# Tornado Correlation Analysis on the Arithmetic Performance of 36-48 Month-Old Malaysian TASKA Children

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*Due to how fast life moves these days, most parents forget to keep an eye on their children's development and math skills as early as 4 years old. The role of child care is very important to enhance quality assurance practices among staff for the development of future leaders. The main objective of this study is to determine the strength of the relationships between each element and arithmetic proficiency among Malaysian TASKA children. This study is significant to identify the primary factors that influence children's math skills. A questionnaire was utilized to collect data. From 376 TASKAs registered in Malaysia, only 103 of the 458 selected centers provide care and instruction for children aged 36 to 48 months. Between the ages of 36 and 46 months, language, communication, and early reading skills account for the majority of a child's mathematical ability. Therefore, an effective training module should be built on these characteristics. The upcoming study will compare all unregistered TASKA facilities to the facilities that have been registered throughout Malaysia.*

*Keywords: tornado correlation, arithmetic performance, TASKA, Malaysian children*

## INTRODUCTION

There has been a substantial amount of research on education and teachers during the past two decades. Much of this has centered on the psychological characteristics of the teacher, namely the teacher's overall thought processes (Naimah & Utaminingsih, 2021; Shavelson & Stern, 1981). However, two components of the philosophy of teaching in early childhood education can be distinguished (Fischer et al., 2020; Copple & Bredekamp, 2009). These are the teacher's cognitive processes and thought structures, such as planning, interactive decision-making, and reflection; the knowledge, beliefs, and attitudes are stored as schemas in the teacher's mind (Ibañez & Pentang, 2021). The divide between the fluid processes and semipermanent structures of the mind echoes Schwab's (1961) difference between the syntax and semantics of a field, as well as the conventional philosophical dichotomy between structure and functions (Philp & Goyen, 1973).

Science is based on simple ideas and beliefs. proving that advances in these and other numerical methods are in line with national reports on scientific guidelines (Kharuddin et al., 2020; Barcelos et al., 2018) and proposals for early youth honing (Kharuddin et al., 2020; Shah et al., 2018). The system's basic reasoning, thinking, correspondence, connections, and pictures help children learn content knowledge (Pratama et al., 2015). Content is what young kids need to know to learn how to add and subtract (Krukowski et al., 2021; Ibrahim et al., 2020). After some time and if they are well taken care of, these systems give people chances to learn. The development and use of these systems by teenagers is one of the most reliable and basic signs that juggling numbers are going well. As the teens think about them, talk about them in different ways, and connect them to other things they've thought about, their experiences and intuitions become more and more numerical (Barcelos et al., 2018).

During the first few years of their lives, children watch and think about how their lives make sense (Ginsburg et al., 2001). TASKA can look into this way of learning through links of cooperation and action. Teachers in TASKA can use reliable online modules to learn how to work together and with children (Mukunthan & Anantharajah, 2021). The rules make it possible for children to learn. While activities planned should be appropriate for the child's age to make the educational environment engaging, enjoyable, and demanding for their development (Bano et al., 2018). Number juggling assists adolescents in comprehending their life even outside school and fosters the development of a solid academic foundation. The evolution of this paper can be broken down into six parts. The presentation is the focus of the first part. Section 2 has the writing that is related to this investigation. The third part is about the sources of information. In the fourth part, we talk about the structure of the research. In Section 5, we talk about how the way this exploration was done changed. In Section 6, we talk about the results and what they mean. Section 7 is the last part of the paper and ends it. It has the paper's findings and suggestions for how to improve work in the future.

