

# Exploring the Impact of Gender Difference on 3-6 Years Old Children's Physical Activity Levels

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## Abstract

Several studies have shown that children's physical activity levels (PAL) are not sub-optimal, however, PAL is critical to children's development. The purpose of this study is to test the hypothesis that whether there is a significant gap between boys and girls on PAL. The gender is ignored in the previous research was remedied in this study. Quantitative methods are employed to collect primary data on PAL in children aged 3-6 years. This study has implications in terms of theory, methodology, and practice, for researchers, practitioners, and parents in the preschool education field.

**Keywords:** physical activity, preschool education, gender

## 1. Introduction

(1) Introduction: More and more parents, kindergartens, and educational institutions are concerned about children's physical activity, but children's physical activity levels (PAL) still show sub-optimal levels. Physical activity benefits children not only in terms of their health but also in terms of their well-being in physical, psychological, emotional, interpersonal, and cognitive development (Masnjak, 2017b). Babić, Horvat and Jenko Miholić (2013) found that gender is bound up with children's fundamental motor abilities; however, gender is overlooked in the relevant research (Springer et al., 2012, cited in Schlund et al., 2021b). Quantitative methods are used in this research proposal to fill the gap in previous research on gender and to test the hypothesis that girls' PAL is nearly parallel to boys'.

(2) Rationale: This research proposal aims to explore the impact of gender divergences on PAL among 3-6 years old children. In theory, this proposal provides a refreshing perspective for future related research, emphasising gender factors while considering other PAL affecting factors. In methodology, as previous research has depended partly on qualitative methods, the quantitative approaches of this research proposal will stand out among the relevant studies. Furthermore, the fundamental data and a broad age range group, 3-6 years old participants, are offered in this proposal allowing researchers to take gender into maximum account in research in the future. In practice, it can inform parents and practitioners about the influence of gender divergences on children's PAL, allowing them to identify which skill should be targeted for training (Nikolić, Mraković and Kunješić, 2016). It also tries to break down the gender stereotypes rooted in physical education and thereby reduce stereotypes of girls' physical abilities, allowing them to be more confident and active.

## 2. Objectives

To investigate whether there are significant differences in PAL between boys and girls aged 3-6 years old.

(1) Literature Review: Compare and contrast literature on the impact of gender differences on 3-6 years old children's PAL and the variables that determine children's PAL.

Methodology and Methods: The quantitative methods will be used. Appropriate methodologies will be selected to collect the factors that influence children's PAL and investigate the hypothesis that girls' PAL is nearly parallel to boys'.

(2) Data Analysis: Evaluate the available information critically and then compare the differences between the boys' and girls' PAL data by controlling for variables.

(3) Conclusion: Summarise the extent to which gender affects PAL and determine whether the hypothesis in the research proposal is valid. Appealing parents, kindergartens, and educational institutions are responsible for

promoting equitable support and encouragement in physical education.

### **3. Literature Review**

#### *3.1 Introduction*

The fact that boys have a higher PAL than girls is taken for granted by most people. Some experts argue that it does not entirely hold water, however. As a result, this chapter will discuss a topic that has gotten much attention in recent years: the extent of the difference between boys and girls in PAL, in the following five aspects: (1) The concept of physical activity levels. (2) The impact on children's physical activity levels. (3) Gender equality in physical education. (4) Boys' PAL is higher than girls'. (5) Girls' PAL is higher than boys'. In addition, although there is a considerable amount of research on PAL in children, due to the emphasis of this research proposal being on PAL in children aged 3 to 6 years old, the related research and literature on other age groups will not be studied deeply.

#### *3.2 The Concept of Physical Activity Levels*

Even though PAL has received much attention in the motor-relevant literature, the definition of PAL is still ambiguous in the current research (Newell, 2020). According to Department for Education (2021), a child's PAL is defined as the ability to master gross and fine motor movements and demonstrate an adequate level of control. Moreover, Navarro-Patón et al. (2021) defined PAL as locomotory abilities, object handling and control, and body coordination and balance skills in PAL. Similarities between the two definitions are based on the levels that children can achieve as young as six years old, which the ability to gross motor skills and the control objects are both regarded as PAL.

