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# Parents' Educational Level Correlates with The Cognitive Development of Logical Thinking in Early Childhood

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**Abstract**

*Purpose: The present study aims to contribute to the existing body of research on the relationship between family and cognitive development by examining the link between parental education levels and cognitive development in early childhood.Methodelogy: This study utilizes data concerning parents and students in the Kedungwuni subdistrict, specifically at Aisyiyah Puri Kindergarten and RA Muslimat NU Kwayangan, to ascertain the extent of the relationship between parental education and cognitive development in early childhood. The present study employed a descriptive qualitative method, with a sample size of 101. A direct questionnaire was administered to parents to ascertain their level of education, while children aged 5-6 years were asked to complete an indirect questionnaire containing cognitive development tests. Results: The findings indicated that children with highly educated parents exhibited higher levels of cognitive development in logical thinking compared to children with less educated parents. A correlation has been demonstrated between higher parental education levels and increased diversity in knowledge and experience, which can be applied in the future, particularly in enhancing logical thinking in early childhood. These results demonstrate a positive correlation between parental education levels and the cognitive development of logical thinking in early childhood. This study contributes to the existing body of knowledge by underscoring the pivotal role that parental education plays in shaping cognitive abilities in early childhood. This phenomenon also underscores the crucial role that higher education plays in adults' decision-making processes, particularly in the context of marital transitions*

Keywords: education level, early childhood education, cognitive development, logical thinking.

## Introduction Section

The fundamental objective of early childhood education is to facilitate the attainment of developmental milestones that are commensurate with the child's age. This approach aligns with Law Number 20 of 2003, which stipulates that the objective of early childhood education is to provide educational stimulation to facilitate children's physical and spiritual growth and development, ensuring their readiness to pursue further education. The educational goals to be achieved in early childhood are outlined in Law Number 137 of 2014 Article 7, Paragraph 3 concerning standards for child development achievement (STTPA), which states that child development achievement levels include aspects of language and social-emotional skills, religious and moral values, cognitive skills, physical-motor skills, and arts. A principal constituent of development is cognitive development in early childhood, as it forms the basis for achieving subsequent stages of development (Tanjung et al., 2023).

Many previous studies have discussed various family dimensions that influence children's cognitive development—for example, Xueyan Huang's (2024) study in *"The Impact of Family Education on Children's Cognitive Development*." Furthermore, Lanjekar et al. (2022) in their study "The Effect of Parenting and the Parent-Child Relationship on a Child's Cognitive Development" and analyze by Nasution et al. (2023) in "The Role of Family in Mental Formation and Its Influence on Cognitive Development in Children".Furthermore, Yu & Yan (2023) in their study "*Effects of Siblings on Cognitive and Sociobehavioral Development: Ongoing Debates and New Theoretical Insights*." They did not specifically address the relationship between the family environment in the context of parental education level and the cognitive development of logical thinking.

In cognitive development, there is a crucial subfield that plays a major role in the formation of intelligence, one of which is logical thinking, as stated in Law Number 137 of 2014 Article 7, Paragraph 3 2014. Logical thinking is defined as a cognitive ability that involves the process of pattern recognition, selection, and application of appropriate reasoning to solve a problem (Shahmohammadi et al. 2024). The development of logical thinking, which is a fundamental cognitive ability, is an essential aspect of early childhood education. At the age of 5-6 years, children begin to recognize differences

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based on size. "More than," "less than," and "most/least" (2.) Demonstrating initiative in the selection of a game theme (e.g., "Let's play pretend like birds") (3.) Organizing the sequence of activities to be undertaken (4.) Discerning causal relationships within the environment (the wind's motion induces the movement of leaves; water engenders dampness) (5.) Classifying objects based on according to hue, form, and dimension (3 variations) (6.) Assembling a broader range of objects into analogous or corresponding categories, or paired sets exceeding 2 variations (7.) Recognizing the recurring ABCD-ABCD configuration (8.) The objective is to sort objects based on their size, with the smallest objects being placed first and the largest objects being placed last, or vice versa. This is in accordance with Law Number 137 of 2014, Article 7, Paragraph 3. This ability is needed by children to understand and solve everyday problems and is an important foundation for academic success (Gaziyeva & Barkinova 2025).

