

# Motor Affordances in Family Context of Children 18 to 42 Months, From a Urban Coastland County of Portugal\*

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AHEMD-SR (Affordances in the Home Environment for Motor Development-Self Report) was applied to children from 18 to 42 months ( $N = 132$ ), from a coastal municipality of Portugal. The results revealed that the father's income provides more conditions for motor development stimulation, and that a higher number of offspring may result in less conditions for the younger ones. Having a mother, whatever her academic qualifications, is also a factor that promotes better conditions. Thus, in families with fewer resources and more children, it is strategically advisable to technically support the mother. The kindergarten appears to be an equalizer factor for opportunities for access to motor stimulation resources.

*Keywords:* AHEMD, kindergarten, motor development, toys

## Introduction

The association between housing and the child's (motor) development is known (Caldwell & Bradley, 1984; Abbott, Bartlett, Fanning, & Kramer, 2000), particularly the strong association with available toys, even more than the socioeconomic status (Abbott & Bartlett, 2001). Children up to three years of age with better motor performance are those with access to a greater quantity and diversity of toys, in particular for fine motor skills (Valadi & Gabbard, 2020), and diversified outdoor spaces (Schobert & Valentini, 2008; Haydari, Askari, & Nezhad, 2009; Temple, Naylor, Rhodes, & Higgins, 2009; Hsieh, Hwang, Liao, Chen, Hsieh, & Chu, 2011; Mori, Nakamoto, Mizuochi, Ikudome, & Gabbard, 2013). Opportunities for stimulation of motor activity are constrained by the father's lower academic qualifications and lower family income (Soares, Flores, Katzer, Valentini, Corazza, & Copetti, 2015; Valadi & Gabbard, 2020). However, higher socio-economic status is not, in itself, conducive to better motor development (do Nascimento Junior, Ferreira, Vissoci, da Silva, Caruzzo, & Vieira, 2015; Freitas, Gabbard, Caçola, Montebelo, & Santos, 2013). It is likely that more moderating variables

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exist, e.g., the number of hours in the kindergarten and the outdoor conditions existing in it (Pedrosa, Caçola, & Carvalho, 2015).

Although there are studies carried out in several countries around the world, on toys and spaces available for motor activity in young children, we are unaware of the reality in Portugal. With this descriptive study we intend to analyze the conditions for motor stimulation in the family environment in children aged 18 to 42 months, in a medium-sized city on the coast of Portugal.

## Methods

### Sample

Questionnaires related to 132 children ( $36.08 \pm 5.88$  months of age), 62 of the female gender, of the 210 distributed in two private kindergartens and three social kindergartens, in the municipality of Caldas da Rainha. In the number of siblings: 44 children are singleton, 53 have one sibling, 30 have two, and six have four. In the brotherhood, 30 occupy the 1st position and 48 the 2nd. Seventy-four were born with normal delivery, 47 with caesarean, and 12 with forceps or suction cup, with a gestation of  $39.15 (\pm 1.31)$ , minimum 36) weeks. Five families have a monthly income of less than €1,000, 25 from €1,000 to 1,500, 25 from €1,500 to 2,500, 51 from €2,500 to 3,500, 17 from €3,500 to 5,000, and nine more than €5,000. Informed consent was obtained.

### Procedures and Protocols

AHEMD-SR (Affordances in the Home Environment for Motor Development-Self Report), with validation for Brazilian Portuguese (Caçola, Gabbard, Montebelo, & Santos, 2015), and AHEMD Calculador VPbeta1.5.xls, for calculation subscales and total value, were used. The questionnaire allows characterizing the conditions conducive to the motor (and playful) development of the small child, through the identification of the quality and diversity of spaces and toys available in the home and abroad, and of the socioeconomic and academic level of the family. A spreadsheet produces a small report, based on a Likert-type scale, identifying strengths and weaknesses of the conditions afforded to the child, on the quality of available and accessible space, and of equipment and toys for fine and gross motor skills.

### Statistical Analysis

The IBM SPSS Statistics program, version 24, was used for a probability of 0.05, bilateral. Normality was verified using the Kolmogorov-Smirnov or Shapiro-Wilk tests, according to the sample size. Comparison between groups with Kruskal-Wallis test (H), and Monte Carlo correction, followed by Mann-Whitney U test (Z), with Bonferroni correction and estimate of effect size  $r$  ( $r$ ); Anova One-Way, when confirmed homoscedasticity by Levene's test, for analysis of covariance. Jonckheere-Terpstra test (J-T) to analyze the trend of values across groups. Spearman test ( $\rho$ ) to analyze the association between variables.

### Results

Monthly income is associated with the total AHEMD ( $\rho$  (132) = 0.209,  $p$  = 0.05), with a difference between the subcategories (H (5) = 13.641,  $p$  = 0.018); showing the same pattern with fine motor skills ( $\rho$  = 0.246,  $p$  < 0.01; H (5) = 13.933,  $p$  = 0.016; J-T (4.128) = 2.818,  $p$  = 0.05) and gross motor skills ( $\rho$  = 0.332,  $p$  < 0.001; H (5) = 23.295,  $p$  = 0.001; J-T (4.128) = 3.815,  $p$  = 0.001); appearing as the variable that provides the most conditions for motor development. Considering the monthly income as covariant, the difference between genders is no longer significant for gross motor skills (F (1.132) = 2.179,  $p$  = 0.142) and for fine motor skills (F (1.132) = 2.884,  $p$  = 0.092).