#### *3.3 The Impact on Children's Physical Activity Levels*

Gender, according to Hu et al. (2021), is one of the most generally influencing elements of PAL. Similarly, biological characteristics such as gender impact the development of children's physical talents, as proved by Navarro-Patón et al. (2021). In addition, several experts also proved that internal and external factors impact children's PAL to some extent. Age, ethnicity, height, weight (Hu et al., 2021), and semesters of birth (Navarro-Patón et al., 2021) are internal factors that directly impact children's PAL. And the external social environment (Livonen & Sääkslahti, 2013), such as sports facilities accessibility and a safe community, and interpersonal interactions (Hu et al., 2021), are external factors that potentially impact children's PAL subliminally.

#### *3.4 Gender Equality in Physical Education*

Kippe and Lagestad (2018) argued that, in a day, girls are less encouraged to participate in physical activity. Furthermore, both Navarro-Patón et al. (2021) and Masnjak (2017b) pointed out that kindergartens have a responsibility to encourage gender equality and offer equal physical education opportunities for both boys and girls. In more detail, girls should be encouraged to participate in physical activity from an early age (Masnjak, 2017b). According to Okely and Booth (2004, cited in Nikolić, Mraković and Kunješić, 2016), the skills gap between boys and girls may be narrowed if girls reap equal chances over teaching, feedback, practice, and encouragement as boys.

#### *3.5 Boys' PAL Is Higher Than Girls'*

It is not surprising that numbers of experts give an unambiguous opinion concerning boys having a higher PAL than girls. Masnjak (2017b) found that boys are good at physical exercise, as per parental assessments, and are more physically active than girls. Likewise, Babić, Horvat and Jenko Miholić (2013) insisted that boys' PAL have far more ideal outcomes than girls', who also discussed that boys display better body coordination, agility, balance, throwing accuracy, and aiming accuracy.

#### *3.6 Girls' PAL Is Higher Than Boys'*

Nonetheless, some experts continue to make the case that, when compared to boys' PAL, girls have superior specific motor abilities. Nikoli et al. (2016) assert that girls have much stronger locomotor abilities than boys, whereas boys' object handling skills are not significant compared to girls. Nikoli et al. (2016) also explained that boys' locomotor proficiency is lower, equal, or even better than girls. Specifically, Navarro-Patón et al. (2021) found that girls outperformed boys in manual dexterity, balance, test, and percentage.

#### *3.7 Research Questions*

Even so, as far as gender in PAL is concerned, gender is still rarely investigated in the field of preschool education. According to multiple review articles, Schlund et al. (2021a), Schlund et al. (2021b), Schulze et al.

(2021), and Kippe and Lagestad (2018) found that gender is inadequate in related studies to a large extent. Some identified affecting factors such as ethnicity (Hu et al., 2021), semester of birth (Navarro-Patón et al., 2021), and SEND also failed to be considered in the previous studies. In addition, Alharahsheh and Pius (2020) argued that the research result and the significance are mainly dependent on the sample scale. However, none of the prior research had a sample size of more than 500 persons. As a result, this research proposal hypothesises that the PAL of girls is nearly parallel to boys'.

#### **4. Methodology and Methods**

##### *4.1 Research Paradigm*

The paradigm consists of ontology, which makes assumptions about reality, or epistemology, which assumptions about knowledge (Alharahsheh & Pius, 2020). Ontology tends to be used rather than interpretivism (anti-positivism) because the topic of this research proposal is based on a factual background. On top of the ontology paradigm, this research adopts positivism rather than interpretivism. Positivism focuses on objective phenomena that provide scientific laws by generalising the phenomenon (Alharahsheh & Pius, 2020), which provides the basis for choosing suitable methods and methodologies in this research. In contrast, interpretivism prefers the subjective initiative to recognise and explain all problems (Alharahsheh & Pius, 2020).

