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ARTICLE

A Systematic Review of School-based Physical Activity Programs on Physical Fitness, Cognition, and Affective Outcomes in Early Childhood

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ABSTRACT

The purpose of this study was to review intervention studies on school-based physical activity programs in early childhood to identify the gaps and future trends in this topic. Forty-one quantitative experimental studies were identified from nine electronic databases using predefined inclusion and exclusion criteria. All identified studies were coded using a coding template. The interrater reliability between the two coders was 96.5%. The frequencies and percentages for each coded category were reported descriptively. The randomized controlled trial with a control group was the most used research design (70.7%), and 41.5% of the studies were guided by a theoretical/conceptual framework. The intervention length ranged from four days to three years, and 41.5% of the studies reported an intervention fidelity check in various forms. Different dependent variables were measured, and about half of the studies were focused on physical activity and anthropometry outcomes. A trend of the positive impact of school-based physical activity programs on children in early childhood was found. However, the rigor of studies needs significant improvements in multiple areas. Future intervention programs are suggested to include different elements in the design to develop children's cognition, physical fitness, and affective outcomes.

1. Introduction

Physical inactivity has been identified as the fourth leading risk factor for global mortality, leading to various health-related diseases (World Health Organization [WHO], 2020).[39] To prevent people from physical inactivity, WHO (2018)[38] released the Global Action Plan on Physical Activity 2018–2030: More Active People for a Healthier World, highlighting the role of regular physical activity in people's health and well-being for a quality life. Given the powerful impact of physical activity on children and adults, WHO also developed some global physical activity recommendations for specific age groups. The Guidelines on Physical Activity, Sedentary Behavior, and Sleep for Children under 5 Years of Age is one document that provides suggestions on how much time children in early childhood should spend being physically active. For example, children aged 3-4 should participate in at least 180-minute physical activity throughout the day, at least

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60 minutes of moderate to vigorous intensity.

Many research studies have indicated the positive effect of physical activity on reduced adiposity among children (Davis et al., 2016;[5] Nyberg et al., 2015;[18] Waters et al., 2011).[34] With the growth of the rates for overweight and obesity, childhood obesity is one of the serious public health challenges of the 21st century (WHO, 2012).[37] For instance, the rates of overweight and obesity have tripled over the past three decades in the United States (U.S.) (Ogden et al., 2012).[20] More specifically, the prevalence of childhood obesity was 12.7% among 2- to 5-year-olds, 20.7% among 6- to 11-year-olds, and 22.2% among 12- to 19-year-olds between 2017-2020 (Centers for Disease Control and Prevention [CDC], 2022).[2] Childhood obesity has led to high blood pressure, high cholesterol, type 2 diabetes, breathing problems, and joint problems (CDC, 2022).[2] It has been suggested that children participate in regular physical activity to reduce and prevent overweight and obesity (Lambourne & Donnelly, 2011;[9] Nowicka & Flodmark, 2007;[17] Steinbeck, 2001).[25]

In addition, engagement in physical activity provides significant benefits for health among children, such as increased physical fitness, bone health, and mental health (WHO, 2022).[40] As a result, a solid and healthy body helps a child have more energy and live a longer life. The release of endorphins due to activities helps to reduce the risk of anxiety and depression (U.S. Department of Health and Human Services [USDHHS, 2021).[27] Physical activity participation can also enhance children's psychosocial outcomes, such as confidence and self-efficacy, which might be retained as they become adults (Spruit et al., 2016).[24] Evidence also shows that physical activity improves cognitive outcomes, positively affecting children's memory and concentration in class (Donnelly et al., 2016;[6] Strong et al., 2005).[26] Given those benefits, CDC (2022)[2] has recommended that children aged 3 to 5 should be active throughout their day, and children aged 6 to 17 should have at least 60-minute moderate to vigorous physical activity daily.

Schools have been identified as critical sites for children as they spend the majority of their daytime in school. The Comprehensive School Physical Activity Program (CSPAP) indicates that schools can provide many opportunities for students to be physically active through physical activity after/before school, physical activity during school, physical education, family and community engagement, and staff involvement (CDC, 2018).[3] The opportunities such as movement breaks in the classroom, after-school sports clubs, activities/games in physical education, recess, and other school activities can potentially facilitate children's physical activity levels. Thus, a school-based physical activity program is essential in improving children's physical activity and developing them as a whole person, not only for their health and well-being but also for their academic achievement. Researchers have conducted various studies to examine the impact of school-based physical activity interventions on children. For example, the study conducted by Martínez-Vizcaíno and colleagues (2020)[13] tested a physical activity intervention on obesity indicators, physical fitness, and blood pressure in children, and the study of Podnar and colleagues (2018)[21] explored the effectiveness of a 5-minute classroom-based physical activity on children's on-task behavior and physical activity levels.

Early childhood is when children experience rapid physical and cognitive development, and their lifestyle habits are open to changes and adaptations. Helping children develop a physically active lifestyle is critical, and school plays an essential role in developing their habits. To date, while the majority of the systematic reviews on school-based physical activity programs have focused on K-12 students (i.e., elementary school students, middle school students, and high school students) and emphasized one or some of the following variables: physical activity, health, cognition, and/or motor skills (Mehdizadeh et al., 2020;[14] Woodforde et al., 2022),[36] few reviews are about the overall impacts on early childhood aged 0-8 years. This systematic review aimed to comprehensively review the impact of school-based physical activity programs in early childhood. By analyzing previous studies, this study attempted to provide insights into how physical activity programs were designed and implemented for early childhood and their impact on different outcomes.

2. Materials and Methods

This study reviewed research on school-based physical activity programs in early childhood to understand the status, identify the gaps and future trends, and make recommendations for future research studies.

2.1 Data Source and Literature Search

Before searching for research articles, two authors conducted three discussions to narrow down the scope of the review and inclusion and exclusion criteria. As a result of the discussions, nine electronic databases highly used in the field were emphasized for literature research, including Education FullText, Eric, SportDiscus, Medline, PsycINFO, EBSCO Host, JSTOR, PubMed, and Proquest. In addition, the authors also examined Google Scholar, reference lists, and other literature review papers on the

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relevant topic as supplements. The following key terms were used to search: physical activity program, physical activity intervention, school-based physical activity program, before-school physical activity program, after-school physical activity program, early childhood, classroom physical activity, classroom movement, and brain breaks. In addition, all types of dependent variables were included.

2.2 Inclusion and Exclusion Criteria

Seven inclusive criteria were used: (1) intervention study, (2) quantitative study, (3) early childhood (0-8 years old); (4) school-based physical activity program; (5) published after 2000, (6) English article, and (7) peer-reviewed academic paper. Studies were excluded if they only employed a qualitative method, included mixed age groups of participants, focused on motor skill programs/intervention rather than physical activity, or the study was a proposal, not an actual study. Intervention studies in a physical education setting were also excluded from this review. The first two authors manually examined the articles in the databases using the key terms and inclusion and exclusion criteria. When examining, the authors investigated the titles, abstracts, methods, and age groups. Through this search round, 56 articles were identified by the first two authors as the first review pool. Next, the first two authors independently examined the pool and highlighted the articles that did not meet the criteria and should be removed from the pool. Then the two authors met and discussed the highlighted articles. As a result, 15 articles were removed from the first pool, with a 100% consensus between the two authors. In the end, 41 articles that met inclusion and exclusion criteria were included as the final review pool for further analyses in the present study. Each article was given a specific I.D. number for organization and future use.

2.3 Data Extraction Procedure

To extract data from the articles, the first author developed an initial coding template with an operational definition for each variable in a coding book. Then the first two authors met to discuss the initial template, and revisions were made based on suggestions and comments. The details of the coding template are described below.

Coding Template

The coding template consisted of twelve columns, including I.D., citation, year, region, the purpose of the study, theoretical/conceptual framework, participants (i.e., sample size, age, and other characteristics as identified), research design, length of intervention/treatment, intervention/treatment program, fidelity check of implementation, and dependent variables. The first two columns (i.e., I.D. and citation) were provided based on the final review pool. The citation format followed the American Psychology Association (APA) guideline. The coders coded the rest ten columns for each identified article using the same template. Specifically, the operational definition for each variable is described below.

Year and Region. The year the paper was published was coded based on the citation as this information helps identify the time patterns of the experimental studies on this topic. In this region column, the authors focused on identifying the country where the study was conducted to examine whether research interests on this topic varied in different geographical zones. This information has the potential to provide backgrounds and contexts for school-based physical activity programs.

Study Purpose and Theoretical/Conceptual Framework. The study's purpose statement was included descriptively in the template for coders to understand the focus of the study. The coders identified the statement primarily from the paper abstract, and a second round of examination of the purpose statement in the main text was used to ensure consistency throughout the study. Once the coders finished collecting the purpose statement, they moved to identify the theoretical or conceptual framework applied to the studies. While collecting data for this column, the coders aimed to identify whether a theoretical or conceptual framework was applied to guide the study or the intervention design. If the authors employed a theoretical or conceptual model (e.g., Social Cognitive Theory, Achievement Goal Theory, Social-ecological model) to guide their study, it was coded as "1". Otherwise, it was coded as "0". The coders collected this information mainly from the methods section, with some exceptions that information was provided in the introduction section.

Participants. Two data sets were descriptively involved in the participant column: the total number of participants and age groups. Studies with participants aged 0-8 years old were selected (e.g., Pre-schoolers, K-2, etc.) and studies have mixed grade levels (e.g., PreK-5) were excluded from this review. If other characteristics were identified in participants, the coders included additional notes.

Research Design. The research design was coded based on the modified categories presented by Li et al. (2020),[11] which included seven categories: (1) quasi-experimental design: only one intervention group without a repeated measure or with a repeated measure, (2) quasi-experimental design: multiple group comparisons

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without control and with a post measure, (3) quasi-experimental design: multiple group comparisons with a control group and a post measure, (4) quasi-experimental design: multiple group comparisons with a repeated measure without a control, (5) quasi-experimental design: multiple group comparisons with a repeated measure with a control, (6) randomized controlled trials (randomly assigned treatments with a control group: pre- and post-), and (7) single subject design for behavioral research. The research design was coded using the number of the category listed above.

Intervention and Fidelity Check. The length of the intervention was descriptively recorded based on the description by the authors (e.g., number of lessons/sessions, number of weeks, months, or years). If the length of the intervention was less than 12 weeks (about three months), it was coded "1."; if the length was between 12 weeks and 24 weeks long (about three months to six months), it was coded "2." If it was more than six months or 24 weeks, it was coded "3." Fidelity of implementation refers to "the extent to which delivery of an intervention adheres to the protocol or program model originally developed" (Mowbray, Holter, Teague, & Bybee, 2003, p.315).[15] If a fidelity check of intervention implementation was conducted in the study, it was coded as "1". Otherwise, it was coded as "0."

Dependent Variables and Significance of Findings. The dependent variables were coded into seven categories descriptively: (1) physical activity (e.g., moderate physical activity [MPA], vigorous physical activity [VPA], moderate to vigorous physical activity [MVPA]), (2) anthropometry variables (e.g., Body Mass Index [BMI], waist circumstances, heart rate), (3) cognition (e.g., knowledge of the physical activity, school readiness, attention), (4) affective variables (e.g., on-task behaviors, behavior control, motivation, emotion, interest, attitudes), (5) motor skills, and (6) physical fitness (e.g., running time; balance). In the category of others, any variables not listed in categories 1 to 6 were coded as others. One column on the significance of findings was used to examine the effectiveness of the intervention on the dependent variables targeted in the study. The study's key findings were coded descriptively based on the identified dependent variables. The emphasis in coding this category was whether *statistical significance* was found in the specific dependent variables.

Coding and Data Analysis Procedure

The first two authors employed a series of steps to code all the identified articles. First, the two authors used the finalized coding template to practice coding two randomly selected articles from the pool independently; then, they met to compare and discuss the coding results. All questions and clarifications were addressed before moving to the second step. Second, over one-third of the identified articles were selected (n=15) and independently coded by the first two authors. Interobserver agreement (IOA) was calculated following the formula: IOA = (Total of Agreed Coding Items /Total Agreed and Disagreed Coding Items) X 100%. The IOA between the authors was 96.5%. Five disagreed coding items were discussed, and 100% consensus was achieved between the two authors. Lastly, the first two authors equally coded the rest of the articles. Once all articles were coded, all data were merged into one master Microsoft Excel Worksheet for analysis. A descriptive analysis procedure was performed for each variable identified in the coding template. The frequency and percentage for each variable were reported next.

3. Results and Discussion

The purpose of this paper was to review studies conducted on the research topic of school-based physical activity programs in early childhood. Specifically, a variety of categories of each study were examined, including the year of the publication, region of the study being conducted, purpose statement, research design type, theoretical/conceptual framework or model, characteristics of participants, fidelity check of implementation, dependent variables, and significance of the key findings. This section reported the findings in each category, and the interpretation of these findings was discussed afterward. Results of the findings were presented in the following order: year and region of study, study purpose and theoretical/conceptual framework, participants, research design, length of interventions and fidelity check of implementation, dependent variables, and significance of critical findings.

Year and Region of Study

Of the 41 school-based physical activity studies conducted since 2000, five studies (12.2%) were published in 2000-2010, and 36 studies (87.8%) were published since 2010. The data shows that most studies identified in this paper were published after 2010 and only a few were published between 2000 to 2010. The data from studies conducted in different countries are presented in Table 1. Europe and North American countries published significantly more studies on this topic than other continents. As shown in Table 1, almost half (n=20) of the studies were conducted in North America (48.8%). United States has the most studies conducted on this topic, which

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accounts for 43.9% (*n*=18). More than a quarter of studies (*n*=12, 29.3%) were conducted in Europe countries, such as Spain, Switzerland, and Norway. Five studies (12.2%) were conducted in Israel, three (7.3%) were conducted in Australia, and only one study (2.4%) from Asia was identified. The results were not surprising as this review only included the articles published in English that more studies in this paper may come from English-speaking countries.

A couple of reasons may help interpret the findings above. One reason is the prevalence of obesity worldwide, especially in Western countries since 2010. There has been a continuous call to address the obesity issue in prevention at an early stage of child development. In the United States, the obesity prevalence has significantly increased, from 30.5% in 1999-2000 to 41.9% in 2017-2020 (National Health and Nutrition Examination Survey, 2021).[4] The other possible reason is the impact of the national physical activity and health guidelines and documents. Li et al. (2016) [10] identified forty-five national physical activity and health guidelines and documents cited in research on teaching K-12 physical education in the United States since 1996. They found that 41% (108) of 262 articles cited one or more physical activity and health guidelines or documents when rationalizing and contextualizing the study. Thirty-eight guidelines and documents (84.4%) were published after 2000. The most cited documents were Healthy People Documents (USDHHS, 1991; [28] 2000; [30] 2018; [33]), Surgeon General Report (1996),[29] Centers for Disease Control and Prevention documents, National Association of Sport and Physical Education (NASPE) standards, and National Physical Activity Guidelines (USDHHS, 2008).[31] More guidelines and documents have been updated in recent years, such as Healthy People 2030, and the 2018 National Physical Activity Guideline (USDHHS, 2018).[32] A similar pattern could be found in other countries as well. Physical Activity Guidelines and documents provide critical information and statistics on the status of different health indicators for different population groups. Future research should refer to these documents to rationalize and contextualize their study to best serve the population in need and achieve the health objectives recommended in the documents.