According to Wulandari et al. (2022), stimulating cognitive development from an early age is very important to help children actualize their potential in the future to achieve appropriate logical thinking skills; therefore, stimulation is necessary. This stimulation cannot be separated from the child's immediate environment, both physical and social. This is in line with Urie Bronfenbrenner's ecological theory of development, which emphasizes that the child's microsystem (immediate environment), in the development process. This microsystem includes significant people with whom the child interacts directly and continuously, such as family members (Sofni Indah Arifa Lubis et al. 2024).

Personal development emerges from the dynamic interplay among diverse yet interconnected environmental contexts. One of these is the family environment, where children interact with their parents. A study shows that parents play a vital role as the first and primary educators Amin & Eliasa (2023). Through daily interactions, parents consciously and unconsciously transfer values, knowledge, and ways of thinking to their children. The quality of interaction itself is greatly influenced by various factors, one of which is the level of parental education (Sofiani et al., 2020). Different levels of education will result in different learning experiences and knowledge, and with different experiences, individuals will have different ways of stimulating child development. As stated in Fardhan & Yanti (2024), the level of education influences individuals in behaving based on the experiences and knowledge they have gained while studying in the world of educational.

According to Law Number 20 of 2003 concerning the National Education System, the strata of education are delineated as progressive stages of learning, determined by the developmental phase of learners, the intended pedagogical objectives, and the competencies to be cultivated. Formal education is a structured pathway that includes higher education, secondary education, and primary education. The levels of formal education in Indonesia are enumerated in Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, article (17). Primary education comprises junior high school (SMP) and elementary school (SD), along with other equivalent forms of education.Article (18) delineates the structure of secondary education, which encompasses general and vocational secondary education, such as high school (SMA) and vocation high school (SMK). According to articles 19 and 20, higher education is provided by universities and includes specialist, master's, bachelor's, diploma, and doctoral programs.Therefore, this study was conducted with the aim of determining the correlation between parents' education levels and children's logical thinking cognitive development in order to fill this gap by focusing on analyzing the relationship between these 2 variables. The emphasis on this direct relationship will validate the urgency of the research and demonstrate its unique contribution to the existing literature.

## Method

This study employs a quantitative approach with a correlational descriptive design. It examines the relationship between parents' educational level and cognitive development of logical thinking in early childhood using this design. The population in this study consisted of 136 parents of kindergarten B children in Kedungwuni District, namely RA Muslimat NU Kwayangan and TK Aisiyah Puri. From the total population, a sample of 101 kindergarten B parents was taken, consisting of 74 parents of kindergarten B children from RA Muslimat NU Kwayangan and 36 parents of kindergarten B children from TK Aisiyah Puri. The selection of the sample size was based on the Solvin formula with an error tolerance level (e) of 5% (e=0.05). This sampling was carried out if the population members were heterogeneous (Setiawan, 2021). This study used proportional random sampling, a technique that involves selecting samples from the population proportionally and randomly.

Data collection in this study was carried out through the distribution of questionnaires conducted directly by researchers at RA Muslimat NU Kwayangan and TK Aisiyah Puri with the assistance of teachers. For the independent variable, namely the parents' education level, data was collected using a direct questionnaire given to the parents of TK B children. Meanwhile, for the dependent variable, namely the logical thinking cognitive development of TK B children, data was obtained through an indirect questionnaire that was also given to parents. However, it contained statements that described the achievement of children's logical thinking cognitive development. This questionnaire was designed to measure the extent to which children achieved cognitive development based on parental observations. After that, the data obtained was analyzed using the Spearman correlation technique. Data analysis was carried out utilizing the SPSS 25 application.