##### *4.2 Research Method*

Quantitative methods that questionnaires and experiments will be adopted in this research proposal (Navarro-Patón et al., 2021). The aim of using quantitative methods is to control the PAL affecting variables to identify to what extent gender influences PAL and explore whether girls' PAL is similar to boys' or not. As a result, the experimental method is tended to use instead of the non-experimental method like the interview. In addition, a cross-sectional design is used to collect data. One reason for this is that the causal relationship between the independent and dependent variables needs to be explicitly displayed by data at a time point. The other reason is that if a longitudinal design is used, the controlled dependent variables such as age, weight, and height will change over time, thus defeating the purpose of the research.

##### *4.3 Data Collection Method*

Questionnaires and experiments are both used to acquire primary data through the non-random selected method.

##### *4.4 Questionnaire*

A questionnaire in a paper will be adopted (Masnjak, 2017b). The questionnaire will be used to screen PAL affecting variables to control the independent variables: gender, ethnicity (Hu et al., 2021), Body Mass Index (BMI), and semester of birth (semester 1: born from January to June; semester 2: born from July to December) (Navarro-Patón et al., 2021). In addition, participants will all be picked by a non-random method from 3 to 6 years old of full-time preschool children from different kindergartens in various city neighbourhoods while settling in the same socioeconomic area (Kippe & Lagestad, 2018). This method may reach out to a broader range of appropriate participants, allowing research results to be free from uncertainty as far as possible. The questionnaires will be given and collected within a day to all participants' legal guardians/carers during the research.

##### *4.5 Experiment*

The Movement Assessment Battery for Children-Second Edition (MABC-2) is a targeted experiment to evaluate children's 3-6 years old PAL (Henderson, Sugden, & Barrett, 2007, cited in Newell, 2020): manual dexterity, ball skills, and balance. It is essential to test in groups based on independent variables to achieve control variables. At the same time, the sample size should be large enough to precisely control the PAL influencing variables. To improve the accuracy of the research finding, attempting to raise the sample size from 500 to 750 to cover the gap from the previous study. Moreover, the ratio of boys to girls will be as balanced as possible to manipulate easier in the following data evaluation and analysis. Four criteria of participants are included: (1) Consent by parents is obtained (Babić, Horvat and Jenko Miholić, 2013). (2) Without illness or difficulty (both physical and mental) that would prevent children from participating in the experiment. (3) Normal or corrected-to-normal eyesight and no obvious difficulties that might compromise motor abilities (Hirata et al., 2018). (4) Test's final score is unusual or below the 5th percentile (Navarro-Patón et al., 2021). Furthermore, to guarantee that the data obtained will not be influenced by external variables such as weather, the MABC-2 test will begin and conclude simultaneously.

##### *4.6 Conclusion*

This research has several advantages currently. Many participants will be included in the research, which is

enough to reflect the impact and differences of gender on PAL. Non-random sample selection not only allows for the selection of more suitable participants for the research but also allows for the number of participants to be as even as possible in terms of gender. This method will contribute to a successful experiment and achieve a more reliable result. Even so, only part of the affecting PAL variables will be included because of the philosophical stance in this research proposal. The variables are finally adopted as objective factors such as ethnicity rather than other subjective overtones such as social environment (Livonen & Sääkslahti, 2013) and interpersonal interactions (Hu et al., 2021), even though the factors did have an impact on children's PAL.

### **5. Evaluation and Analysis of Data**

Statistical Package for the Social Sciences 17.0 (SPSS) (Newell, 2020) (Hirata et al., 2018) will be used to collection and analysis the data of the questionnaire and experiment. In terms of the questionnaire, data is gathered to control and account for variables other than gender that influence PAL, generating the most objective results in the final analysis of PAL differences between boys and girls.