The number of children in the home reveals a significant difference and direct association with fine motor skills ( $H(3) = 20.907, p = 0.001$ ;  $J-T(4.128) = 4.609, p = 0.001$ ;  $\rho = 0.392, p = 0.001$ ) and with total AHEMD ( $H(4) = 35.248, p = 0.0001$ ;  $J-T(5.132) = 4.673, p = 0.0001$ ;  $\rho = 0.491, p = 0.001$ ).

The trend of total AHEMD as a function of the number of children in the home is not linear, suffering an inflection for the largest number of children; which is also factual for the number of siblings and for the brotherhood (Table 1). Therefore, it is possible that there is a lack of resources for the motor development of the last children to emerge in large families.

Table 1

*Total AHEMD Score (Mean  $\pm$  Standard Deviation, Median) by Number of Siblings and Brotherhood*

Number	Siblings	Brotherhood
1	15.75 $\pm$ 2.17. 15.00	15.90 $\pm$ 1.42. 17.00
2	17.03 $\pm$ 1.32. 17.00	16.27 $\pm$ 2.25. 17.00
3	-	17.60 $\pm$ 2.07. 18.00
4	13.67 $\pm$ 1.03. 13.00	-
5	-	13.67 $\pm$ 1.03. 13.00

The father's academic qualifications are directly associated with the total of AHEMD, whose trend is significant ( $\rho = 0.213, p = 0.014$ ;  $H(3) = 14.792, p = 0.001$ ;  $J-T(4.132) = 2.425, p = 0.015$ ) and with fine motor skills ( $\rho = 0.349, p = 0.0001$ ;  $H(3) = 18.449, p = 0.0001$ ;  $J-T(4.132) = 4.052, p = 0.001$ ); but the mother's are only associated with fine motor skills ( $\rho = 0.277, p = 0.001$ ;  $H(3.132) = 13.018, p = 0.002$ ;  $J-T(4.132) = 3.151, p = 0.002$ ). Thus, children with more qualified parents benefit from better conditions to explore their fine motor skills. However, for the total of AHEMD only the father's qualifications have such influence; so, the mother, whatever her academic qualifications, appears to be a factor in safeguarding conditions for the child's motor development.

The length of stay time at the kindergarten is positively associated with the total of AHEMD ( $H(2.132) = 6.853, p = 0.033$ ;  $J-T(3.132) = 2.407, p = 0.016$ ;  $\rho = 0.211, p = 0.015$ ). Because no association between length of stay time at the kindergarten and monthly income was found ( $\rho = 0.102, p = 0.243$ ), this may mean that length of stay time at the kindergarten may be an independent variable.

For the sample as a whole, the conditions are sufficient to stimulate satisfactory motor development with level three for the outside space ( $2.07 \pm 1.27$ ), four for the home space ( $12.87 \pm 4.45$ ), four for the variety of stimulation ( $14.54 \pm 0.99$ ), three for fine motor skills ( $58.73 \pm 11.46$ ), three for gross motor skills ( $26.35 \pm 6.01$ ), and two for total AHEMD ( $15.58 \pm 0.00$ ).

## Discussion

For this medium-sized city on the central coast of Portugal, the indicators in the AHEMD questionnaire reveal satisfactory family conditions for the motor development of young children. Fine motor skills proved to be the most sensitive variable to the influence of other variables (Valadi & Gabbard, 2020; Schobert & Valentini, 2008; Haydari et al., 2009; Temple et al., 2009; Hsieh et al., 2011; Mori et al., 2013). The most influential variables were family income (Valadi & Gabbard, 2020; do Nascimento Junior et al., 2015; Freitas et al., 2013; Defilipo, Frônio, Teixeira, Leite, Bastos, Vieira, & Ribeiro, 2012), father's academic qualifications (Soares et al., 2015), and the number of children in the home. A high number of offspring may result in less conditions for the stimulation of motor development for the younger ones. For this sample, having a mother,

regardless of her academic qualification, proved to be a protective variable of better conditions for the stimulation of motor development. Therefore, in families with fewer resources and more children, it is strategically advisable to technically support the mother. In addition, the kindergarten appears to be a factor in equalizing opportunities for access to resources for motor stimulation (Pedrosa et al., 2015).

The fact that a child has diversity and suitability of motor conditions does not necessarily result in an adequate and regular motor stimulation; Therefore, in future studies it is suggested that the survey of motor conditions should be accompanied by an assessment of motor competence and the pattern of children's playful behaviors.

This instrument would provide us with the potential to help mothers and fathers to know the weaknesses and strengths of motor conditions that they provide to their children, helping them to create better conditions for their development.

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