In this study, the independent variable (X) is the parents' level of education. This study defines the parents' level of education based on Law No. 20 of 2003 concerning the National Education System. Data on the independent variable (X)

is sourced from parents' responses to the questionnaire and indirectly from school documents. Meanwhile, the dependent variable (Y) is the cognitive development of logical thinking in early childhood. This cognitive development is operationalized based on the Standard Level of Child Development Achievement (STTPA) for ages 5–6 in Law Number 137 of 2014 Article 7, Paragraph 3.

This study used a questionnaire grid developed based on 8 items of the standard level of child achievement (STTPA) for ages 5-6 years in the scope of cognitive development of logical thinking, which was described into 20 indicators to measure children's cognitive development. The scale used in this study is a Likert scale. This scale has five answers, namely: Always (A), Often (O), Sometimes (S), Rarely (R), and Never (N) for a number of statements. For favorable statements, if the subject chooses the "always" alternative, they will get a score of 5, if they choose the "often" alternative, they will get a score of 4, and so on. Conversely, for unfavorable statements, if the subject chooses the Never alternative, they will receive a score of 1, and so on.

Before being used to collect data, the questionnaire was first tested on 28 respondents in the form of direct and indirect questionnaires to parents of students at RA Muslimat NU Kwayangan Kindergarten and Aisiyah Puri Kindergarten, who were members of the population outside the sample. After *the trial*, several items on children's logical thinking cognitive development were discarded, namely items 2, 6,12, so that only 17 items of children's logical thinking cognitive development were used for the research. Then, a review was conducted to collect data from 101 respondents. Meanwhile, none of the items on the parents' education level were discarded. The validity test conducted in this study was constructing validity, calculated using SPSS version 25. For the reliability test in this analyze, Cronbach's Alpha was used with a value of 0.968 for children's logical thinking cognitive development, indicating a high level of reliability.

**Table 1.** Reliability Test

| Reliability Statistics | | |
|---|---|---|
| Cronbach's Alpha | Cronbach's Alpha Based on Standardized Items | N of Items |
| 0.968 | 0.970 | 20 |

Before distributing 101 research questionnaires to 74 parents of RA Muslimat NU Kwayangan students and 27 parents of Aisiyah Puri kindergarten students, A reliability assessment was undertaken employing the Cronbach's alpha coefficient, which produced an index of 0.968 on the cognitive development of children's logical thinking, which showed a high level of reliability. The research data was then processed using the SPSS version 25 programs.

## Results

Before conducting the correlation analysis, preliminary tests were conducted to assess the normality and linearity of the data. The Kolmogorov–Smirnov test was employed in this study to examine data normality, asserting that a significance value greater than 0.05 indicates a normal distribution. The purpose of conducting the normality test was to verify whether the data were normally distributed or not. The linearity test is associated with the analysis of variance (ANOVA) table, specifically the deviation from linearity column, and is contingent upon the p-value exceeding 0.05, which is considered statistically significant. After the establishment of the assumptions of linearity and normality, hypothesis testing was conducted employing Spearman's correlation analysis.

**Table 2.** Descriptive Data

Descriptives

| kognitif berfikir logis | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | 95% Confidence Interval for Mean | | | |
| | N | Mean | Std. Deviation | Std. Error | Lower Bound | Upper Bound | Minimum | Maximum |
| Elementary School | 16 | 79.31 | 6.838 | 1.710 | 75.67 | 82.96 | 62 | 90 |
| Junior High School | 18 | 80.78 | 11.270 | 2.656 | 75.17 | 86.38 | 57 | 99 |
| High School | 26 | 83.04 | 10.176 | 1.996 | 78.93 | 87.15 | 63 | 100 |
| Advanced Diploma | 2 | 92.00 | 1.414 | 1.000 | 79.29 | 104.71 | 91 | 93 |
| Bachelor's Degree | 39 | 92.28 | 8.294 | 1.328 | 89.59 | 94.97 | 75 | 100 |
| Total | 101 | 85.79 | 10.539 | 1.049 | 83.71 | 87.87 | 57 | 100 |