First, validity evaluation will be carried out on the experimental data collected to ensure the experimental result is credible. If the final score is less than five percentage points, the score will not be collected because the data are invalid (Navarro-Patón et al., 2021). In addition, due to the MABC-2 being an artificially rated score, circumstances like overscored or underscored might happen. Therefore, to ensure that the evaluation and analysis of data are statistically significant, the reliability of the collected data also needs to be measured through Cronbach's alpha (Hirata et al., 2018). The criteria include values between 0.70 and 0.80 are judged high; values between 0.60 and 0.69 are considered acceptable, while values below 0.50 are considered unreliable. Following that, valid data is classified based on gender (boys and girls). Descriptive statistics will generate the average MABC-2 scores for boys and girls of different ages, ethnicity, BMI, and semester of birth. Ultimately, the t-test will be used to analyse the degree of differences between boys and girls on PAL (Hirata et al., 2018). The t-test will be used rather than an f-test because there are only two factors involved in this research, boys and girls. More specifically, the t-test is used to detect differences between two sets of data; in contrast, the f-test is used to detect differences between more than two data sets. According to statistical significance, a threshold value is set as 0.95. Therefore, if the P-value is less than 0.95, the null hypothesis will be retained: the difference between the PAL of boys and girls is minor. If the P-value is more significant than 0.95, an alternative hypothesis will be chosen, which the difference between the PAL of boys and girls is significant.

### **6. Ethical Considerations**

This chapter will insist on incorporating children's voices into the research (Crane & Broome, 2017). After obtaining parental consent, children will also be informed of the experimental process and their rights (right to anonymity, privacy, complaint, and withdrawal). It is worth noting that the children will be given a "veto power" after the parents and children decide to participate in the research. In other words, they will not be included in this research, as long as the child's words, behaviour, or attitudes express any rejection, no matter how the attitude of the parents is.

A DVD, a nicely and comfortably method, is used to inform children and their legal guardians/carers about the research procedure (Fargas-Malet et al., 2010). Several types of recording (video, image, and text) will also be informed children and ask the children how well he/she takes to the record. Children will also be conveyed that any personal information collected will be anonymised throughout the research, which will not be disseminated (GOV.UK, 1998) in public, on social networks, and on third-party (Hill, 2005, cited in Newell & Fitzgerald, 2011). However, whether a researcher should report a child who is at risk of abuse becomes a problem. Whether via disclosure or non-disclosure, both strategies present a dilemma: either confidentiality has been breached, leading to a deterioration in the relationship between researcher and child, or the child's rights have been violated. Nonetheless, this research strongly advocates revealing the truth, as ignoring it would be harmful to children in the long run. As a result, this research project decides to inform children about confidentiality and its restrictions in advance (Williamson et al., cited in Newell & Fitzgerald, 2011). In addition, Crane & Broome (2017) argued that most children look forward to their parents protecting them during their participation in the study. As a result, if a child makes such a request, then consent should be given to be accompanied by one legal guardian/carer to participate in the research. This strategy will also be used to support children in reducing their emotional instability in the process of the experiment.

In the wake of the child's assent being obtained, a procedure will be made available so that the children can file a complaint. Moreover, children who withdraw from the research will still be rewarded. Children who have consented to participate in the research can withdraw their consent at any time, and the information gathered will not be used. This right should be mentioned at each stage of the research. It is necessary to pay attention to the

child's behaviour, expressions, and reactions to the researcher/materials to detect children's actual attitudes toward the research (Cocks, 2006, cited in Fargas-Malet et al., 2010). To avoid feeling like a failure, children will gain support from researchers before, during, and after the research. And this research will separate one child who is experimenting from the ones who are not, preventing children from comparing the gap between themselves and others throughout the experiment.

After the research, a debriefing will be presented to the children's legal guardian/carers, objectively stating the research information, and expressing gratitude. Undoubtedly, the hazards associated with this study will be higher than those encountered in everyday life due to children will be required to do specific actions continually (such as running, jumping, and throwing). As a result, in addition to the enhanced DBS (Disclosure and Barring Service) certification for all researchers, most researchers will also require first aid and nursing skills. Furthermore, the complete trial location will be risk assessed, drinking water will be supplied to re-hydrate the children, and cartoons will be available to watch and rest after the research (no other toys or snacks will be provided to lessen risk).

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