Study Purpose and Theoretical/Conceptual Framework

Among the 41 articles, forty studies (97.6%) reported their purposes to examine the effectiveness of the physical activity program on the participants right after the intervention. One study reported that their purpose was to examine the effectiveness of the intervention after 14 weeks of the intervention implementation as a follow-up (Fitzgibbon et al., 2011).[7]

Fifteen of the 41 articles (36.6%) reported the usage of a theoretical or conceptual framework to guide the study or intervention design, while twenty-six studies (63.4%) did not report any usage of the theoretical or conceptual framework. Among the studies with framework guidance, nine studies (60%) reported they applied the social ecological model or social cognitive theory in the study or intervention design. Two studies (13.3%) reported the application of self-determination theory (Riiser et al., 2020;[22] Fitzgibbon et al., 2011).[7] Two articles (13.3%) reported utilizing competence motivation theory in the studies (Gao et al., 2019;[8] Xiong et al., 2019).[41] Achievement goal theory was employed in the study (6.7%) conducted by Robinson et al. (2018),[23] while self-efficacy theory was applied in the study (6.7%) conducted by Annesi, Smith, and Tennant (2013).[1] One study (6.7%) utilized transformational leadership theory in designing their Great Leaders Active StudentS (GLASS) program (Nathan et al., 2017).[16] In addition, two studies reported the usage of more than two theories (Annesi, Smith, & Tennant, 2013;[1] Fitzgibbon et al., 2011).[7]

The crucial finding mentioned above shows that almost two-thirds of the studies reported the usage of a theoretical/conceptual framework or model to guide the design of the study or intervention. The theoretical framework plays a critical role in providing an essential foundation for the researchers and audiences to understand the perspective a study takes. Different frameworks or models have their knowledge base and assumptions to understand how things work or explain different phenomena, which is the foundation for the study design. Therefore, it makes more sense when interpreting the findings from that perspective. The data in this paper showed that the social-ecological model was the most used among all the studies. Considering the complexity of physical activity promotion in early childhood, it may be appropriate to examine the effectiveness of intervention by looking at different factors involved in children's lives, such as parents, school, teachers, community, and policy. Other models or frameworks may also be appropriate depending on the research problems being addressed. Researchers must consider the research problems or questions being answered and employ appropriate theoretical or conceptual frameworks when designing the study.

Participants

The two primary data extracted from participants were

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sample size and age groups. The sample size ranged from 12 to 1,434 participants. One study used the schools as the unit of analysis, and no specific number of participants was reported (Webster, Wadsworth, & Robinson, 2015).[35] Among the 41 articles, the participants ranged from 25 months (about two years old) to 8 years old, from toddlers to second grade. Most studies (*n*=38, 92.7%) focused on 3- 6 years old preschoolers. Three studies (7.3%) covered first- and second-grade participants (7-8 years old) at lower elementary levels. One study focused on children aged 3 to 4 years with autism spectrum disorder.

Research Design

In the category of research design, this study finds that the randomized controlled trial with a control group is the most used design (*n*=29, 70.7%). About 90% of the studies included a control group to compare participants' improvements on different dependent variables between groups. Five studies (12.2%) employed the quasi-experimental design: multiple group comparisons with a repeated measure *with a control*. Four studies (9.8%) reported using the quasi-experimental design: multiple group comparisons with a repeated measure *without a control* (pre-post). Three studies (7.3%) reported using a quasi-experimental design: multiple group comparisons *with a control group (post).* It is suggested that researchers apply rigorous designs when planning for the study, such as randomized controlled trials, group randomized trials, or nested/blocked designs.

Moreover, no mixed methods design was identified in any of the studies. Mixed methods are considered a powerful approach to understanding or examining the effectiveness of the intervention in both quantitative and qualitative ways. Therefore, researchers can include not only a quantitative approach but also a qualitative approach.

Intervention and Fidelity Check of Implementation

The length of treatment ranged from four days to three years of physical activity intervention implementation. Seventeen studies (41.5%) implemented the intervention in less than three months or 12 weeks. About a quarter of the studies (*n*=11, 26.8%) reported that their interventions lasted three months to 6 months or 12 weeks to 24 weeks. One-third of the studies (*n*=13, 31.7%) reported the intervention lasting more than six months or 24 weeks. It is hard for a short-term intervention to be effective, especially on the variables that may require a longer time to demonstrate change, such as BMI. It is recommended that more extended interventions should be designed to see the changes in dependent variables. The intervention arrangement at different periods should appropriately follow the learning curve for children at this age.

Regarding the fidelity check, 17 studies (41.5%) reported that they measured the implementation of the intervention. Twenty-six studies (58.5%) did not report any usage of an intervention fidelity check during their implementation. The measurements used for the fidelity check included checklist, students' responses survey, field observation, and questionnaire. A fidelity check of the intervention implementation is critical to examine whether the intervention is executed as planned, which helps ensure the integrity of implementation and later interprets the data appropriately. As Loffin (2015)[12] argued, the fidelity of program implementation is highly correlated with the intervention outcomes. Without the fidelity check, it will be tough to conclude the effectiveness of one intervention as there may be confounding variables that are not captured by the researchers, regardless of significant findings or not. This study finds that almost 60% of the studies did not report a fidelity check in any form. This should raise research readers' awareness of the findings presented in the study. Future research should always include some forms of fidelity check depending on the complexity of the intervention, such as a checklist, field observations, and questionnaire. Researchers could follow the conceptual framework proposed by O'Donnell (2008)[19] to design the specific forms of fidelity checks, in which five components could be examined during the intervention.

Dependent Variables and Significance of Key Findings

Among all 41 studies, 23 studies (56.1%) measured children's physical activity to examine the effectiveness of the intervention (e.g., steps; MVPA; VPA), with 15 studies (65.2%) reporting statistical significance in increasing participants' physical activity levels within the intervention group. Nineteen studies (46.3%) measured anthropometry variables (e.g., body weight, height, BMI, and waist circumstances), with ten studies (52.6%) reporting significant improvement within the intervention group. Twelve studies (29.3%) reported physical fitness as the dependent variable, and eleven studies (91.7%) found significant improvement in the intervention group. Similar findings were observed in the cognition category: twelve studies (29.3%) reported their measurements of cognition-related variables and eleven (91.7%) reported a significant increase in participants' cognition. Additionally, eleven studies (26.8%) in the review pool reported their assessment of affective-related variables, and nine of

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the eleven studies (81.8%) reported significant findings. Lastly, seven studies (17.1%) examined the effectiveness of the interventions on participants' motor skills, and five (71.4%) reported significant improvement in participants' gross motor skills and/or objective control skills.

These findings show that the dependent variables reported focused on physical activity and anthropometry-related variables, with less stress on children's physical fitness, cognition, and affective outcomes. Studies to examine the effects of physical activity programs on these three domain outcomes are critical. Physical fitness levels provide essential data on children's condition and potential to participate in physical activities. They are primary indicators of one individual's physical ability and can be applied to any physical activity. Cognitive levels show how well the children know or understand physical activity. Regardless of age, understanding how physical activity works and what it does to the body and life is vital to develop an active lifestyle. Individuals' attitudes, emotions, or habits in participating in physical activity should not be ignored. Research has shown how valuable physical activity is in regulating people's emotions, values, and motivation to participate in physical activity and social benefits. More future research should be conducted to examine the effectiveness of the intervention on these variables. Moreover, the interventions should also consider integrating elements in developing children's physical fitness, cognition, and affective outcomes into the design rather than physical activity or anthropometry variables only.

The findings of the significance of interventions on different outcomes show that higher percentages of statistically significant findings were presented in variables in physical fitness, cognition, and affective outcomes. In comparison, relatively lower percentages of statistical significance were observed in physical activity and anthropometry-related variables. Different reasons may help interpret this finding. First, different measurements were used to assess physical activity and anthropometry data. Some studies used different tools to assess physical activity, such as accelerometers, pedometers, or parents' reported children's play time. This may result in the variances detected and the significance levels. The same pattern applies to anthropometry measurements. Second, the length of the intervention. As only 30% of the interventions are longer than six months, it may create challenges to see significant positive changes in physical activity and anthropometry outcomes. Especially for anthropometry outcomes, it may take much longer to detect significant changes in children's weight, height, BMI, and waist circumstances, compared to other outcomes. Third, external factors. Most studies did not report any control of other factors, such as nutrition or other physical activity programs in which children participated. How these factors impact children's participation during the intervention must be clarified.

4. Conclusion

This study examined the experimental research on the effectiveness of school-based physical activity programs in early childhood. Overall, the descriptive analysis of the impact of physical activity on children's outcomes in different domains showed a positive pattern. However, improvements in study rigor were identified in the following areas in the present study: theoretical framework utilization, rigorous research design, the longer length of intervention, fidelity check of implementation, and reliable and validated measurements. Appropriate physical activity programs that reflect the development levels in this age group should be designed following the theoretical framework. It is suggested that more in-depth analysis should be conducted to examine further the quality of the intervention and the appropriateness of methodology utilized in the study. Moreover, gaps should be addressed in examining intervention effectiveness in cognition, physical fitness, and affective outcomes in early childhood.

Furthermore, fidelity checks of intervention implementation should be from different components, such as the participants' responses and other stakeholders' observations, rather than only on the execution by personnel providing the treatments. Lastly, it is recommended that researchers should contextualize the research problems in a variety of populations that are in need. This study provides essential information and can contribute to future research design on school-based physical activity programs.

References

[1] Annesi, J. J., Smith, A. E., & Tennant, G. (2013). Cognitive-behavioral physical activity treatment in African American preschoolers: Effects of age, sex, and BMI. *Journal of Paediatrics and Child Health, 49*(2), E128-E132.

[2] Centers for Disease Control and Prevention (2022). Childhood obesity facts. Retrieved from https://www.cdc.gov/obesity/data/childhood.html

[3] Center for Disease Control and Prevention (2018). Trends in meeting the 2008 physical activity guidelines, 2008–2017. Atlanta, GA. Retrieved from https://www.cdc.gov/physicalactivity/downloads/trends-in-the-prevalence-of-physical-activity-508.pdf

 DOI: https://doi.org/10.30564/jiep.v6i1.5363

[4] Centers for Disease Control and Prevention (2021). National Health and Nutrition Examination Survey—2017-2020. Retrieved from https://wwwn.cdc.gov/nchs/nhanes/continuousnhanes/default.aspx?cycle=2017-2020. Accessed 12 May 2023.

[5] Davis, S. M., Myers, O. B., Cruz, T. H., Morshed, A. B., Canaca, G. F., Keane, P. C., & O'Donald, E. R. (2016). CHILE: Outcomes of a group randomized controlled trial of an intervention to prevent obesity in preschool Hispanic and American Indian children. *Preventive medicine, pp. 89*, 162–168.

[6] Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., Lambourne, K., & Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: a systematic review. Medicine and Science in Sports and Exercise, 48(6), 1197.

[7] Fitzgibbon, M. L., Stolley, M. R., Schiffer, L. A., Braunschweig, C. L., Gomez, S. L., Van Horn, L., & Dyer, A. R. (2011). Hip-Hop to Health Jr. obesity prevention effectiveness trial: postintervention results. *Obesity, 19*(5), 994-1003.

[8] Gao, Z., Zeng, N., Pope, Z. C., Wang, R., & Yu, F. (2019). Effects of exergaming on preschool children's motor skill competence, perceived competence, and physical activity. *Journal of sport and health science, 8*(2), 106-113.

[9] Lambourne, K., & Donnelly, J. E. (2011). The role of physical activity in pediatric obesity. *Pediatric Clinics, 5*8(6), 1481-1491.

[10] Li, W., Gao, Z., Xiang, P., Shen, B., Yin, Z., & Kong, Q. (2016). Impact of national physical activity and health guidelines and documents on research on teaching K-12 physical education in USA. *Journal of Teaching in Physical Education, 35*, 85-96.

[11] Li, W., Xie, X., Li, Y., Chen, Y., & Shen, He. (2020): Twenty Years of Intervention Research in School Physical Education in the JTPE and RQES, *Research Quarterly for Exercise and Sport*, DOI: 10.1080/02701367.2019.1708236

[12] Loffin, J. W. (2015). Relationship between teacher fidelity and physical education student outcomes. *Physical Educator, 72*, 359-383.

[13] Martínez-Vizcaíno, V., Pozuelo-Carrascosa, D. P., García-Prieto, J. C., Cavero-Redondo, I., Solera-Martínez, M., Garrido-Miguel, M., ... & Sánchez-López, M. (2020). Effectiveness of a school-based physical activity intervention on adiposity, fitness and blood pressure: MOVI-KIDS study. *British journal of sports medicine, 54*(5), 279-285.

[14] Mehdizadeh, A., Nematy, M., Vatanparast, H., Khadem-Rezaiyan, M., & Emadzadeh, M. (2020). Impact of parent engagement in childhood obesity prevention interventions on anthropometric indices among preschool children: a systematic review. Childhood Obesity, *16*(1), 3-19.

[15] Mowbray, C. T., Holter, M. C., Teague, G. B., & Bybee, D. (2003). Fidelity criteria: Development, measurement, and validation. *American Journal of Evaluation, 24*, 315–340. doi:10.1177/109821400302400303

[16] Nathan, N., Sutherland, R., Beauchamp, M. R., Cohen, K., Hulteen, R. M., Babic, M., ... & Lubans, D. R. (2017). Feasibility and efficacy of the Great Leaders Active StudentS (GLASS) program on children's physical activity and object control skill competency: A non-randomised trial. *Journal of science and medicine in sport, 20*(12), 1081–1086.

[17] Nowicka, P., & Flodmark, C. E. (2007). Physical activity—key issues in treatment of childhood obesity. *Acta Paediatrica, 96*, 39-45.

[18] Nyberg, G., Sundblom, E., Norman, Å., Bohman, B., Hagberg, J., & Elinder, L. S. (2015). Effectiveness of a universal parental support programme to promote healthy dietary habits and physical activity and to prevent overweight and obesity in 6-year-old children: the healthy school start study, a cluster-randomised controlled trial. *PloS one, 10*(2), e0116876.

[19] O'Donnell, C.L. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research, 78*, 33-84. Doi:10.3102/0034654307313793.

[20] Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2012). Prevalence of obesity and trends in body mass index among U.S. children and adolescents, 1999-2010. *Jama, 307*(5), 483-490.

[21] Podnar, H., Novak, D., & Radman, I. (2018). Effects of a 5-minute classroom-based physical activity on on-task behavior and physical activity levels. *Kinesiology, 50*(2.), 251-259.