The data presented in table 2 indicates that children whose parents have a bachelor's degree exhibit an average logical thinking ability score of 92.79. This score was determined based on the responses of 39 individuals, with a minimum score of 75 and a maximum score of 100. In addition, children whose parents attained an advanced diploma education level

exhibit have an average logical thinking ability score of 92.00. This finding is evidenced by two respondents, with maximum score of 92 and a minimum score of 91. In addition, the mean of logical thinking ability score of children whose parents have a high school education level is 83.04 based on the responses of 26 individuals. This score ranges from a minimum score of 63 to a maximum score of 100. Furthermore, children whose parents have a junior high school education level have an average logical thinking ability score of 80.78, with 18 respondents, a minimum score of 57, and a maximum score of 99. Additionally, children whose parents have an elementary school education level have an average logical thinking ability score of 79.31 with 16 respondents and a minimum score of 62 and a maximum score of 90. Following the description of the data, the subsequent step is to test the hypothesis using spearman's correlation test. Prior to conducting the correlation test, a prerequisite test is performed normality and linearity test.

**Table 3.** Normality Test

| NPar Tests | | |
|---|---|---|
| One-Sample Kolmogorov-Smirnov Test | | |
| | | Unstandardized Residual |
| N | | 101 |
| Normal Parameters[a,b] | Mean | 0.0000000 |
| | Std. Deviation | 12.06808485 |
| Most Extreme Differences | Absolute | 0.085 |
| | Positive | 0.077 |
| | Negative | -0.085 |
| Test Statistic | | 0.085 |
| Asymp. Sig. (2-tailed) | | .200[c,d] |
| a. Test distribution is Normal. | | |
| b. Calculated from data. | | |
| c. Lilliefors Significance Correction. | | |
| d. This is a lower bound of the true significance. | | |

After to the initial prerequisite test, a normality was conducted, the normality of the residual data can be inferred, as the Kolmogorov–Smirnov test employed yielded a significance value of 0.200, which exceeds the 0.05 criterion. After the completion of the normality test, the second prerequisite test, namely the linearity test, was conducted. In assessing the deviation from linearity, the linearity test was executed through SPSS 25. The variables can be declared linear if the Sig in the ANOVA table is more than 0.05. The following table presents the outcomes of the linearity assessment.

**Table 4.** Linearity Test

| ANOVA Table | | | | | | |
|---|---|---|---|---|---|---|
| | | | Sum of Squares | df | Mean Square | F |
| TOTAL * tingkat pendidikan orang tua | Between Groups | (Combined) | 3041.226 | 4 | 760.307 | 9.050 |
| | | Linearity | 2883.060 | 1 | 2883.060 | 34.316 |
| | | Deviation from Linearity | 158.166 | 3 | 52.722 | 0.628 |
| | Within Groups | | 8065.408 | 96 | 84.015 | |
| | Total | | 11106.634 | 100 | | |

As illustrated in table 4, the statistical significance of the observed results is indicated. The results of indicated a deviation from linearity with a value 0,599 greater than 0.05. These findings suggest the presence of a linear relationship between the variable of parental education level and the cognitive development of children's logical thinking. The hypothesis testing in this study was based on the Spearman correlation coefficient presented in the table of relationship strength levels.

