or indirectly improve student health and welfare on many levels, although increased academic accountability measures have partially led to a decline in the frequency and duration of recess periods in US schools [59,61,62]. However, though students should be encouraged to participate in PA during recess; recess should supplement, not replace PE classes [58]. Extracurricular PA is another option to provide AP opportunities outside of the school day. It is important for schools to recognize the need and provide support for extracurricular activities. They are to advocate and develop policies to implement such PA-based programming, as well as provide accessible and attractive PA activity spaces to supplement PE and recess.

Promotion and Application of Active Play in the Education Setting

Regardless of whether educators recognize the value of play in their students' academic, along with their social-emotional development, they are not often prepared to meaningfully advocate and integrate AP into their daily schedules. While limited, there is research documenting various interventions for such beginning at the teacher education level for both preservice and current teachers, as well as recommendations for existing school policies and practices.

Interventions can begin as simply integrating the concept and possibly experiential learning about play in teacher education programming for preservice teachers. Kempleet al. [63] demonstrated the effectiveness of integrating an experiential play lab in an early childhood teacher education course as a

means of questioning, documenting, and cultivating preservice teachers' understanding of the importance of providing and supporting play in the classrooms for young children. Other recent research by Jung et al. [64] focused on the role of play coursework in teacher education programming by examining whether there was a relationship between this coursework, perceptions of play, and the intention to integrate play in their future classrooms. Results confirmed that play-related coursework served as a significant component in the preservice teachers' intentions to use play, though it was also indicated that there was a complete mediating role of their perceptions of play in association between intention to integrate play and play-related coursework. Suggestions were made for teacher education programming in recognizing college students' perceptions of play while providing play courses, as well as increasing the teaching effectiveness in these courses including engaging discussions and assignments, reflection papers, and thought-provoking exams in attempt to gauge student perception and support optimal environments to build positive views on play. Further recommendations have included careful observation and assessment strategies, as well as developing and implementing play-related activities in the field, beyond mere observation [64]. Still other research has shown preservice teachers to be uncertain about how to promote, participate, and lead children's AP, thereby causing insecurity about the teaching effectiveness of play-based lessons and activities. Teacher education programming could address this by demonstrating AP activities to the preservice teachers, encouraging their planning and participation, and supporting their lead in presenting play-based activities in their practices [11,13].

There are numerous interventions for current teachers and recommendations for existing school policies and practices, as well. Professional development in-service training can benefit teachers' beliefs and practices about the importance and integration of play in the educational setting. Vu et al. [65] suggested that most teachers share in the belief that play is relevant to social and cognitive skill, and further recognized the benefits of which, both before and after training. Though the teachers in this particular study demonstrated greater levels of engagement with children during play. In the schools, aside from the obvious policy- and practice-related recommendations to increase/maximize PE, recess time, and availability/accessibility of extracurricular PA/AP programming, there are multiple means of increasing children's engagement in play, particularly moderate-to-vigorous PA. This promotion and application could be implemented in regards to all three components of PE, recess, and extracurricular PA by targeting the types of play (free play or organized activities) [66,67]; structure (modified equipment or minimized lines) [68,69]; location (indoor/outdoor) [67,70,71]; and staff behaviors (verbal promotion) [72,73]. Efficient, effective strategies include modifying the structure by moving play outside, reducing team size or removing elimination [52,68,69,74] and targeting staff behaviors to increase verbal promotion and participation [73,75,76]. Additionally, results indicated that maximal school PA/AP can be achieved in specifically extracurricular programs with strong administrative support; developmentally-appropriate and interesting activities led by dedicated, well-trained staff; the

provision of accessible, varied PA spaces and adequate equipment; as well as attention and planning for proper transportation [66,77-79].

Conclusion

The evidence of the importance of AP to children's optimal holistic health, as well growth and development on so many levels is compelling and validates the role of such in the lives of children, especially in the educational setting. Play is children's work; it is the means by which little ones explore and learn about themselves and the world around them, as well as acquire skills. Greater attention and support needs to be directed to the significance of play and the fact that it serves as a powerful teaching tool in the educational setting, promoting the learning process and preparedness for life. Children learn and master the world around them through exploration and play, which also enables them to develop competencies that cultivate confidence and resiliency needed to approach future challenges in life [80-82]. Hence, PA-based or AP can achieve all of this, plus begin to establish active, healthy habits in children leading to greater quality of life and longevity.

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