[22] Riiser, K., Richardsen, K. R., Haugen, A. L., Lund, S., & Løndal, K. (2020). Active play in ASP–a matched-pair cluster-randomized trial investigating the effectiveness of an intervention in after-school programs for supporting children's physical activity. *BMC Public Health, 20*, 1-12.

[23] Robinson, L. E., Palmer, K. K., Webster, E. K., Logan, S. W., & Chinn, K. M. (2018). The effect of CHAMP on physical activity and lesson context in preschoolers: a feasibility study. *Research Quarterly for Exercise and Sport, 89*(2), 265-271.

[24] Spruit, A., Assink, M., van Vugt, E., van der Put, C.,

  DOI: https://doi.org/10.30564/jiep.v6i1.5363

& Stams, G. J. (2016). The effects of physical activity interventions on psychosocial outcomes in adolescents: A meta-analytic review. *Clinical Psychology Review, 45*, 56-71.

[25] Steinbeck, K. S. (2001). The importance of physical activity in the prevention of overweight and obesity in childhood: A review and an opinion. *Obesity reviews, 2*(2), 117-130.

[26] Strong, W. B., Malina, R. M., Blimkie, C. J., Daniels, S. R., Dishman, R. K., Gutin, B., ... & Trudeau, F. (2005). Evidence based physical activity for school-age youth. *The Journal of pediatrics, 146*(6), 732-737.

[27] U.S. Department of Health and Human Services (2021). Physical activity is good for the mind and the body. Retrieved from https://health.gov/news/202112/physical-activity-good-mind-and-body

[28] US Public Health Service (1991). Healthy people 2000: National health promotion and disease prevention objectives. *US Department of Health & Human Services.*

[29] US Department of Health and Human Services. (1996). Physical activity and health: A report of the Surgeon General Atlanta. GA: *Centers for Disease Control and Prevention*.

[30] US Department of Health and Human Services (2000). Healthy People 2010. Washington, DC: *US Department of Health and Human Services.* Retrieved from *www.health.gov/healthypeople/*

[31] US Department of Health and Human Services. (2008). 2008 physical activity guidelines for Americans. *Washington, DC.*

[32] US Department of Health and Human Services (2018). Physical Activity Guidelines for Americans. 2nd ed. *Washington, DC.*

[33] U.S. Department of Health and Human Services. (2018). Healthy People 2020. Retrieved from https://wayback.archive it.org/5774/20220413182850/https://www.healthypeople.gov/2020/.

[34] Waters, L. A., Galichet, B., Owen, N., & Eakin, E. (2011). Who participates in physical activity intervention trials?. *Journal of physical activity and health, 8*(1), 85-103.

[35] Webster, E. K., Wadsworth, D. D., & Robinson, L. E. (2015). Preschoolers' Time On-Task and Physical Activity During a Classroom Activity Break. *Pediatric Exercise Science, 27*(1).

[36] Woodforde, J., Alsop, T., Salmon, J., Gomersall, S., & Stylianou, M. (2022). Effects of school-based before-school physical activity programmes on children's physical activity levels, health and learning-related outcomes: a systematic review. *British Journal of Sports Medicine, 56*(13), 740-754.

[37] World Health Organization (2012). Global strategy on diet, physical activity, and health: childhood overweight and obesity. Retrieved from https://apps.who.int/gb/ebwha/pdf_files/WHA57/A57_R17-en.pdf

[38] World Health Organization. (2018). Global action plan on physical activity 2018–2030: more active people for a healthier world. Retrieved from https://apps.who.int/iris/handle/10665/272722. License: CC BY-NC-SA 3.0 IGO

[39] World Health Organization. (2020). WHO guidelines on physical activity and sedentary behaviour. Retrieved from https://apps.who.int/iris/handle/10665/336656. License: CC BY-NC-SA 3.0 IGO

[40] World Health Organization. (2022). Physical activity. Retrieved from https://www.who.int/news-room/fact-sheets/detail/physical-activity

[41] Xiong, S., Zhang, P., & Gao, Z. (2019). Effects of exergaming on preschoolers' executive functions and perceived competence: a pilot randomized trial. *Journal of Clinical Medicine, 8*(4), 469.

Table 1

Descriptive Statistics for Region of Studies Being Conducted

Country	Frequency	Percentage
United States	18	43.9%
Israel	5	7.8%
Spain	4	6.8%
Switzerland	4	7.3%
Australia	3	5.9%
Canada	2	4.2%
Denmark	1	2.2%
Scotland	1	2.2%
China	1	2.3%
England	1	2.3%
Norway	1	2.4%
Total	41	100.0%

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ARTICLE

The Impact of a Weekend Dance Program on Social-Emotional Learning Among Young Children

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ABSTRACT

Dance and movement encourages socialization promoting children's social and emotional skills. This study aimed to examine the impact on the SEL of children after a weekend dance program.

METHOD: This study employed a quasi-experimental controlled trial design with 60 children aged 5-6 in Fujian Province, China. Participants were randomly assigned to either an integrated dance program group (n=30) or control group (n=30). The weekend dance program was led by professional instructors and consisted of 12 weekly lessons, each lasting 50 minutes. Pre- and post-measurements were taken using the Social-Emotional and Character Development Scale (SECDS) and the Preschooler Gross Motor Quality Scale (PGMQS) to assess changes in social-emotional learning and gross motor skills. Repeated-measures ANOVA tests were conducted to determine the impact of the integrated dance program.

RESULTS: The study found a significant difference in the changes between the two groups, indicating that the weekend dance program had a positive impact on the social-emotional behavior and motor skill quality of the children who participated compared to the control group. Specifically, the participants in the dance program group demonstrated significantly greater improvements in their social-emotional behavior and motor skill quality compared to those in the control group.

CONCLUSION: The study provides preliminary evidence that an integrated dance program can promote social-emotional development and gross motor skills in young children. After-school dance activities may help to improve children's well-being. Further research is needed to understand the underlying mechanisms and to evaluate alternative arts-based therapies.

1. Introduction

1.1 Importance of Social and Emotional Learning (SEL) in Children

Social and Emotional Learning (SEL) is an essential tool for promoting positive development in children, as it facilitates mental well-being and influences all areas of children's growth (Jones, Barnes, Bailey, & Doolittle, 2017;[9] Greenberg, Domitrovich, Weissberg, & Durlak, 2017).[6] SEL encompasses the acquisition and application of knowledge, skills, and attitudes that contribute to healthy self-awareness, emotional management, and

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the achievement of individual and collective goals. Additionally, it helps refine the ability to express emotions and empathize with others, leading to healthy and supportive interpersonal relationships (Borowski, 2019).[2] While there is a significant body of literature on the importance of SEL in promoting mental well-being, there is a paucity of research on the relationship between dance and movement engagement and SEL in children. Therefore, this study aims to investigate the impact of a weekend dance program on the social-emotional learning of young children.

1.2 The Need for SEL

Today's children are growing up in an increasingly digital world, where electronic devices are becoming an integral part of their lives (Keeley et al., 2017).[10] While technology can supplement social interaction, excessive screen time has been linked to children's cognitive, linguistic, and social-emotional skills (Schwarzer, Grafe, Hiemisch, Kiess, & Poulain, 2022).[20] Young children may experience inattention, aggressive behavior, obesity, lack of physical activity, and sleep disorders due to the use of electronic devices (Mustafaoğlu, Zirek, Yasacı, & Özdinçler, 2018).[17]

Neglecting children's social and emotional competencies can put their academic and social behaviors at significant risk (Thayer, Campa, Weeks, Buntain-Ricklefs, Low, Larson, & Cook, 2019).[22] However, children with high social-emotional competency are more likely to achieve their academic goals because they can control their emotions and solve problems when they encounter difficulties (Wang, Yang, Zhang, Wang, Liu, & Xin, 2019).[25] Thus, the United Nations Educational, Scientific and Cultural Organization (UNESCO) has recognized the importance of SEL and advocated for it as the key to achieving the United Nations (UN) Sustainable Development Goals (SDGs), including building peaceful and sustainable societies through education. High social-emotional competency enables children to achieve their academic goals by allowing them to control their emotions and solve problems when they encounter difficulties (Nandini Chatterjee Singh, 2022).[18]

1.3 Complementarity of SEL and Creative Dance

While SEL and creative dance may seem unrelated, recent research suggests that thy can complement each other in enhancing children's social and emotional abilities. The 2015 Menzer study provides evidence connecting arts participation with social-emotional development, highlighting that participation in the arts, including music, dance, and theater, can foster social connections and a sense of community, leading to improved social skills and emotional well-being. Moreover, the creative process involved in arts participation allows for self-expression and reflection, facilitating personal growth and self-awareness. Engagement in the arts can also promote problem-solving skills, critical thinking, and creativity, valuable assets for social and emotional development (Menzer, 2015).[16]

Research has shown that creative dance has the potential to enhance children's cooperation, communication, leadership, and teamwork skills, while also promoting acceptance of individual differences (Rossberg-Gempton, Dickinson, & Poole, 1999).[19] In addition, a systematic review by McCabe and Altamura (2011)[15] found that dance and other social-emotional training programs can have a positive impact on social and emotional competence in preschool children in the short term (McCabe & Altamura, 2011).[15] According to a recent meta-analysis conducted by Blewitt C et al., (2018),[1] those favorable effects from SEL programs are more likely to be associated with facilitators, specialists, or researchers than with class teachers (Blewitt, Fuller-Tyszkiewicz, Nolan, Bergmeier, Vicary, Huang, McCabe, McKay, & Skouteris, 2018).[1] The reason might be inadequate preparation for teachers to intervene within preschool programs. artistic activities such as dance and creative movement, which draw upon Laban's notation work, have long been recognized as effective ways to engage young children, promote their emotional growth, and foster social interaction (Hanna, Patterson, Rollins, & Sherman, 2013).[7] Thus, creative dance can be an effective mean to promote SEL in young children.

1.4 The Role of Dance in Supporting Social-Emotional Development

Recent research has specifically focused on the role of dance in supporting social-emotional development in early childhood. Despite being an ancient art form, creative dance can still offer significant benefits to children, including enhanced social and emotional skills. Dance programs can foster social and emotional learning, creativity, responsibility, teamwork, and effective movement strategies. Through dance movements, children can benefit from improved motor ability, social interactions, sensory engagement, and cognitive flexibility (Lorenzo-Lasa, Ideishi, & Ideishi, 2007).[13] Additionally, physical movement and expression in dance involve social interactions, which foster sensitivity to understanding, reacting, and coping with emotions (Walter & Sat, 2013).[24] By integrating social-emotional learning into dance programs, children can explore and refine their movement, synchronize

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with music and other learners, and engage with class themes, promoting social-emotional development through movement and expression.

While SEL has been shown to have a positive impact on children, there is a lack of research on the integration of SEL with dance and movement programs for children. Thus, the purpose of this study is to investigate the effects of an integrated dance program on children's social-emotional learning and motor skills compared to a choreographed dance program offered in a private culture and art center. This study aims to fill the research gap and provide insights into the potential benefits of incorporating SEL into dance programs for children. By examining the impact of an integrated dance program on social-emotional learning and motor skills, this study seeks to contribute to the development of effective interventions for promoting positive development in children.

2. Research Method

2.1 Participants

In this quasi-experimental controlled study, participants were recruited through a private culture and art center located in Putian, Fujian Province. The center works to support and strengthen local dance, music and theater organizations through partnerships and cooperation. Advertising materials were emailed to the center, the director replied and sent an official agreement. The researchers contacted the dance instructors in-person and obtained the personal agreement for joining the research project. The director recruited volunteers via an e-poster sent to parents in the WeChat group during fall 2020 and spring 2021. Oral and written informed consent and assent were obtained from parents and children before baseline data collection. Parents and children were invited to attend an orientation meeting, where the study procedures and integrated dance program were explained. All participants could communicate with the researchers via their instructors/director about the project and could withdraw at any time. The study followed ethical guidelines and all procedures were approved by the Research Committees of the University of Macau.

A total of seventy young girls, between the age of 5 and 6 years, were recruited in the study. Sixty-three girls were able to complete the study. Three participants were excluded due to personal reasons. Participants were allocated equally, they were blinded which they were unaware of the groups they were assigned to. Thirty girls were included in the intervention group and thirty girls were included in the control group for the final analysis.

2.2 Inclusion and Exclusion Criteria

The inclusion criteria of subjects included 1) all girls; 2) age between 5 to 6 years old with parental/legal guardian consent; 3) no history of major surgery; 4) children background, attendance rate and assessment information are complete and no missing. In addition, the exclusion criteria included 1) learning difficulties or physical disabilities reported by their doctors/parents.

2.3 Procedure

The integrated dance program was implemented by qualified dance instructors who received licenses and qualifications recognized by the Chinese Dance Association, based on Dance Standards s approved in Putian, Fujian Province.

The program structure and main contents were presented in Table 1. The 12-week integrated dance program consisted of one session per week, with a total of 3 units. Each unit had 4 sessions and each session lasted for 50 minutes. Three dances were selected from the Syllabus for Graded Examination on Chinese Dance Grade III designed by the China Dancers Association, namely “Dance in Forest”, “Little Helpers” and “Happy Day”. In the intervention group, students were offered movement opportunities that allowed them to create dance movements according to their personal preferences while listening to the selected music and lyrics.

Each session was structured into 5 parts: 1) greeting, 2) warm-up and stretching activities, 3) developing skills, 4) music and dance movements improvisation and 5) cool-down and stretching. The integrated dance program and all lesson plans were specifically designed for this study, based on the conceptual approach of creative dance founded by Gilbert in 1992 (Green Gilbert & Smith, 1992).[5] Additionally, the instruction, guided exploration and tasks were adapted and integrated with Rudolf Laban’s movement framework through the elements of movement like space, effort, body, and relationships.

During each session, the instructor was always visible to the students, teaching in the center of the circle or in front of them. To integrate SEL, children were divided into groups to listen to the theme song and engage in dance movement activities (ie, jogging and galloping) and SEL activities (ie, building relationships and bolstering their expression). Physical activities and games were organized according to the themes, and children were assigned to create different postures and movements with peers in each lesson routine (ie, animal moves).

During the 8-week intervention period, the control group attended regular Chinese dance instruction. The

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sessions strictly adhered to Foundation Level 1 for beginning Chinese dance learners, which consists of basic locomotor skills, moves, and rhythms that are very repetitious and are taught by a licensed dance instructor appointed by the art center.