## LITERATURE REVIEW

In early adolescence, kids show a clear interest in and enjoyment of science and math. Research shows that parents should look into and use science with their children as soon as possible before they go to an early childcare center. This is because children's early logical learning can be very shaky and rough (Krukowski et al., 2021; Kharuddin et al., 2019). Young children learn logical ideas and steps through play and step-by-step activities. For example, they sort and ask for things, look at numbers, and notice shapes and cases (Piaget & Inhelder, 2014; Baroody, 2004; Fuson, 2004; Steffe, 2004; Clements et al., 2004; 2003; 1999). Science helps children comprehend the cultural and psychosocial realities in which they live, and the early stages of a child's life are frequently structured to help them utilize numbers creatively and intelligently (Ginsburg et al., 1998). Educators build and grow children's understanding of numbers and interest in them by using these moments and planning a variety of encounters in the context of logical thoughts. Because children's experiences have such a deep effect on how they think about science, it's important to make sure that their first encounters with number-crunching are fun and supportive (Shah et al., 2018). In their early years, it's important for kids to believe they can understand and use math by the end of the day and to see science as a part of their compass. Also, having good experiences with using math to solve problems when a child is young helps them develop qualities like curiosity, innovative energy, variety, creative ability, and consistency, all of which help them do well in school in the future (Charlesworth & Banaji, 2019).

Individual early childhood experiences and facts must be seen and built upon if early youth scientific preparation is to be successful (Seo & Ginsburg, 2004; Bredekamp & Rosegrant, 1995). Bano et al. (2018) found that the mathematical concerns of excellent posterity in different places are strikingly similar. In addition, it is evident that young children have increasing social, semantic, domestic, and gathering experiences on which to improve their total count skills (Matusov, 2020). There is a specific demand for a new mathematics-specific paradigm for young children (Copple, 2004). There is an increasing demand for innovative mathematics instruction in many nations. Important government publications, such as those in non-Caledonian Britain, have made forceful calls for change, including the following:

a) Mathematics education must place a greater emphasis on problem-solving, applications, and higher-level skills.
b) Mathematics education must accommodate improvements in knowledge and computer chip innovations, particularly electronic items, and microcomputers, and empower learners to create full use of these tools.

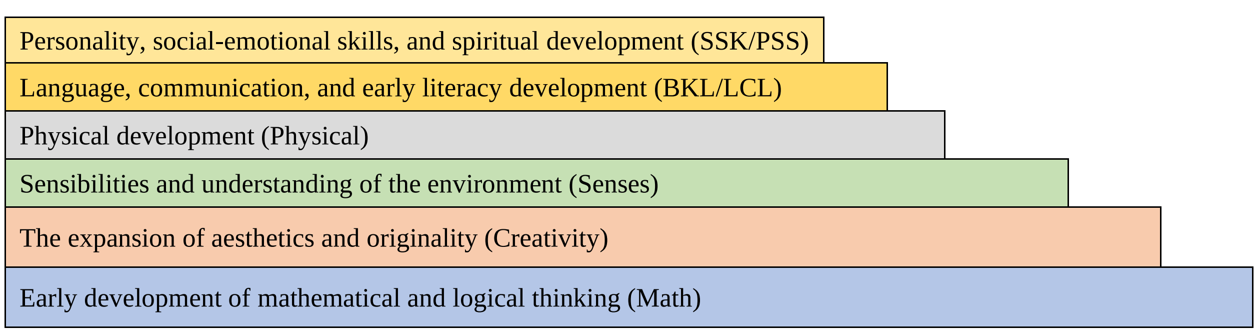
Moreover, the suggestions for a National Curriculum in Mathematics (Charlesworth & Banaji, 2019), which are likely to become law in the near future, essentially support these ideas. Instructors or guardians must understand as much as possible about these distinctions and attempt to draw links between children’s shifting new things and new learning in order to help them feel positive about themselves and acquire the correct information (Ibañez & Pentang, 2021). Students learn best when they have a variety of ways to understand a given concept. This is true in any data field (Pohjolainen et al., 2018). Instructional modules and rules for number juggling are much more useful when children’s individual traits and ways of learning are taken into account (Ahmad et al., 2021). For example, a few kids learn very well when teaching materials and methods use geometry to teach them about numbers (Razel & Eylon, 1990). Early childhood certainty, knowledge, and interest in science grow when new experiences are important and related to previous facts and experiences (Fonseca, 2020).