**Table 5.** Correlation Test

| Correlations | | | | |
|---|---|---|---|---|
| | | | tingkat pendidikan orang tua | kognitif berfikir logis |
| Spearman's rho | tingkat pendidikan orang tua | Correlation Coefficient | 1.000 | .510** |
| | | Sig. (2-tailed) | | 0.000 |
| | | N | 101 | 101 |
| | kognitif berfikir logis | Correlation Coefficient | .510** | 1.000 |
| | | Sig. (2-tailed) | 0.000 | |
| | | N | 101 | 101 |

A clear association can be observed, as shown in Table 5, between the parental education variable and children's logical cognitive development. The correlation coefficient was determined to be 0.510 with a significance value of 0.000, this indicates a relationship between parental education level (X) and the cognitive development of logical thinking in early childhood. Based on Prof. Dr. Sugiyono (2013) guidelines for interpreting Pearson's correlation, a value of 0.510 is classified as moderate. The direction observed denotes a positive association, suggesting that elevated levels of parental education are linked to improved conditions, the better their children's cognitive development in logical thinking.

The result of the study indicates a significant positive correlation between parental education level and the logical thinking cognitive development of early childhood in Kedungwuni. This hypothesis was confirmed through the results of the product moment correlation test, which yielded a significant score of 0.000 ($p < 0.05$) and a correlation coefficient of 0.510. This coefficient denotes a positive association in the moderate category. That is, as parental education reses there is concomitant rise in children's ability, particular in the area of logical thinking. However, not all students with highly educated parents also have high logical thinking cognitive abilities. This is influenced by several other factors that affect children's logical thinking cognitive development.

## Discussion

The findings of this analyze are consistent with those of previous studies, which demonstrate a correlation between parental education levels and the development of children's logical thinking abilities. Research by (Akabalieva, 2024) shows that "children of parents with high levels of education tend to perform better on cognitive tests". Another study by Kamiliyah Zain et al. (2024) highlights the positive interaction between children and parents with high levels of education. This is because educated parents are more likely to interact positively with their children in terms of fostering an environment conducive to learning and cognitive growth. This interaction is very important for developing early cognitive skills. In line with research by Rozana et al. (2021), which reveals that more educated parents are better able to create a supportive learning environment that is in line with educational goals.

This shows that, in their children's development, parental education significantly contributes to strengthening parental involvement. Naeem & Khan (2023) state that Parents who have attained higher levels of education are more inclined to nurture, stimulate, and support their children more effectively during early childhood.

However, it is important to understand that this study does not strictly control other variables that also influence children's logical thinking abilities, such as family environment and economic conditions (Rakesh et al., 2025), the quality of educational institutions (Von Suchodoletz et al., 2023), literacy wealth (Bigozzi et al., 2023), and play environments (Cankaya et al. 2025). According to Sofiani et al. (2020), children's logical thinking abilities are not solely derived from their parents' education, but also by parenting styles, age-appropriate stimulation, and the surrounding environment. These variables are influenced by cultural background, socioeconomic status, and overall parental education levels.

## Conclusion

The present study demonstrates a correlation between parental education level and the cognitive development of logical thinking in early childhood. The present study explores the correlation between parental education level and the cognitive development of logical thinking in early childhood within the Kedungwuni subdistrict. The finding indicates a positive correlation between children cognitive development, specifically their logical thinking and parental education level. However, the relationship found (0.510) is classified as moderate, identifying that parents are not the only factor influencing the cognitive development of logical thinking in children. This study has several limitations that need to be considered, such as a small sample size. This study was conducted only in a specific geographical area located in the Kedungwuni subdistrict, which has a unique socio-cultural context, so this study cannot be generalized broadly. In addition, this study only focused on one variable, namely the parents' level of education, without considering other external variables such as peers, teacher support, family environment, and gender, which can influence children's cognitive development of logical thinking. Therefore, more comprehensive research is needed that covers a wider area and considers more diverse variables, to attain a more comprehensive apprehension of the determinants that shape children's logical thinking development.

## Recommendations

The present study suggests that parents should be cognizant of the significance of education and implement effective motivational to enhance their children's development. In addition, policymakers need to consider the educational readiness of young couples who are planning to get married.

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