2.4 Measures

The Preschooler Gross Motor Quality Scale (PGMQS) was used to assess body movement skill qualities of children (Sun, Zhu, Shih, Lin, & Wu, 2010).[21] This process-oriented assessment is administered by researchers and instructors, with 17 items in three subscales. The locomotion subscale includes 8 items (down stairs, running, horizontal jumping, hopping, sliding, galloping, leaping, and jumping from side to side), the object manipulation subscale includes 5 items (overhand throwing, catching, kicking, ball bouncing, and striking a stationary ball) and the balance subscale includes 4 items (single leg standing, tandem standing, walking line forward, and walking line backward). Each young child was awarded one point if they demonstrated the required quality component and zero if they did not meet the criteria. The total score for PGMQS is 84, with 41 points for the locomotion subscale, 25 points for the object manipulation subscale, and 18 points for the balance subscale. Higher scores indicate better motor skill performance.

The Social-Emotional and Character Development Scale (SECDS) was used to evaluate various aspects of social-emotional skills and character development in children aged 3 to 8 years old (Ji, DuBois, & Flay, 2013).[8] This 28-item scale includes six subscales: prosocial behavior (six items), honesty (five items), self-development (four items), self-control (four items), respect at school (five items), and respect at home (four items). Items were assessed using a 4-point Likert scale to indicate how often the children performed each SECD-related behavior. The instructors read aloud and explained each item to ensure that the children understood the items and to improve the accuracy of the responses. Examples of items include: "I try to cheer up other kids if they are feeling sad," "I tell the truth when I have done something wrong," "I set goals for myself," "I follow the rules even when nobody is watching," "I obey my teacher and other adults at schools," and "I speak politely to my parents." Higher scores indicate higher SECD skills.

2.5 Data Analysis

The study utilized pre- and post-measurements with

Table 1. *The integrated dance program*

	Dance in Forest (week 1 – 4)	**Little Helpers (week 5 – 8)**	**Happy Day (week 9– 12)**
Greeting and warm up			
Dance Movement (Think different posture and routines; Create move with peers)	**Locomotion**		
	Animal moves (walk or jump like bird, frog, pig, horse; run through or avoid objects)	Deliver (skipping)	Waking up (jog and gallop in different direction)
	Manipulation		
	Discover (catch and hold different objects)	Sweep (hold and kick objects) Clean (circular movements with different body part and directions; throw and catch objects)	In the circuit (striking)
	Balance		
	Animal postures (single leg stand and reach)	Big hand (with different postures in different levels)	Expressing happy feeling (hop with one leg on stilts)
Social Emotional Learning	Self-development and control Touch (feel, touch and hug) Honesty Bolster own expression	Communicate and respect Get closer (build relationship) Big hand (strong helper; know how to help at home and school) Big thumb (praise each other; motivate peers expressions)	Prosocial behavior and good choice Big eyes (watch and clap; was it interesting? difficult?) Good taker (find, select, reflect and make good decision)
Cool-down/stretches and best wishes			

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the Social-Emotional and Character Development Scale (SECDS) and Preschooler Gross Motor Quality Scale (PGMQS) to assess changes in social-emotional learning and gross motor skills. The initial analysis was performed using independent t-tests and paired t-tests for continuous variables to compare means differences between the intervention group and the control group and to assess pre-post changes in both intervention and control groups. To determine the impact of the integrated dance program on children's SEL and motor skills, repeated-measures ANOVA tests were conducted.

3. Results & Discussion

3.1 Results

The results for the change in motor skill quality and social-emotional learning in the pre- and post- intervention are presented in Table 2. No significant differences ($p > 0.05$) were found at pre and post- measures among those observed variables.

After twelve weeks of the integrated dance program intervention, locomotion in the intervention group increased significantly (+19.6, $p<0.001$), moreover, manipulation in the intervention group increased significantly (+10.1, $p<0.001$) and the balance in the intervention group also increased significantly (+15.1, $p<0.001$). Overall, the PGMQS total scores of the intervention group increased significantly (+37.6, $p<0.001$).

There were tendencies of improvement of the intervention in SCEDS. Prosocial behavior in the intervention group increased significantly (+2.66, $p<0.001$), and honesty in the intervention group increased significantly (+3.7, $p<0.001$). A significant increase in self-development was found in the intervention group (+4.03, $p<0.001$), as well as self-control (+3.7, $p<0.001$). Respect at school increased significantly (+2.5, $p<0.001$) while respect at home also increased significantly (+3.73, $p<0.001$). Overall, the SECDS total scores of the intervention group increased significantly (+20.3, $p<0.001$).

There were significant increases in all variables of PGMQS in the control group; locomotion in the control group increased significantly (+2.93, $p<0.001$), manipulation in the control group increased significantly (+2.03 , $p<0.001$) and balance also increased significantly (+1.5, $p<0.001$). While there were only 2 variables of the SECDS increased significantly in the control group. Respect at school in the control group increased significantly (+0.35, $p<0.001$) and the total scores of SECDS in the control group increased significantly (+1.12, $p<0.001$) as well.

To conclude, the PGMQS total scores of the intervention group (+37.6, $p<0.001$) and control group (+6.46, $p<0.001$) increased significantly, with a significant increase in the SECDS total scores of the intervention group (+20.3, $p<0.001$) and control group (+1.12, $p<0.001$) . The changes between the intervention group and the control group were significantly different before and after the study. There were significant changes in all the variables and total scores of PGMQS and SECDS in the intervention group compared to the control group.

3.2 Discussion

To the authors' knowledge, this is the first preliminary study to examine whether an intervention-integrated dance program can provide immediate improvements in social-emotional and motor skills of young children.

The findings of our study highlight the potential benefits of integrating creative dance activities into early childhood education programs for promoting both social-emotional learning and motor skill development. Our intervention demonstrated significant improvements in children's prosocial behavior, honesty, self-development, self-control, and respect, indicating the value of increasing dance experiences in young children. These findings are in line with previous studies that have found positive effects of dance programs on children's self-esteem, social competence, and behavior (Lai Keun & Hunt, 2006);[11] (Lobo & Winsler, 2006).[12]

One potential reason for the positive outcomes of our intervention is the use of experienced instructors who employed a conceptual approach of movement exploration and recreated regular movements based on children's social interaction and emotional expression. This approach may have provided a conducive atmosphere for children to express their natural curiosity, make decisions, resolve conflicts, and practice nonverbal communication with peers and groups. The importance of experienced instructors is also supported by Blewitt et al.'s (2018)[1] meta-analysis, which found that favorable effects of social-emotional training programs are more likely to be associated with facilitators, specialists, or researchers than with class teachers (Blewitt et al., 2018).[1]

Our study also found that both integrated and Chinese dance program children showed improvements in gross motor abilities in locomotion, manipulation, and balance, as compared to their baseline evaluation. This is consistent with Gallahue's (1982)[3] theory of motor skill developmental model, the improvements could be attributed to various dancing activities, voluntary movements, and movements that occurred as part of normal development since they were 5–6 years old and still dealing with physical development and the gradual enhancement of the fundamental movements (Gallahue, 1982).[3]

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Table 2 *Effect of Motor Skill Quality and Social-Emotional Learning*

		Integrated Dance group (n=30)			Chinese Dance group (n=30)		
Scales	Variables	Pre	Post	Δ	Pre	Post	Δ
PGMQS	Locomotion	19.9±5.28	39.5±2.75**	19.6±4.97#	22.2±4.05	25.1±3.00**	2.93±2.09
	Manipulation	12.7±3.78	22.9±2.46**	10.1±3.07#	12.1±2.11	14.1±1.93**	2.03±1.32
	Balance	7.26±3.54	15.1±4.58**	7.83±4.61#	11.6±3.76	13.1±2.64**	1.5±1.47
	Total score	39.9±10.7	77.5±8.82**	37.6±9.63#	45.9±7.08	52.4±5.22**	6.46±3.24
SECDS	Prosocial Behavior	19.0±3.92	21.7±1.96**	2.66±2.42#	17.9±3.91	18.2±3.53	0.22±0.99
	Honesty	12.5±4.09	16.2±2.69**	3.7±2.75#	15.3±4.45	15.1±4.02	-0.2±0.80
	Self-Development	8.6±3.45	12.6±2.20**	4.03±2.23#	10.1±4.29	10.4±3.83	0.25±0.77
	Self-Control	8.53±3.86	12.2±2.48**	3.7±2.69#	10.6±3.83	10.9±3.46	0.29±0.86
	Respect at School	14.8±3.88	17.3±1.84**	2.5±2.68#	15.4±3.93	15.8±3.41*	0.35±0.91
	Respect at Home	10±2.62	13.7±1.48**	3.73±2.21#	11±3.10	11.2±2.69	0.22±0.76
	Total Score	73.5±17.5	93.9±10.4**	20.3±11.2#	80.5±17.1	81.7±15.4*	1.12±2.44

Note: Data are means ± SD.

Δ denotes the change in the pre-test and post-test.

* denotes p value ($p<0.05$) of the integrated dance group was statistically significant from that of the Chinese dance group.

** denotes p value ($p<0.01$) of the integrated dance group was statistically significant from that of the Chinese dance group.

# denotes p value ($p<0.01$) of Δ in the integrated dance group was statistically significant from that of the Δ in the Chinese dance group.

However, the largest increases in gross motor skills were observed in the integrated dance program group, indicating the potential benefits of incorporating dance activities into early childhood education programs. The results of our study expand upon the findings of previous research that has also found significant improvements in basic kinaesthetic skills and gross motor skills among children who received carefully designed and organized dance programs (Lykesas, Tsapakidou, & Tsopmanaki, 2014;[14] Georgios, Ioannis, Olga, Dimitris, & Maria, 2018;[4] Theocharidou, 2017).[23] The playful and engaging nature of dance may provide an opportunity for young children to develop motor skills through the effortless acquisition of movement abilities.

It is worth noting that the duration of our intervention was just a weekly session for twelve weeks, which is shorter than previous interventions that have shown similar results. This suggests that even brief interventions can strengthen young children's motor skill quality and social-emotional learning, while remaining feasible in terms of time and frequency. However, further research is needed to examine the long-term effects of creative dance interventions on young children's development.

4. Conclusion

In conclusion, our study provides strong evidence that an integrated dance program can have significant positive effects on young children's social and emotional learning and motor quality. The findings suggest that even a moderate-duration program can offer many advantages and benefits that extend beyond simply learning dance skills.

However, it is important to acknowledge that there is no one definitive approach to using dance as an intervention to increase social emotional competence. More research is needed in different contexts and with varying durations to fully understand the extent of the impact that performing arts can have on promoting children's social-emotional development. It is essential that future studies utilize reliable subjective and objective measures to collect data, which will strengthen our understanding of the benefits of dance interventions.

References

[1] Blewitt, C., Fuller-Tyszkiewicz, M., Nolan, A., Bergmeier, H., Vicary, D., Huang, T., McCabe, P., McKay, T., & Skouteris, H. (2018). Social and Emotional Learning Associated With Universal Curriculum-Based Interventions in Early Childhood Education and Care Centers: A Systematic Review and Meta-analysis. *JAMA Netw Open*, *1*(8), e185727. https://doi.org/10.1001/jamanetworkopen.2018.5727

[2] Borowski, T. (2019). CASEL's framework for systemic social and emotional learning. https://measuringsel.casel.org/wp-content/uploads/2019/08/AWG-Framework-Series-B.2.pdf

[3] Gallahue, D. L. (1982). Understanding motor development in children.

[4] Georgios, L., Ioannis, G., Olga, T., Dimitris, C., & Maria, K. (2018). The Effect of a Traditional Dance

Program on Health-Related Quality of Life as Perceived by Primary School Students. *Journal of Education and Training Studies*, *6*(1), 96-103.

[5] Green Gilbert, A., & Smith, H. P. (1992). Creative dance for all ages: A conceptual approach. *Reston, VA: American alliance for health, physical education, recreation and dance*.

[6] Greenberg, M. T., Domitrovich, C. E., Weissberg, R. P., & Durlak, J. A. (2017). Social and Emotional Learning as a Public Health Approach to Education. *The Future of Children*, *27*, 13-32. https://doi.org/10.1353/foc.2017.0001

[7] Hanna, G., Patterson, M., Rollins, J., & Sherman, A. (2013). The Arts and Human Development: Framing a National Research Agenda for the Arts, Lifelong Learning and Individual Well-Being. 81-1211. https://www.arts.gov/sites/default/files/TheArtsAndHumanDev.pdf

[8] Ji, P., DuBois, D. L., & Flay, B. R. (2013). Social-Emotional and Character Development Scale: Development and initial validation with urban elementary school students. *Journal of Research in Character Education*, *9*, 121-147.

[9] Jones, S. M., Barnes, S. P., Bailey, R., & Doolittle, E. J. (2017). Promoting Social and Emotional Competencies in Elementary School. *The Future of Children*, *27*, 49-72. https://doi.org/10.1353/foc.2017.0003

[10] Keeley, B., Ed.; Little, Céline, Ed. (2017). *The State of the Worlds Children 2017: Children in a Digital World*. United Nations Children's Fund (UNICEF).

[11] Lai Keun, L., & Hunt, P. (2006). Creative dance: Singapore children's creative thinking and problem-solving responses. *Research in Dance Education*, *7*(1), 35-65.

[12] Lobo, Y. B., & Winsler, A. (2006). The Effects of a Creative Dance and Movement Program on the Social Competence of Head Start Preschoolers. *Social Development*, *15*(3), 501-519. https://doi.org/https://doi.org/10.1111/j.1467-9507.2006.00353.x

[13] Lorenzo-Lasa, R., Ideishi, R. I., & Ideishi, S. K. (2007). Facilitating Preschool Learning and Movement through Dance. *Early Childhood Education Journal*, *35*(1), 25-31. https://doi.org/10.1007/s10643-007-0172-9

[14] Lykesas, G., Tsapakidou, A., & Tsopmanaki, E. (2014). Creative Dance as a Means of Growth and Development of Fundamental Motor Skills for Children in First Grades of Primary Schools in Greece. *Asian Journal of Humanities and Social Studies*, *2*(1). https://www.ajouronline.com/index.php/AJHSS/article/view/982

[15] McCabe, P. C., & Altamura, M. (2011). Empirically valid strategies to improve social and emotional competence of preschool children. *Psychology in the Schools*, *48*(5), 513-540. https://doi.org/10.1002/pits.20570

[16] Menzer, M. (2015). *The Arts in Early Childhood: Social and Emotional Benefits of Arts Participation: A Literature Review and Gap-Analysis (2000-2015)*. https://www.arts.gov/sites/default/files/arts-in-early-childhood-dec2015-rev.pdf

[17] Mustafaoğlu, R., Zirek, E., Yasacı, Z., & Özdinçler, A. R. (2018). The negative effects of digital technology usage on children's development and health. *Addicta: the Turkish journal on addictions*, *5*(2), 13-21.

[18] Nandini Chatterjee Singh, A. D. (2022). *Rethinking learning: a review of social and emotional learning for education systems*. UNESCO MGIEP. https://unesdoc.unesco.org/notice?id=p::usmarcdef_0000373890

[19] Rossberg-Gempton, I. E. v., Dickinson, J. L., & Poole, G. D. (1999). Creative dance: potentiality for enhancing social functioning in frail seniors and young children. *Arts in Psychotherapy*, *26*, 313-327.