First, a young child’s understanding of numbers is instinctual. Sometimes, a child can’t fully use what they’ve learned and make a connection to class number juggling because they don’t think things through clearly. In the same way, teachers need to find out what young children value and give them the tools they need to start to understand these ideas through math or science.

## RESEARCH FRAMEWORK

For children aged 0 to 4, TASKA in Malaysia follows the PERMATA curriculum. This curriculum is divided into six sections:

**FIGURE 1**
**PERMATA CURRICULUM SECTION**



This ability to model after others, particularly their success, contributes to a good attitude and improves performance. A combination of social persuasion, positive reinforcement, and appraisal can assist motivate people to do better. As a result, encouragement, support, and acknowledgment from the administration and society are likely to build confidence, assisting TASKA caretakers in projecting positive characteristics toward early developmental skills.

**FIGURE 2**
**THEORETICAL FRAMEWORK**

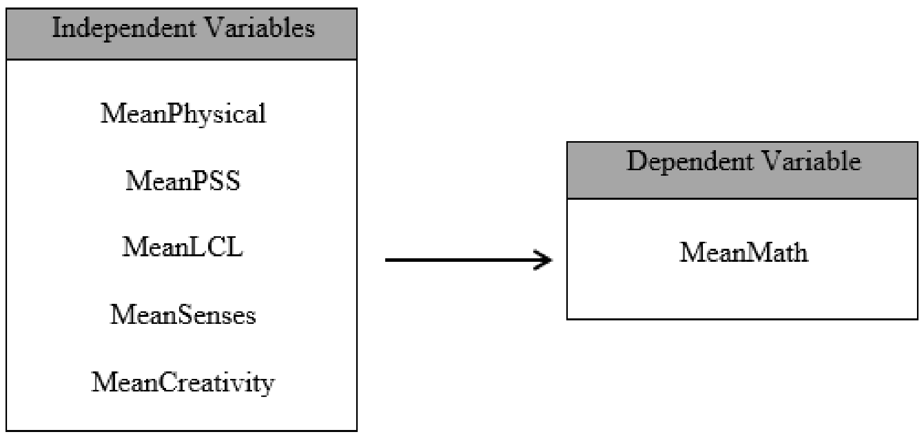



Table 1 lists the variables employed in this study as well as the explanations for each variable, and Figure 2 depicts the research's theoretical framework for achieving the main goal.

**TABLE 1**
**THE VARIABLES USED IN THIS RESEARCH**

| No | Variables | Parameters | Notation | Type |
|---|---|---|---|---|
| 1 | | MeanMath | Mean score of the early development of mathematical and logical thinking variable | Continuous |
| 2 | Dependent | MeanPhysical | Mean score of physical development variable | Continuous |
| 3 | | MeanPSS | Mean score of development of personality, social-emotional skills, and spirituality variable | Continuous |
| 4 | | MeanLCL | Mean score of development of language, communication, and literacy variable | Continuous |
| 5 | Independent | MeanSenses | Mean score of sensibilities and understanding of environment variable | Continuous |
| 6 | | MeanCreativity | Mean score of the expansion of aesthetics and originally variable | Continuous |

## METHODOLOGY

Pearson's correlation coefficient also known as Pearson's r, the Pearson product-moment correlation coefficient, and the bivariate connection evaluates the linear relationship between two variables in statistics (X and Y). It is also referred to as Pearson's r. It has an inclination between +1 and 1, where 1 shows a positive linear relation, 0 indicates no such relationship, and 1 indicates a negative linear relation. In the fields of science, it is frequently employed.