[20] Schwarzer, C., Grafe, N., Hiemisch, A., Kiess, W., & Poulain, T. (2022). Associations of media use and early childhood development: cross-sectional findings from the LIFE Child study. *Pediatr Research*, *91*(1), 247-253. https://doi.org/10.1038/s41390-021-01433-6

[21] Sun, S. H., Zhu, Y. C., Shih, C. L., Lin, C. H., & Wu, S. K. (2010). Development and initial validation of the Preschooler Gross Motor Quality Scale. *Res Dev Disabil*, *31*(6), 1187-1196. https://doi.org/10.1016/j.ridd.2010.08.002

[22] Thayer, A. J., Campa, D. M., Weeks, M. R., Buntain-Ricklefs, J., Low, S., Larson, M., & Cook, C. R. (2019). Examining the Differential Effects of a Universal SEL Curriculum on Student Functioning Through the Dual Continua Model of Mental Health. *The Journal of Primary Prevention*, *40*(4), 405-427. https://doi.org/10.1007/s10935-019-00557-0

[23] Theocharidou, O. (2017). The effectiveness of a creative dance program based on the Laban theory, relating to the quality of life perceptions associated with the health of students/three in primary education. *Unpublished MA Dissertation, Aristotle University of Thessaloniki*.

[24] Walter, O., & Sat, E. (2013). Dance and its influence on emotional self-control and regulation and emotional intelligence abilities among early child-

  DOI: https://doi.org/10.30564/jiep.v6i1.5324

hood-aged children. *International Journal of Arts & Sciences*, *6*(4), 77.

[25] Wang, Y., Yang, Z., Zhang, Y., Wang, F., Liu, T., & Xin, T. (2019). The Effect of Social-Emotional Competency on Child Development in Western China [Original Research]. *Frontiers in Psychology*, *10*. https://www.frontiersin.org/articles/10.3389/fpsyg.2019.01282

Appendices:

Appendix 1: Analysis of paired t-test of pre- and post- test between the integrated dance group and the Chinese dance group

	Integrated dance group (n=30)				Chinese dance group (n=30)			
Variables	Pre	Post	t	p	Pre	Post	t	p
PGMQS								
Locomotion	19.9±5.28	39.5±2.75**	-21.59	0.000	22.2±4.05	25.1±3.00**	-7.651	0.000
Manipulation	12.7±3.78	22.9±2.46**	-18.07	0.000	12.1±2.11	14.1±1.93**	-8.401	0.000
Balance	7.26±3.54	15.1±4.58**	-9.293	0.000	11.6±3.76	13.1±2.64**	-5.552	0.000
Total score	39.9±10.7	77.5±8.82**	-21.37	0.000	45.9±7.08	52.4±5.22**	-10.91	0.000
SECDS								
Prosocial Behavior	19.0±3.92	21.7±1.96**	-6.021	0.000	17.9±3.91	18.2±3.53	-1.270	0.214
Honesty	12.5±4.09	16.2±2.69**	-7.353	0.000	15.3±4.45	15.1±4.02	1.564	0.129
Self-Development	8.6±3.45	12.6±2.20**	-9.881	0.000	10.1±4.29	10.4±3.83	-1.861	0.073
Self-Control	8.53±3.86	12.2±2.48**	-7.526	0.000	10.6±3.83	10.9±3.46	-1.874	0.071
Respect at School	14.8±3.88	17.3±1.84**	-5.095	0.000	15.4±3.93	15.8±3.41*	-2.164	0.039
Respect at Home	10±2.62	13.7±1.48**	-9.245	0.000	11±3.10	11.2±2.69	-1.651	0.109
Total score	73.5±17.5	93.9±10.4**	-9.872	0.000	80.5±17.1	81.7±15.4*	-2.578	0.015

Note: Data are means ± SD.

Δ denotes the change in the pre-test and post-test.

* denotes p value ($p<0.05$) of the integrated dance group was statistically significant from that of the Chinese dance group.

** denotes p value ($p<0.01$) of the integrated dance group was statistically significant from that of the Chinese dance group.

Appendix 2: Analysis of sample t-test of the changes in motor skill quality and social-emotional learning of pre- and post- test for the integrated dance group compared to the Chinese dance group

Variables	Changes of the integrated dance group (n=30)	Changes of the Chinese dance group (n=30)	t	p
PGMQS				
Locomotion	19.6±4.97**	2.93±2.09	16.927	0.000
Manipulation	10.1±3.07**	2.03±1.32	13.264	0.000
Balance	7.83±4.61**	1.5±1.47	7.155	0.000
Total score	37.6±9.63**	6.46±3.24	16.775	0.000
SECDS				
Prosocial Behavior	2.66±2.42**	0.22±0.99	5.152	0.000
Honesty	3.7±2.75**	-0.2±0.80	7.439	0.000
Self-Development	4.03±2.23**	0.25±0.77	8.797	0.000
Self-Control	3.7±2.69**	0.29±0.86	6.576	0.000
Respect at School	2.5±2.68**	0.35±0.91	4.176	0.000
Respect at Home	3.73±2.21**	0.22±0.76	8.181	0.000
Total score	20.3±11.2**	1.12±2.44	9.120	0.000

Note: Data are means ± SD.

Δ denotes the change in the pre-test and post-test.

** denotes p value ($p<0.01$) of intervention group was statistically significant from that of the Chinese dance group.

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Appendix 3: Checks for regularity for scoring variables

Group			Kolmogorov-Smirnov			Shapiro-Wilk		
			Statistics	df	Sig.	Statistics	df	Sig.
Experimental	Pre test	PGMQS_total	0.114	30	.200*	0.983	30	0.908
	Pre test	SECDS_total	0.169	30	0.029	0.893	30	0.006
Control	Pre test	PGMQS_total	0.137	30	0.157	0.974	30	0.645
	Pre test	SECDS_total	0.132	30	0.190	0.957	30	0.252
Experimental	Post test	PGMQS_total	0.232	30	0.000	0.743	30	0.000
	Post test	SECDS_total	0.112	30	.200*	0.966	30	0.430
Control	Post test	PGMQS_total	0.112	30	.200*	0.971	30	0.569
	Post test	SECDS_total	0.160	30	0.049	0.958	30	0.278

* denotes p value ($p<0.05$) of integrated dance group was statistically significant from that of the Chinese dance group.

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ARTICLE

Exploring the Impact of Socioeconomic Status and Physical Play on Early Childhood Development among Macau Young Children

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ABSTRACT

This research investigates the intricate relationships between socioeconomic status (SES) and physical play in early childhood development within the unique context of Macau. Our study reveals that parental education levels are associated with conducive home environments for child development, characterized by larger play spaces, diverse toys, and increased participation in physical activities and extracurriculars. This study found a significant correlation between media screen activity and involvement in extracurriculars or physical activity programs, highlighting the need to explore the multifaceted influences on children's media consumption. This study emphasizes the importance of parental education in creating nurturing environments for child development and the crucial need for an in-depth understanding of media screen activity's role in early childhood. Our findings bear implications for academia and policymakers, educators, and parents, underscoring the importance of supportive environments that facilitate physical play, promote parental education, and encourage healthy media usage habits for optimal child development outcomes. However, a larger and more diverse sample size in future research could enhance these findings' external validity.

1. Introduction

1.1 Background Information on Early Childhood Development

Recognized as the cornerstone of an individual's developmental journey, early childhood encapsulates the critical first five years of life (Valla, Slinning, Kalleson, Wentzel-Larsen, & Riiser, 2020).[24] During this period, children are exceptionally open to environmental stimuli, rapidly acquiring essential motor, cognitive, and communicative skills that set the stage for future growth and learning. In contemporary society, the weight placed on educational success from an early age is substantial, with parents often stressing the significant role that formal schooling plays in their child's developmental trajectory. Yet, it is crucial to acknowledge that influences on a child's development transcend the confines of a school curriculum. As the primary social construct, the family is instrumental in molding a child's experiences, opportunities, and overall developmental outcomes (Bradley & Corwyn, 2002;[3] Lee & McLanahan, 2015).[10] A growing body of research underscores the home environment's vital role the home environment plays in shaping a child's developmental path (Yang, Yang, Zheng, Song, & Yi, 2021).[29] Salient factors, such as socioeconomic status, the parents' roles, and the

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provision of stimulating experiences, significantly steer a child's cognitive, social, and emotional development (Ginsburg, Communications, Child, & Health, 2007);[8] September, Rich, & Roman, 2016);[16] Slemming, Norris, Kagura, Saloojee, & Richter, 2022).[19]

1.2 The Potential Influence of Socioeconomic Status on Child Development

Socioeconomic status (SES) is an influential factor encompassing various dimensions, including income, education, and occupation. Previous studies have demonstrated that SES is associated with a wide range of developmental outcomes in children, including health, cognitive, and socioemotional outcomes (Bradley & Corwyn, 2002;[3] Letourneau, Duffett-Leger, Levac, Watson, & Young-Morris, 2013),[12] which can impact a child's access to resources such as quality education and healthcare (Sheridan & McLaughlin, 2016).[18] Empirical studies suggest that higher parental education and household income positively correlate with superior child development outcomes (Akhlaghipour & Assari, 2020).[1] Parents with elevated incomes, often associated with higher educational attainment, command an enhanced understanding of effective parenting practices and enjoy more substantial social capital, thereby positively fostering their children's development (Wimer & Wolf, 2020).[27] For instance, a recent study from China discovered a significant association between family income and parental education with preschool children's cognitive school readiness (Xia, 2022).[28] In contrast, financial constraints can impair parents' capacity to offer warm, sensitive parenting, adversely influencing children's development (Zhang, 2012).[30]

1.3 The Role of Physical Play in Child Development

Physical play is a critical component of early childhood development, as identified in recent studies (Sincovich, Gregory, Harman-Smith, & Brinkman, 2020;[17] Suzuki, 2020;[20] Prins, van der Wilt, van Santen, van der Veen, & Hovinga, 2022).[15] Such play-based activities equip children with indispensable motor, cognitive, and socioemotional skills, serving as the bedrock for their holistic growth and development (Undiyaundeye, 2013).[23] The advantages of physical play in fostering children's development are well-delineated in scholarly literature, underscoring its profound impact on children's comprehensive well-being. Children explore the world and their identities through play, cultivating the necessary skills for academics, work, and interpersonal relationships (Ginsburg, Communications, Child, & Health, 2007).[8] According to Milteer and colleagues, physical play promotes resilience to cooperate, overcome challenges, and negotiate with others (Milteer, Ginsburg, Communications, Child, Health, Ameenuddin, Christakis, Cross, & Hill, 2012).[13] Participating in play activities equips children with the capacity to navigate varied situations, fostering adaptability in the face of change (Thomas & Harding, 2011).[21]

1.4 The Impact of Availability of Learning Resources in the Physical Home Environment, Media Screen Activity, and Extracurriculars

1.4.1. Availability of Learning Resources in the Home Environment

Exposure to various stimulating experiences and diverse learning opportunities within a child's home environment can profoundly influence their intellectual and socio-emotional development. The availability of resources within this environment, including books, educational toys, and other intellectually stimulating materials, plays a crucial role in a child's cognitive evolution (Zoghi, Gabbard, Shojaei, & Shahshahani, 2019).[32] Children from families with higher educational attainment often have more access to these resources, fostering intellectual curiosity, enhancing language development, and promoting critical thinking skills. A study stated that the greater the availability of resources in a child's familial environment and the higher the family's economic status, the better the child performs on cognitive development tests (Pereira, Guedes, Morais, Nobre, & Santos, 2021).[14] Understanding the variations in the availability and utilization of such resources across different educational backgrounds can illuminate potential disparities in learning opportunities. This understanding, in turn, can guide strategies to ensure equitable access to educational resources for all children, thereby promoting a more balanced educational landscape.

1.4.2. Extracurriculars and Media Screen Activity

There is significant emphasis on the potential detrimental effects of excessive use of electronic devices on child development (Domingues-Montanari, 2017;[4] Al & Al, 2020).[2] Nevertheless, research must clarify the possible correlation between electronic device usage and children's extracurricular engagement, particularly concerning SES. One might hypothesize that families with a higher SES may have a more acute understanding of the potential negative outcomes of excessive screen time. As a result, they could encourage their children to participate in extracurriculars as a substitute or supplement to screen-based activities. This approach could be a conscious attempt by these parents to provide a balanced developmental experience for their children, facilitating participation in tech-

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nologically driven activities and rich educational experiences. This underscores the need for additional research on the complex interplay between digital media usage, extracurriculars, and SES influencing child development.

To explore these interrelated factors, this study investigated the correlation between SES and physical play, specifically focusing on parental educational attainment, income, physical home environment, parent involvement, and media screen activity. By examining these aspects, we aimed to understand how these factors influence early childhood development, thereby informing the development of effective interventions and policies that promote positive outcomes for children from diverse backgrounds.

2. Materials and Methods

2.1 Participants

The participants in this study were caregivers, primarily parents of children aged 18 to 60 months in Macau. The participants were selected using a simple random sampling method, ensuring a representative sample from the target population. The inclusion criteria for this study were as follows: the caregiver had at least one child between 18 months and 60 months, regardless of sex, and the child did not have significant illnesses, injuries, or major medical treatments. Additionally, parents with more than one child within the age range of 18 months to 60 months were instructed to answer the questionnaire based on one child of their choice. Ultimately, 359 children between 18 and 60 months were included in the present study. They were categorized into age groups: 18-24 months, 24-36 months, 36-48 months, and 48-60 months. The ethics board of the University of Macau approved the research protocols. Written informed consent was obtained from all participants after they were fully briefed about the study procedures and implications.

2.2 Procedures

The research questionnaire was designed based on the research objectives and informed by relevant empirical studies (September, Rich & Roman, 2016;[16] Zoghi, Gabbard, Shojaei & Shahshahani, 2019).[32] The questionnaire encompassed the Developmental Screening Scale for Young Children (DSSYC) (Huang, 2000),[9] Affordances in the Home Environment for Motor Development-Self Report (AHEMD-SR) (Gabbard & Rodrigues, 2008),[6] Media Screen Activity, and Parents' Involvement. The recruitment poster was created and disseminated through various emails, mobile text messages, and social media platforms (including WeChat and Facebook). Flyers were circulated in nurseries across Macau to invite the primary caregivers of children to participate. Data collection took place in the fall of 2020.