The Correlation tornado graph illustrates the Pearson connection between being an objective and its copied inputs. The Pearson correlation coefficient is the sum of the covariances of two components divided by the difference in their standard deviations. The type of the definition contains a "product-moment," which is the mean (main minute relative to the origin) of the result of mean-balanced random elements. Hence, the term "product-moment" is included in the name.

When used with an example, Pearson's relationship coefficient is regularly alluded to as the illustration association coefficient or the sample Pearson correlation coefficient (Benesty et al., 2009). Incorporating the assessments of the covariance matrices and fluctuations based on an example into the preceding formula provides an equation for r. As a result, if there are n esteems in one dataset x1,...,xn and n esteem in another dataset y1,...,yn, the formula for r is:

$$r = \frac{\sum_{i=1}^{n}(x_i-\bar{x})(y_i-\bar{y})}{\sqrt{\sum_{i=1}^{n}(x_i-\bar{x})^2}\cdot\sqrt{\sum_{i=1}^{n}(y_i-\bar{y})^2}}$$

$$r = r_{xy} = \frac{n\sum x_i y_i - \sum x_i \sum y_i}{\sqrt{n\sum x_i^2-(\sum x_i)^2}\cdot\sqrt{n\sum y_i^2-(\sum y_i)^2}} \quad (1)$$

$$r = r_{xy} = \frac{\sum x_i y_i - n\bar{x}\bar{y}}{\sqrt{(\sum x_i^2 - n\bar{x}^2)}\cdot\left(\sqrt{\sum y_i^2 - n\bar{y}^2}\right)}$$

where,

$n$is the sample size,

$x_i, y_i$ are the single samples indexed with $i$, and

$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$is the sample mean $\bar{y} = \frac{1}{n}\sum_{i=1}^{n} y_i$.

## RESULTS AND DISCUSSIONS

In this investigation, the statistical software SPSS IBM 23.0 was utilized. Table 2 displays the descriptive and inferential statistics of the factors related to this study.

**TABLE 2**
**DESCRIPTIVE STATISTICS**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| MeanMath | 2.3657 | .45868 | 103 |
| MeanPhysical | 2.5341 | .40193 | 103 |
| MeanSSK | 2.4945 | .48032 | 103 |
| MeanBKL | 2.3434 | .45602 | 103 |
| MeanSenses | 2.3814 | .53924 | 103 |
| MeanCreativity | 2.4339 | .53139 | 103 |

Table 3 displays the Pearson correlation coefficients among the linked variables. The relationship between the independent factors and the predictor variables is evident. Mathematical proficiency is significantly correlated with children's overall development. The tornado study depicted in Figure 2 lends weight to this assertion.