2.3 Measure

2.3.1. Young Children's Development

For the assessment of the development of early childhood, the DSSYC developed by Huang [24] was used. This scale consists of five dimensions, which are language and communication development (31 items), social-personal development (34 items), gross motor skills development (36 items), fine motor skills development (31 items), and perceptual-cognitive development (35 items). The scale provides three response options: "able=3," "don't know=2," and "unable=1." The "don't know" response option may indicate that the caregiver has not observed the child's behavior or is uncertain about how to respond due to unclear item wording. The data are considered invalid if the respondent selects "don't know" for more than sixteen items. Scoring involves identifying the basal level and the ceiling level. The interpretation categories include normal development (i.e., basal level falls within the age-appropriate item group), suspected developmental delay (i.e., basal level below the age-appropriate item group, ceiling level below or within the age-appropriate item group), and follow-up (i.e., basal level below the age-appropriate item group, ceiling level exceeds the age-appropriate item group). Furthermore, the scale allows for the assessment of developmental range. A "wide" field is considered when the child's age is less than four years and the difference between the ceiling and basal levels exceeds six months. On the other hand, an "imbalanced" range is observed when the child's age is over four years and the difference between the ceiling and basal levels exceeds 12 months. This scale provides a comprehensive observation of overall child development and is widely applied in research related to early childhood development (Lei, 2017;[11] Tsai, 2011).[22] The reliability estimates for the DSSYC were established with high consistency, with Cronbach's α ranging from 0.962 to 0.967 (Zhao & Lei, 2018).[31]

2.3.2. Physical Home Environment

The assessment of the physical home environment utilized the Chinese version of the AHEMD-SR (Gabbard & Rodrigues, 2008),[6] which is a validated and reliable questionnaire consisting of three types of questions: Simple dichotomic choice, 4-point Likert-type scale, and description-based queries; representing 20 variables and 67 items. This self-administered questionnaire consists of five aspects: outside and inside space, variety of stimulation, gross motor toys (sliding, creeping, climbing, and rolling),

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and fine motor toys (such as puzzles and shape sorters). A total AHEMD-SR score was calculated by summing the scores of each subscale. A short family demographic survey was included, capturing variables such as the number of adults and children in the house, number of rooms (excluding the bathroom), the duration the child has lived at home, parents' education, annual family income, and childcare attendance. Internal consistency reliability was assessed using Cronbach's α coefficient, ranging from 0.80 to 0.91, indicating high reliability (Gabbard & Rodrigues, 2008).[6]

2.3.4. Media Screen Activity and Parents Involvement

Participants were asked to provide information about media screen activity and parental involvement. The variables examined included the number of electronic devices in the household, the age of the child's first contact with screens in months, the child's daily screen time categorized into different intervals (i.e., less than 30 minutes, 30-60 minutes, 60-120 minutes, more than 120 minutes), reason of using the devices (i.e., pacification, entertainment, learning, rewarding good behavior, improving family interaction, and others), and parental views on their child's media screen activity. Participants were also asked to rate their involvement with their children. This included indicating whether the child attended any extracurriculars or participated in physical activity programs, the amount of time spent daily with the child, and outdoor activities over the past six months.

2.4 Analytical Plan

After the data collection of the questionnaires, a coding process was implemented to ensure data organization. The collected data were then subjected to statistical analysis using SPSS 26.0 and Excel 2021 for Windows. Independent sample t-test and Spearman correlation coefficient were used for statistical tests. The educational attainment of parents was categorized into three levels: Primary and middle school (PS&MS), secondary school (SS) and college and above (COLL). The pairwise comparison was significant. Performance was compared across groups using one-way ANOVA and chi-square. The analysis assessed the significance of these differences and calculated p-values to determine their statistical value.

3. Results

3.1 Descriptive Statistics

As shown in Table 1, descriptive statistics were used to summarize the child and family characteristics in the study sample. These statistics highlight the diversity in parental involvement, media screen activity, family structure, educational attainment, and income levels.

The study's cohort consisted of 359 children, fairly split between males (51%) and females (49%). The most represented age group was 24-36 months, followed by the 18-24 months group. A considerable majority of participants were from Macau (90.5%).

Regarding parental involvement, most children (78%) did not engage in extracurricular activities, and a significant majority (85%) did not participate in physical activity programs. Parent-child interaction was typically between 3-5 hours daily, while the duration of outdoor activities for most children ranged from 30-60 minutes.

In family demographics, mothers were the primary caregivers. Most families had two or three rooms in their homes, excluding bathrooms. Families typically had children with two or more siblings or just one child. Fathers and mothers predominantly completed college-level or higher education, and most families reported an annual income exceeding MOP 400,000. More than half of the fathers and about one-fifth of the mothers earned a monthly salary exceeding MOP 25,000.

Regarding media use, most children (84.7%) used electronic devices, often for entertainment (36.1%).

3.2 The Differences in Physical Home Environment and Child Development Between Extracurriculars and PA Programs

As shown in Table 2, the differences in child development and home environment between children who joined extracurriculars or PA programs and those who did not join were examined. Specifically, 79 (22.0%) children attended the extracurriculars and 280 (78.0%) did not. Regarding whether children participate in PA programs, 54 (15.0%) children participated, and more than four-fifth (85.0%) did not. T-tests were conducted to compare the means of the variables, and p-values were calculated to determine the significance of the differences.

Physical Home Environment. Children who joined extracurriculars had a significantly higher mean score for gross motor toys (M = 19.30) and fine motor toys *(*M = 51.14*)* compared to those who did not join (M = 15.75 and 41.79, respectively). Similarly, children who participated in PA programs had a significantly higher mean score for gross motor toys *(*M = 19.46) than those who did not participate (M = 16.02).

Parents Involvement. Children who joined extracurriculars showed a marginally higher mean score for physical activities (M = 4.56) than those who did not. However, no significant difference was found in play involvement or children's usage of electronic devices between the two

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Table 1. Descriptive Statistics of Child and Family Characteristic

Variable	Unit	Frequency(n)	Percentage(%)
Children Information			
Gender	Male	183	51.0
	Female	176	49.0
Age group	18-24 months	109	30.4
	24-36 months	123	34.3
	36-48 months	76	21.2
	48-60 months	51	14.2
Birthplace	China mainland	12	3.3
	Macau	325	90.5
	Hong Kong	11	3.1
	Others	11	3.1
Parents Involvement			
Extracurriculars	Not attend	280	78.0
	Attend	79	22.0
PA programs	Not participate	305	85.0
	Participate	54	15.0
Parent company time (indoor + outdoor)	≤ 3 hours	38	10.6
	3-5hours	165	46.0
	5-8hours	105	29.2
	≥ 8 hours	51	14.2
Outdoor activities	≤ 30 minutes	57	15.9
	30-60minutes	199	55.4
	60-120minutes	61	17.0
	≥ 120minutes	42	11.7
Media Screen Activity			
Devices	Never used	55	15.3
	Have used	304	84.7
Reason of using	Pacify	84	23.4
	Entertainment	129	36.1
	Learning	46	12.7
	Reward	66	18.3
	Interaction	30	8.3
	Others	4	1.2
Main caregiver	Father	59	16.5
	Mother	165	45.9
	Paternal grandfather	21	5.9
	Paternal grandmother	48	13.3
	Maternal grandfather	9	2.7
	Maternal grandmother	27	7.4
	Others	30	8.3
Number of siblings	One	148	41.2
	≥Two	211	58.8
Number of rooms	One room	6	1.7
	Two rooms	179	49.9
	Three rooms	156	43.5
	Four rooms	17	4.7
	≥Five rooms	1	0.3
Father educational attainment	Primary and Middle	43	12.0
	Secondary	94	26.2
	College and above	222	61.8
Mother educational attainment	Primary and Middle	29	8.1
	Secondary	104	29.0
	College and above	226	62.9
Annual income (MOP)	≤ 400,000	100	27.9
	> 400,000	259	72.1
Father's salary	≤ 25,000	169	47.1
	≥ 25,001	190	52.9
Mother's salary	≤ 25,000	282	78.6
	≥ 25,001	77	21.4

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Table 2. Differences in Family and Home Environment between Extracurriculars and PA Programs

Variable	Total	Extracurriculars			PA programs		
	Mean±SD	Join (n=79)	Not Join (n=280)	T-test	Join (n=54)	Not Join (n=305)	T-test
		Mean±SD	Mean±SD		Mean±SD	Mean±SD	
Physical Home Environment							
Outside space	0.97±1.939	1.28±2.259	0.89±1.834	0.002	1.37±2.284	0.90±1.866	0.007
Inside space	11.61±2.379	11.65±2.521	11.60±2.342	0.180	11.66±2.691	11.60±2.324	0.054
Variety of stimulation	26.36±3.211	26.84±2.933	26.23±3.278	0.291	27.07±2.906	26.24±3.250	0.414
Gross motor toys	16.53±9.351	19.30±10.565	15.75±8.844	0.019**	19.46±11.657	16.02±8.803	0.005*
Fine motor toys	43.84±15.175	51.14±15.380	41.79±14.492	0.575***	52.59±15.947	42.3±14.520	0.294***
Parents Involvement							
Move activities	4.43±0.587	4.56±0.496	4.39±0.606	0.065*	4.57±0.492	4.40±0.600	0.073
Play involvement	2.71±0.401	2.77±0.347	2.70±0.414	0.040	2.77±0.349	2.70±0.409	0.041
Electronic use	1.84±0.766	1.95±0.221	1.82±0.387	0.000***	1.96±0.191	1.83±0.380	0.000***
Media Screen Activity							
First contact	13.72±7.900	15.62±9.777	13.19±7.214	0.000*	15.93±10.112	13.33±7.393	0.000
Favorable views	0.26±0.180	3.63±0.678	3.44±0.785	0.294*	3.61±0.763	3.46±0.766	0.983
Child Development							
Language and Communication Development							
Basal level	38.78±16.614	47.42±17.383	36.34±15.575	0.485***	48.26±15.244	37.1±16.301	0.099***
Ceiling level	47.78±16.497	57.19±14.709	45.13±16.018	0.755***	58.35±14.051	45.91±16.208	0.282***
Mean	43.51±15.990	52.49±15.184	40.97±15.307	0.756***	41.74±15.734	58.35±14.051	0.154***
Social and Personality Development							
Basal level	36.33±16.368	43.29±16.294	34.37±15.874	0.463***	43.17±16.907	35.12±15.997	0.751**
Ceiling level	46.90±11.722	52.54±9.493	45.31±11.813	0.087***	53.87±8.806	45.67±11.753	0.005***
Mean	41.79±12.867	48.03±11.506	40.03±12.700	0.206***	48.63±11.26	40.57±12.791	0.065***
Gross Motor Development							
Basal level	36.53±13.727	41.51±12.216	35.13±13.823	0.000***	41.54±13.538	35.64±13.591	0.194***
Ceiling level	42.78±10.153	47.16±7.203	41.55±10.526	0.000***	48.41±6.074	41.79±10.409	0.995***
Mean	39.79±11.108	44.46±8.813	38.48±11.346	0.000***	45.09±8.448	38.85±11.269	0.345***
Fine Motor Development							
Basal level	37.96±17.352	46.06±19.819	35.67±15.895	0.019***	47.52±19.302	36.26±16.446	0.194***
Ceiling level	47.57±15.504	56.76±15.517	44.98±14.508	0.046***	57.87±14.711	45.75±14.939	0.995***
Mean	42.97±15.519	51.62±16.718	40.53±14.273	0.008***	52.93±15.613	41.20±14.846	0.345***
Perception and Cognition Development							
Basal level	39.52±19.508	48.85±21.056	36.89±18.242	0.092***	49.72±20.880	37.71±18.718	0.463***
Ceiling level	48.88±16.180	58.05±14.291	46.29±15.757	0.029***	60.61±12.755	46.80±15.848	0.003***
Mean	44.46±16.913	53.70±16.601	41.86±16.094	0.650***	55.37±15.508	42.53±16.433	0.384***

Note: *p < 0.05, **p < 0.01, ***p < 0.001

groups. Similarly, there were no significant differences in parental involvement measures between children who participated in PA programs and those who did not.

Media Screen Activity. Children who joined extracurriculars had a higher mean number of devices at home (M = 7.49) than those who did not (M = 8.94), with a significant difference. However, the two groups had no significant difference in the child's age of first contact with electronic devices. Moreover, children who joined extracurriculars had significantly higher mean scores for

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favorable views of electronic devices of parents (M = 3.36) compared to those who did not join. No significant differences were found in media screen activity variables among children who participated in PA programs compared to those whose parents did not participate.

Child development. Specifically, children who participated in these activities demonstrated higher mean scores for basal- and ceiling-level language and communication growth, social and personality development, gross motor development, fine motor development, and perception and cognition development.

Regarding language and communication development, children who joined extracurriculars and PA programs exhibited significantly higher mean scores for both basal levels (M = 47.42 and 48.26 and ceiling levels (M = 57.19 and 58.35) than their counterparts who did not participate. Similarly, significant differences were observed in both basal level (M = 43.29 and 43.17) and ceiling level (M = 52.54 and 53.87) of social and personality development among children who participated in extracurriculars and PA programs. In motor development, both gross and fine motor skills showed significant differences between children who joined extracurriculars and PA programs and those who did not participate. Children who participated in these activities had significantly higher mean scores for both basal level (M = 41.51 and 41.54) and ceiling level (M = 47.16 and 48.41) of gross motor development compared to their non-participating counterparts. The same pattern was observed for fine motor development, with children who joined extracurriculars and PA programs exhibiting significantly higher mean scores for basal levels (M = 46.06 and 47.52) and ceiling levels (M = 56.76 and 57.87). Children who joined extracurriculars and PA programs demonstrated significantly higher mean scores for both basal level (M = 48.85 and 49.72) and ceiling level (M = 58.05 and 60.61) of perception and cognition development than those who did not participate.

3.3 The Differences in Home Environment and Child Development Based on Parental Education Attainment

As shown in Table 3, an analysis was conducted to examine the differences in parents' educational attainment and its association with various variables related to family information, parents' involvement, physical home environment, media screen activity, and child development.

Family information. Both the father's and mother's educational attainment is significantly associated with family SES (as reflected by salaries and annual income) and family size (number of siblings) ($p < 0.05$).

The father's educational attainment level showed significant differences in the mother's salary when comparing PS & MS to COLL (M = 1.09 and 1.29) and SS to COLL (M = 1.09 and 1.29). However, no significant difference was observed when comparing PS & MS to SS (M = 1.09). The mother's educational attainment level showed substantial differences in her salary across PS & MS compared to COLL (M = 1.03 and 1.29) and SS compared to COLL (M = 1.11).