**FIGURE 3**
**TORNADO ANALYSIS**

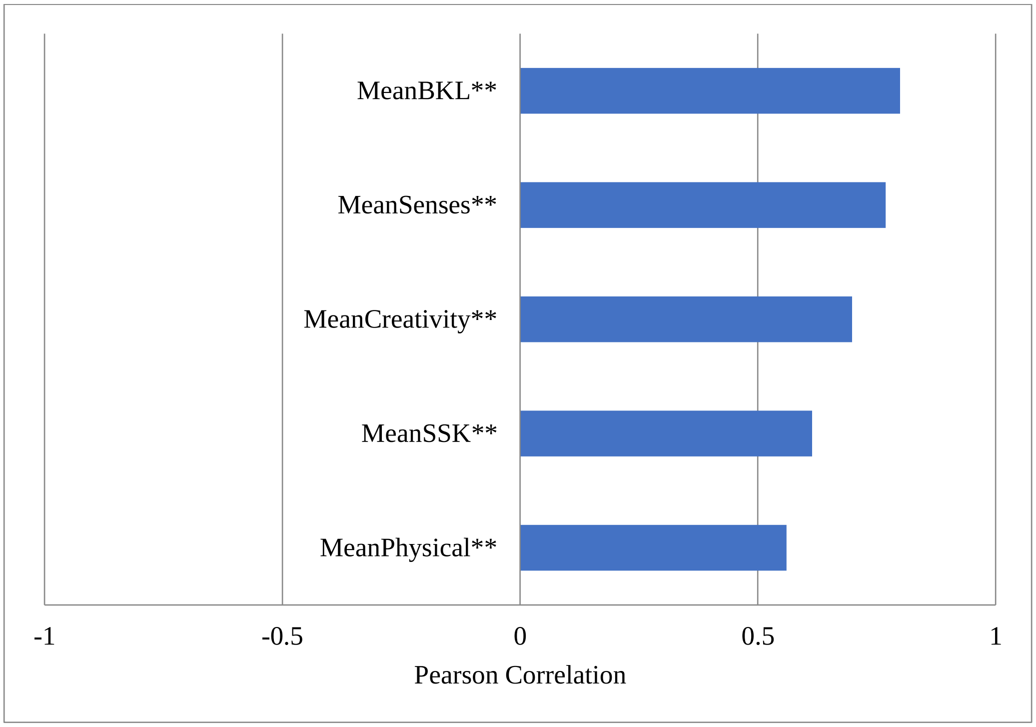


**TABLE 3**
**CORRELATIONS**

| | | **MeanPhysical** | **MeanSSK** | **MeanBKL** | **MeanSenses** | **MeanCreativity** | **MeanMath** |
|---|---|---|---|---|---|---|---|
| MeanPhysical | Pearson Correlation | *1* | *0.769*** | *0.653*** | *0.596*** | *0.640*** | *0.560*** |
| | Sig. (2 Tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 105 | 105 | 105 | 105 | 105 | 105 |
| MeanSSK | Pearson Correlation | *0.759*** | *1* | *0.733*** | *0.663*** | *0.672*** | *0.614*** |
| | Sig. (2 Tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 105 | 105 | 105 | 105 | 105 | 105 |
| MeanBKL | Pearson Correlation | *0.653*** | *0.733*** | *1* | *0.810*** | *0.802*** | *0.799*** |
| | Sig. (2 Tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 105 | 105 | 105 | 105 | 105 | 105 |
| MeanSenses | Pearson Correlation | *0.596*** | *0.633*** | *0.810*** | *1* | *0.766*** | *0.769*** |
| | Sig. (2 Tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 105 | 105 | 105 | 105 | 105 | 105 |
| MeanCreativity | Pearson Correlation | *0.640*** | *0.672*** | *0.802*** | *0.766*** | *1* | *0.698*** |
| | Sig. (2 Tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| | N | 105 | 105 | 105 | 105 | 105 | 105 |
| MeanMath | Pearson Correlation | *0.560*** | *0.614*** | *0.799*** | *0.769*** | *0.698** | *1* |
| | Sig. (2 Tailed) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | |
| | N | 105 | 105 | 105 | 105 | 105 | 105 |

## CONCLUSIONS

As a result, it can be concluded that the goal has been accomplished. The following grasp abilities should be worked on in order to support the proper development of mathematical and logical thinking in children aged 36 to 48 months:

a) Language, communication, and early literacy development (BKL)
b) Sensibilities and understanding of the environment (Senses)
c) The expansion of aesthetics and originality (Creativity)
d) Personality, social-emotional skills, and spiritual development (SSK)
e) Physical development (Physical)

As a result, relevant educational modules at TASKAs should be examined with the specific purpose of ensuring exceptional thinking and math skills for kids of the aforementioned age (Nordin et al., 2022). In the future, similar approaches could be applied to children of various ages which are 0-6, 6-12, 12-24, and 24 three years at Malaysian TASKA. The produced display is significant in terms of recognizing and assessing the type of scientific and coherent reasoning achievement at TASKA or other childcare facilities throughout the world. Appropriate curricula should be created by relevant experts with consideration for notable credits in order to ensure exceptional mathematical development among children of these early ages.

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