The father's educational attainment level showed sig-

Table 3. Differences in Involvement and Home Environment between Parents' Educational Attainment (One-way ANOVA)

	Father Educational Attainment			Mother Educational Attainment		
Variables	**Level**	**Level**	**Sig.**	**Level**	**Level**	**Sig.**
Parents Involvement						
Play involvement	PS &MS	SS	0.629	PS &MS	SS	0.050**
	PS &MS	COLL	0.443	PS &MS	COLL	0.909
	SS	COLL	1.000	SS	COLL	0.001**
Physical Home Environment						
Inside Space	PS &MS	SS	0.264*	PS &MS	SS	0.978*
	PS &MS	COLL	0.008**	PS &MS	COLL	0.173
	SS	COLL	0.053	SS	COLL	0.021*
Fine-motor toys	PS &MS	SS	0.568*	PS &MS	SS	0.842***
	PS &MS	COLL	0.047*	PS &MS	COLL	0.024*
	SS	COLL	0.066	SS	COLL	0.000***
Gross-motor toys	PS &MS	SS	0.905*	PS &MS	SS	0.214**
	PS &MS	COLL	0.037*	PS &MS	COLL	0.403
	SS	COLL	0.008**	SS	COLL	0.000***

Note: p values refer to group differences. *p < 0.05, **p < 0.01, ***p < 0.001

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nificant differences in the father's salary when comparing PS & MS to COLL (*M* = 1.42 and 1.62) and SS to COLL (*M* = 1.37 and 1.62). The PS & MS to SS comparison did not yield a significant difference (*M* = 1.34, 1.41 and 1.61). Significant differences were observed in the mother's educational attainment level across the comparisons of PS & MS to COLL (*M* = 1.34 and 1.61) and SS to COLL (*M* = 1.41 and 1.61).

The father's education level showed significant differences in the annual income when comparing PS & MS to COLL (*M* = 5.49 and 5.78) and SS to COLL (*M* = 5.57 and 5.78). Similarly, there were significant differences across all comparisons in the mother's educational attainment level: PS & MS compared to SS (*M* = 5.24 and 5.65) and PS & MS compared to COLL (*M* = 5.24 and 5.77).

The father's education level showed significant differences in the number of siblings when comparing PS & MS to COLL (*M* = 1.74 and 1.53) and SS to COLL (*M* = 1.66 and 1.53), but not when comparing PS & MS to SS (*M* = 1.74 and 1.66). The mother's educational attainment level showed significant differences in PS & MS compared to COLL (*M* = 1.83 and 1.65) and SS compared to COLL (*M* = 1.65 and 1.53).

Parents Involvement. The mother's educational attainment was more associated with variations in parental play involvement, enrollment in extracurriculars, and participation in PA programs, particularly when comparing SS to COLL. The father's educational attainment showed a different level of influence.

The father's educational attainment level showed no statistically significant differences in play involvement, whether the father's academic level was PS&MS compared to SS (*M* = 2.77 and 2.71) or PS&MS compared to COLL level (*M* = 2.77 and 2.70). SS to COLL level comparison was not statistically significant (*M* = 2.71 and 2.70). In contrast, the mother's educational attainment level did indicate statistically significant differences in play involvement when comparing PS & MS to SS levels (*M* = 2.77 and 2.60), while no significant difference was observed when comparing PS & MS to COLL (*M* = 2.77 and 2.76). A significant difference was noted when comparing SS to COLL (*M* = 2.60 and 2.76).

There were no statistically significant differences for the father's education attainment in terms of enrollment in extracurriculars, whether comparing PS & MS to SS (*M* = 1.16 and 1.17), PS & MS to COLL *(M* = 1.16 and 1.25), or SS to COLL (*M* = 1.17 and 1.25). However, for mother's education attainment, significant differences were observed when comparing PS & MS to SS (*M* = 1.21 and 1.12) and SS to COLL (*M* = 1.12 and 1.27), but not when comparing PS & MS to COLL (*M* = 1.21 and 1.27).

The father's educational attainment didn't show significant differences in participation in a PA program when comparing PS & MS to SS (*M* = 1.09 and 1.13), PS & MS to COLL (*M* = 1.09 and 1.17), or SS to COLL (*M* = 1.09 and 1.19). However, for mother's education attainment, there were significant differences when comparing PS & MS to SS (*M* = 1.10 and 1.09) and SS to COLL (*M* = 1.09 and 1.19), while no significant difference was observed when comparing PS & MS to COLL (*M* = 1.10 and 1.19).

Physical Home Environment. The parental educational attainment, particularly of the mother, is significantly associated with variations in the physical home environment, especially regarding available inside space and the presence of fine-motor and gross-motor toys.

The father's educational attainment level showed significant differences in inside space when comparing PS & MS to COLL (*M* = 10.83 and 11.88). The mother's educational attainment level showed substantial differences in the inside area when comparing SS to COLL (*M* = 11.20 and 11.85).

The father's educational attainment level showed significant differences in the availability of fine motor toys when comparing PS & MS to COLL (*M* = 40.33 and 45.34). Significant differences were observed in the mother's educational attainment level when comparing PS & MS to COLL (*M* = 39.86 and 46.47) and SS to COLL (*M* = 39.24 and 46.47).

The father's education attainment level showed significant differences in the availability of gross-motor toys when comparing PS & MS to COLL (*M* = 14.49 and 17.71) and SS to COLL (*M* = 14.69 and 17.71). Or the mother's educational attainment level, there were significant differences when comparing SS to COLL (*M* = 13.87 and 17.80).

Media Screen Activity. The educational attainment of parents, particularly fathers, is associated with the media screen activity of their children, including the number of devices available, the age at first contact, the reasons for using devices, and views on electronic usage. However, the mother's education has less influence, with significant differences only observed for the number of devices and daily screen time.

The father's education attainment level showed significant differences in the number of devices when comparing PS&MS to COLL (*M* = 6.98 and 8.32) and SS to COLL (*M* = 6.96 and 8.32). No significant difference was observed when comparing PS & MS to SS (*M* = 6.98 and 6.96). The mother's educational attainment level showed substantial differences in the number of devices when comparing SS to COLL (*M* = 6.80 and 8.28).

The father's educational attainment level showed sig-

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nificant differences in the age at first contact with media devices when comparing SS to COLL (M = 15.61 and 12.84). No significant differences were observed across any comparisons for the mother's educational attainment level.

The father's educational attainment level showed no significant differences in daily screen time across any comparisons. For the mother's educational attainment level, there were significant differences observed when comparing SS to COLL (M = 1.76 and 1.58). The comparison between PS & MS and COLL (M = 1.86 and 1.58) was marginally significant.

The father's educational attainment level showed significant differences in the reason for using devices when comparing SS to COLL (M = 3.41 and 3.32). For the mother's educational attainment level, there were significant differences when comparing PS & MS to COLL (M = 3.32 and 3.57) and SS compared to COLL (M = 3.39 and 3.57).

The father's educational attainment level showed significant differences in favorable views on screen time when comparing SS to COLL (M = 0.31 and 0.24). No significant differences were observed across any comparisons for the mother's educational attainment level.

Child Development. The father's educational attainment is associated with differences in basal perception and cognitive development in children, with higher educational attainment related to advanced development. However, the mother's educational attainment does not significantly influence perception and cognitive development.

The father's educational attainment level significantly differed in basal perception and cognitive development when comparing PS & MS to COLL (M = 45.12 and 37.70). The mother's educational attainment level did not show any significant differences in the basal level of perception and cognitive development across any comparisons: PS & MS compared to SS (M = 39.14 and 41.18), PS & MS compared to COLL (M = 39.14 and 38.81), and SS compared to COLL (M = 41.18 and 38.81).

4. Discussion

This study contributes valuable insights to the body of research examining the impact of the SES (parental educational attainment and income) and physical play (physical home environment, parent's involvement, media screen activity) on early child development, with particular emphasis on the five dimensions of the DSSYC, namely language and communication development, social-personal development, gross motor skills development, fine motor skills development, and perceptual-cognitive development. The results lend empirical support to the influence of these factors and highlight the importance of parental educational attainment and physical play in providing an environment conducive to the child's development.

Impact of Physical Play and Home Environment

Physical Play: Previous research showed moderate evidence for a positive association of physical activity with motor and cognitive development (Veldman, Santos, Sousa-Sá, & Okely, 2019).[25] Our findings indicate a positive association between participation in these activities and various dimensions of child development. Involvement in extracurriculars and Physical Activity (PA) programs is positively associated with all five sizes of DSSYC. Children involved in these programs demonstrated enhanced language and communication skills, social-personal development, gross and fine motor skills development, and perceptual-cognitive development.

Enriched Home Environment: Children participating in extracurriculars and PA programs had access to more gross and fine motor toys, indicative of enriched home environments. This availability of toys and a stimulating environment played a vital role in their development of gross and fine motor skills and fostered social interactions essential for social-personal development.

Impact of Socioeconomic Status

Parental Educational Attainment: A parent's educational attainment is crucial in multiple facets of child development. Higher parental education levels have been associated with favorable outcomes in various domains. The study underscores the impact of parental educational attainment on children's cognitive development. Higher-educated parents often possess a more comprehensive understanding of early childhood education and are more committed to their child's learning and development. This, in turn, positively affects children's cognitive abilities and linguistic proficiency. On the other hand, mothers with higher educational attainment show a greater inclination to enroll their children in extracurriculars, engage in physical activities, and provide play opportunities. This indicates that mothers' educational background influences their understanding of child development and their proactive involvement in fostering children's developmental prospects.

Home Environment and Access to Toys: One notable finding is that parents with higher educational attainment tend to have higher family incomes and larger indoor and outdoor activity spaces. These factors contribute to a more enriched physical home environment, providing children

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greater opportunities for exploration, play, and motor development. Furthermore, a greater abundance of toys and the involvement of multiple children in the family foster social interactions and cognitive development. Previous research indicated that more sources of play materials, including toys, predict better cognitive development (Wang, Luo, Yue, Tang, & Shi, 2022).[26] According to Duncan, Magnuson, & Votruba-Drzal (2017),[5] a traditional association exists between higher parental educational attainment and increased opportunities for higher-paying employment. This, in turn, results in higher income and access to additional resources, enabling parents to acquire a wider range of materials and resources conducive to supporting their children's learning and development.

Access to Extracurriculars and PA Programs: Children with parents having higher educational attainment were more likely to participate in extracurriculars and PA programs, which have been established as beneficial for all dimensions of DSSYC. This indicates a disparity in access to these programs based on SES and underlines the importance of equitable distribution of opportunities for child development. On the other hand, mothers with higher educational attainment are more inclined to enroll their children in extracurriculars, engage in physical activities, and provide play opportunities. This indicates that mothers' educational background influences their understanding of child development and their proactive involvement in fostering children's developmental prospects.

Impact of Media Screen Usage and Parents Involvement

Previous research indicated that most parents express that digital technology could positively impact children's cognitive and social development (Genc, 2014).[7] Regarding media screen activity, the study highlights the differential influence of fathers and mothers based on their educational attainment. Fathers with higher education levels demonstrate a more favorable view towards electronic device usage, likely influenced by their greater exposure to such devices in professional settings. This finding suggests that fathers play a significant role in shaping children's screen media behavior.

5. Conclusions

This research significantly enhances the comprehension of the interconnections among parental education levels, physical play, media screen use, and early child development, thereby contributing substantially to the academic discourse in this field. By exploring these elements, we have enriched our comprehension of the intricate factors influencing children's developmental trajectories.

Our research emphasizes the crucial role of parental education in shaping the home environment and fostering parental involvement. We observed that higher parental education levels corresponded to more conducive conditions for child development, as evident in larger play spaces, a greater variety of toys, and enhanced participation in extracurriculars and physical activity programs. This underscores the necessity of parental education in cultivating an environment that nurtures and stimulates child development.

In addition, our research illuminates the role of media screen activity during early childhood. Although no significant relationship was found between participation in extracurriculars or physical activity programs and media screen activity, this underscores the need for an in-depth understanding of the factors influencing children's media consumption. Future research should further investigate the complex interplay between home environment facets, parental attitudes, and societal influences to gain a broader understanding of the impact of media screen activity on child development.

The limitations of our study need to be recognized. The relatively small sample size may limit the broad applicability of our findings. Future studies should strive to include larger and more diverse samples to enhance the results' external validity. Moreover, the geographical context of Macau may have swayed the results, especially regarding children's real activity spaces. The research tools and assessment scales used in this study were mainly derived from mainland China and foreign countries, potentially needing to capture Macau-specific characteristics and environmental factors fully. Future research should consider tailoring assessment tools to mirror the local context better and accurately evaluate children's experiences in Macau.

The implications of this research are not confined to academia. Policymakers, educators, and parents alike can leverage the insights gleaned from this study. Creating supportive environments that emphasize parental education, facilitate physical play, and encourage healthy media usage habits should be a priority to optimize child development outcomes.

References

[1] Akhlaghipour, G., & Assari, S. (2020). Parental Education, Household Income, Race, and Children's Working Memory: Complexity of the Effects. Brain Sciences, 10(12), 950. https://www.mdpi.com/2076-3425/10/12/950

[2] Al Sagr, A. N., & Al Sagr, N. A. (2020). The effect of

  DOI: https://doi.org/10.30564/jiep.v6i1.5519

electronics on the growth and development of young children: A Narrative Review. Journal of Health Informatics in Developing Countries, 14(1).

[3] Bradley, R. H., & Corwyn, R. F. (2002). Socioeconomic Status and Child Development. Annual Review of Psychology, 53(1), 371-399. https://doi.org/10.1146/annurev.psych.53.100901.135233

[4] Domingues-Montanari, S. (2017). Clinical and psychological effects of excessive screen time on children. Journal of Paediatrics and Child Health, 53(4), 333-338. https://doi.org/https://doi.org/10.1111/jpc.13462

[5] Duncan, G. J., Magnuson, K., & Votruba-Drzal, E. (2017). Moving beyond correlations in assessing the consequences of poverty. Annual Review of Psychology, 68, 413-434.

[6] Gabbard, C., Caçola, P., & Rodrigues, L. P. (2008). A New Inventory for Assessing Affordances in the Home Environment for Motor Development (AHEMD-SR). Early Childhood Education Journal, 36(1), 5-9. https://doi.org/10.1007/s10643-008-0235-6

[7] Genc, Z. (2014). Parents' perceptions about the mobile technology use of preschool-aged children. Procedia-Social and Behavioral Sciences, 146, 55-60.

[8] Ginsburg, K. R., Communications, a. t. C. o., Child, a. t. C. o. P. A. O., & Health, F. (2007). The Importance of Play in Promoting Healthy Child Development and Maintaining Strong Parent-Child Bonds. Pediatrics, 119(1), 182-191. https://doi.org/10.1542/peds.2006-2697

[9] Huang, H. (2000). Developmental Screening Scale for Young Children. Taipei: Psychological Publishing Co., Ltd. (in Chinese)

[10] Lee, D., & McLanahan, S. (2015). Family structure transitions and child development: Instability, selection, and population heterogeneity. American sociological review, 80(4), 738-763.

[11] Lei, S. M. (2017). An Investigation Report on Macao Family Environment and Early Childhood Development. Fu Lun Day Care Centre and Parents Association.

[12] Letourneau, N. L., Duffett-Leger, L., Levac, L., Watson, B., & Young-Morris, C. (2013). Socioeconomic Status and Child Development: A Meta-Analysis. Journal of Emotional and Behavioral Disorders, 21(3), 211-224. https://doi.org/10.1177/1063426611421007

[13] Milteer, R. M., Ginsburg, K. R., Communications, C. o., Child, M. C. o. P. A. o., Health, F., Mulligan, D. A., Ameenuddin, N., Brown, A., Christakis, D. A., Cross, C., Falik, H. L., & Hill, D. L. (2012). The importance of play in promoting healthy child development and maintaining strong parent-child bond: Focus on children in poverty. Pediatrics, 129(1), e204-e213.

[14] Pereira, L., Guedes, S. d. C., Morais, R. L. d. S., Nobre, J. N. P., & Santos, J. N. (2021). Environmental resources, types of toys, and family practices that enhance child cognitive development. CoDAS

[15] Prins, J., van der Wilt, F., van Santen, S., van der Veen, C., & Hovinga, D. (2022). The importance of play in natural environments for children's language development: an explorative study in early childhood education. International Journal of Early Years Education, 1-17.

[16] September, S. J., Rich, E. G., & Roman, N. V. (2016). The role of parenting styles and socio-economic status in Parents' knowledge of child development. Early Child Development and Care, 186(7), 1060-1078.

[17] Sincovich, A., Gregory, T., Harman-Smith, Y. E., & Brinkman, S. (2020). Exploring Associations Between Playgroup Attendance and Early Childhood Development at School Entry in Australia: A Cross-Sectional Population-Level Study. American Educational Research Journal, 57, 475 - 503.

[18] Sheridan, M. A., & McLaughlin, K. A. (2016). Neurobiological models of the impact of adversity on education. Current Opinion in Behavioral Sciences, 10, 108-113.

[19] Slemming, W., Norris, S., Kagura, J., Saloojee, H., & Richter, L. (2022). Child development at age five years: The effects of maternal education, socioeconomic status and early-life growth examined prospectively in a low-resource setting. South African Journal of Child Health, 16(2), 111-116.

[20] Suzuki, Y. (2020). The Effect of Physical Play Experiences on Early Childhood Non-Cognitive Skills Development.

[21] Thomas, F., & Harding, S. (2011). The Role of Play. Outdoor provision in the early years, 12-22.

[22] Tsai, K.-Y., & Chen, C.-Y. (2011). The development and assessment of social-emotional behavior of infants and young children. Elementary school special education, 51, 29-40 (in Chinese)

[23] Undiyaundeye, F. A. (2013). How children learn through play. Journal of Emerging Trends in Educational Research and Policy Studies, 4(3), 514-516.

[24] Valla, L., Slinning, K., Kalleson, R., Wentzel-Larsen, T., & Riiser, K. (2020). Motor skills and later communication development in early childhood: Results from a population-based study. Child: Care, Health and Development, 46(4), 407-413. https://doi.org/https://doi.org/10.1111/cch.12765

[25] Veldman, S. L. C., Santos, R., Jones, R. A., Sousa-Sá, E., & Okely, A. D. (2019). Associations be-

 DOI: https://doi.org/10.30564/jiep.v6i1.5519

tween gross motor skills and cognitive development in toddlers. Early Human Development, 132, 39-44. https://doi.org/https://doi.org/10.1016/j.earlhumdev.2019.04.005

[26] Wang, B., Luo, X., Yue, A., Tang, L., & Shi, Y. (2022). Family Environment In Rural China And The Link With Early Childhood Development. Early Child Development and Care, 192(4), 617-630. https://doi.org/10.1080/03004430.2020.1784890

[27] Wimer, C., & Wolf, S. (2020). Family Income and Young Children's Development. The Future of Children, 30(2), 191-211.

[28] Xia, X. (2022). Family Income, Parental Education and Chinese Preschoolers' Cognitive School Readiness: Authoritative Parenting and Parental Involvement as Chain Mediators [Original Research]. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.745093

[29] Yang, Q., Yang, J., Zheng, L., Song, W., & Yi, L. (2021). Impact of Home Parenting Environment on Cognitive and Psychomotor Development in Children Under 5 Years Old: A Meta-Analysis [Systematic Review]. Frontiers in Pediatrics, 9. https://doi.org/10.3389/fped.2021.658094

[30] Zhang, X. (2012). The effects of parental education and family income on mother–child relationships, father–child relationships, and family environments in the People's Republic of China. Family Process, 51(4), 483-497.

[31] Zhao, B. W., & Lei, S. M. (2018). A study on the relationship between home environment and the development of children under four years old in Macau. University of Macau. (in Chinese)

[32] Zoghi, A., Gabbard, C., Shojaei, M., & Shahshahani, S. (2019). The impact of home motor affordances on motor, cognitive and social development of young children. Iranian Journal of child neurology, 13(2), 61.

Appendix

Appendix 1: *Mean and standard deviation of parents' educational attainment*

Variable	Father Educational Attainment				Mother Educational Attainment		
	Mean±SD				Mean±SD		
	Total	PS &MS	SS	COLL	PS &MS	SS	COLL
Family Information							
Mother's salary	1.21±0.411	1.09±0.294	1.09±0.281	1.29±0.456	1.03±0.186	1.11±0.309	1.29±0.454
Father's salary	1.53±0.500	1.42±0.499	1.37±0.486	1.62±0.487	1.34±0.484	1.41±0.495	1.61±0.490
Annual income	5.69±0.778	5.49±0.856	5.57±0.769	5.78±0.756	5.24±0.988	5.65±0.665	5.77±0.779
Siblings	1.59±0.493	1.74±0.441	1.66±0.476	1.53±0.500	1.83±0.384	1.65±0.478	1.53±0.500
Parents Involvement							
Play involvement	2.71±0.401	2.77±0.309	2.71±0.434	2.70±0.403	2.77±0.298	2.60±0.480	2.76±0.362
Extracurriculars	1.22±0.415	1.16±0.374	1.17±0.378	1.25±0.435	1.21±0.412	1.12±0.321	1.27±0.445
PA program	1.15±0.358	1.09±0.294	1.13±0.335	1.17±0.378	1.10±0.310	1.09±0.283	1.19±0.390
Physical Home Environment							
Inside place	11.61±2.379	10.83±2.419	11.32±2.375	11.88±2.335	11.21±2.484	11.20±2.472	11.85±2.298
Fine-motor toys	43.84±15.157	40.33±16.163	41.91±13.912	45.34±15.357	39.86±14.114	39.24±13.540	46.47±15.456
Gross-motor toys	16.53±9.351	14.49±9.753	14.69±6.903	17.71±9.994	16.28±10.697	13.87±7.351	17.80±9.760
Media Screen Activity							
Devices	7.81±3.202	6.98±3.203	6.96±3.213	8.32±3.099	7.72±2.999	6.80±2.854	8.28±3.282
First contact (month)	13.72±7.900	14.19±9.132	15.61±9.225	12.84±6.863	14.07±7.250	14.04±8.910	13.54±7.504
Daily screen time	1.65±0.772	1.72±0.701	1.79±0.788	1.58±0.773	1.86±0.743	1.76±0.794	1.58±0.758
Reason of using	3.50±0.601	3.37±0.525	3.41±0.588	3.56±0.613	3.32±0.531	3.39±0.634	3.57±0.583
Favorable views	0.26±0.180	0.28±0.165	0.31±0.184	0.24±178	0.27±0.160	0.28±0.181	0.26±0.182
Child Development							
Perception and cognition development							
Basal level	39.52±19.508	45.12±22.675	41.27±18.636	37.70±19.023	39.14±18.23	41.18±19.153	38.81±19.860

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Appendix 2: *Correlation between SES and physical play*

Variable	Language	Social	Gross Motor	Fine Motor	Cognition
Physical Home Environment					
Outside space	0.077	0.070	0.077	0.087	0.066
Inside space	-0.024	0.016	0.005	-0.007	-0.032
Variety of stimulation	.226**	.233**	.268**	.262**	.233**
Gross motor toys	.215**	.175**	.186**	.197**	.187**
Fine motor toys	0.059	0.007	0.050	0.044	0.019
Parents Involvement					
Move activities	0.083	0.041	0.083	0.061	0.038
Play involvement	0.039	-0.027	-0.043	0.022	0.027
Electronic use	-0.039	-0.059	-0.059	-0.047	-0.065
Media Screen Activity					
Devices	-0.015	-0.012	0.000	0.012	-0.024
First contact	.228**	.183**	.188**	.223**	.230**
Family Information					
Father educational attainment	-0.052	-.109*	-0.090	-0.093	-0.091
Mother educational attainment	-0.025	-0.078	-0.061	-0.072	-0.014
Father's salary	0.092	0.045	0.092	0.072	0.057
Mother's salary	-0.005	-0.049	-0.062	-0.029	-0.021
Parents Involvement					
Extracurriculars	.292**	.264**	.211**	.275**	.284**
PA program	.264**	.228**	.192**	.257**	.268**
Parent company time (indoor + outdoor)	.146**	0.084	0.085	.108*	0.093
Outdoor activities	.219**	.189**	.218**	.186**	.218**

Note：*p < 0.05, **p < 0.01, ***p < 0.001

Language=Language and communication development

Social= Social and personality development

Gross Motor= Gross motor development

Fine Motor= Fine motor development

Cognition= Perception and cognition development

Appendix 3: *Differences of variable between parents' educational attainment (Chi-Square)*

Variable	Unit	Father educational attainment				Mother educational attainment			
		PS&MS (%)	SS (%)	COLL (%)	χ^2	PS&MS (%)	SS (%)	COLL (%)	χ^2
Family Information									
Mother's salary	≤ 25,000	39(10.9)	86(24.0)	157(43.7)	21.184***	28(7.7)	93(25.9)	161(44.9)	20.046***
	≥ 25,001	4(1.1)	8(2.2)	65(18.1)		1(0.3)	11(3.1)	65(18.1)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Father's salary	≤ 25,000	25(7.0)	59(16.4)	85(23.7)	18.282***	19(5.3)	61(17.0)	89(24.8)	14.926***
	≥ 25,001	18(5.0)	35(9.8)	137(38.2)		10(2.7)	43(12.0)	137(38.2)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Annual income	≤ 400,000	14(3.9)	27(7.5)	29(8.1)	15.626***	13(3.5)	27(7.5)	30(8.4)	20.198***
	> 400,000	29(8.1)	67(18.7)	193(53.7)		16(4.5)	77(21.5)	196(54.6)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Siblings	One	11(3.1)	32(8.9)	105(29.2)	9.723 **	5(1.4)	36(10.1)	107(29.8)	12.253**
	≥Two	32(8.9)	62(17.3)	117(32.6)		24(6.6)	68(18.9)	119(33.2)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	

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Appendix 3 continued

Variable	Unit	Father educational attainment				Mother educational attainment			
		PS&MS (%)	SS (%)	COLL (%)	χ^2	PS&MS (%)	SS (%)	COLL (%)	χ^2
Number of rooms	1 1	1(0.3)	1(0.3)	4(1.1)	16.012*	1(0.3)	2(0.6)	3(0.8)	7.139
	2 2	23(6.4)	55(15.3)	101(28.1)		17(4.7)	58(16.2)	104(29.0)	
	3 3	17(4.7)	37(10.3)	102(28.4)		10(2.7)	42(11.6)	104(29.0)	
	4 4	1(0.3)	1(0.3)	15(4.2)		1(0.3)	2(0.6)	14(3.9)	
	≥5	1(0.3)	0	0		0	0	1(0.3)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	1.4(29.0)	226(63.0)	
Parents Involvement									
Extracurriculars	Not Join	36(10.1)	78(21.7)	166(46.2)	3.523	23(6.4)	92(25.6)	165(46.0)	9.941 **
	Join	7(1.9)	16(4.5)	56(15.6)		6(1.7)	12(3.3)	61(170)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.1)	104(28.9)	226(63.0)	
PA program	Not Join	39(10.9)	82(22.9)	184(51.3)	2.238	26(7.2)	95(26.5)	184(51.3)	6.041*
	Join	4(1.1)	12(3.3)	38(10.5)		3(0.8)	9(2.5)	42(11.7)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Parent company time (indoor + outdoor)	≤ 3 hours	2(0.6)	6(1.7)	30(8.4)	10.648	1(0.3)	11(3.1)	26(7.2)	3.741
	3-5hours	16(4.5)	46(12.8)	103(28.6)		15(4.2)	52(14.5)	98(27.4)	
	5-8hours	19(5.2)	30(8.4)	56(15.6)		10(2.7)	28(7.8)	67(18.7)	
	≥ 8 hours	6(1.7)	12(3.3)	33(9.2)		3(0.8)	13(3.6)	35(9.7)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Outdoor activities	≤ 30 minutes	8(2.2)	14(3.9)	35(9.7)	5.566	2(0.6)	21(5.8)	34(9.5)	5.092
	30-60minutes	20(5.7)	48(13.4)	131(36.6)		19(5.2)	52(14.5)	128(35.7)	
	60-120minutes	7(1.9)	19(5.3)	35(9.7)		5(1.4)	16(4.5)	40(11.1)	
	≥ 120minutes	8(2.2)	13(3.6)	21(5.8)		3(0.8)	15(4.2)	24(6.7)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Media Screen Activity									
Devices	Never used	4(1.1)	10(2.8)	41(11.4)	4.485	3(0.8)	14(3.9)	38(10.6)	1.219
	Have used	39(10.9)	84(23.4)	181(50.4)		26(7.2)	90(25.1)	188(52.4)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Daily screen time	≤1h	18(5.0)	38(10.6)	127(35.4)	11.001	10(2.8)	45(12.5)	128(35.7)	10.536
	1-2h	19(5.3)	41(11.4)	66(18.3)		13(3.6)	42(11.7)	71(19.8)	
	>2h	6(1.7)	15(4.2)	29(8.1)		6(1.7)	17(4.7)	27(7.5)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.1)	104(28.9)	226(63.0)	
Children Information									
Gender	Male	25(7.0)	54(15.1)	104(29.0)	3.973	18(5.0)	56(15.6)	109(30.4)	2.453
	Female	18(5.0)	40(11.1)	118(32.8)		11(3.0)	48(13.4)	117(32.6)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Age group	18-24 months	11(3.1)	24(6.7)	74(20.6)	14.642*	5(1.4)	23(6.4)	81(22.6)	9.686
	24-36 months	10(2.8)	30(8.4)	83(23.1)		13(3.5)	41(11.4)	69(19.3)	
	36-48 months	10(2.8)	27(7.5)	39(10.9)		6(1.7)	25(7.0)	45(12.5)	
	48-60 months	12(3.3)	13(3.6)	26(7.2)		5(1.4)	15(4.2)	31(8.6)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	
Birthplace	China mainland	1(0.3)	6(1.7)	5(1.4)	5.371	2(0.6)	5(1.4)	5(1.4)	10.239
	Macau	41(11.4)	82(22.9)	202(56.3)		27(7.4)	95(26.5)	203(56.6)	
	Hong Kong	1(0.3)	3(0.8)	7(1.9)		0	4(1.1)	7(1.9)	
	Others	0	3(0.8)	8(2.2)		0	0	11(3.1)	
	Total	43(12.0)	94(26.2)	222(61.8)		29(8.0)	104(29.0)	226(63.0)	

Note: *p < 0.05, **p < 0.01, ***p < 0.001

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