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Adult-child activities and child development outcomes in developing countries: an empirical investigation in Thailand

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ABSTRACT

Is doing activities with young children important for their development? This study aims to examine the effects of adult-child activities on cognitive and non-cognitive development in pre-school children in developing countries by using Thailand as a case study. The adult-child activities of interest are reading, storytelling, singing, outings, and playing. Using national representative secondary data on children aged 3–4 years from the Multiple Indicator Cluster Survey (MICS4) of Thailand, our results show that while the level of children's participation in these activities is relatively high compared to other developing countries, the proportion of children with “normal” cognitive and non-cognitive development is still low. We find that only singing, outings, and playing have positive statistical effects for children who live with both parents (with playing having the highest positive effect), but for children who do not live with both parents or live with others, the positive effect remains only for singing. On the other hand, storytelling, singing, and outings seems to have statistically significant positive effects for non-cognitive outcomes among children who live with both parents (with outings having the highest positive effect). No activities have statistically significant effects on non-cognitive development of children who do not live with both parents. The recommendations call for greater attention on advocating adult-child activities in the context of developing countries.

KEYWORDS

Cognitive development;
non-cognitive development;
adult-child activities;
developing countries;
Thailand

Introduction

Children are important human capital in any nation. Building quality of labor to support sustainable aging societies in the long term depend largely on how we develop our children to become the nation's resources in the future. Literature on child development pinpoints that the pre-school ages are crucial for proper development of a child, and that effort and resources should be expended to elevate the level of child development during the ages that give the highest future return (Heckman & Masterov, 2007). Ages 3–4 years are believed to be a crucial time for developing human capital. Erikson (1963) proposed that a child aged 3–4 years is in the third stage of socio-mental development during which children are ready to engage in free physical movement and pursue individual interests in subjects and environments outside themselves. In terms of long-term development, Pholphirul (2017) uses data from the Performance of International Student Assessment

(PISA) in Thailand showing higher scores in reading, mathematics, and the sciences to argue that early childhood education bears a significant and positive association with cognitive skills in the long run.

A child develops curiosity and tries to learn new things around her as her imagination starts to develop. At this stage of development, the child learns to interact with others in activities with family members and others. It is proved that if a child properly develops at this stage by having positive and supportive interactions with others and learning from unrestricted play, the child will develop creativity and other cognitive and non-cognitive skills that will have great positive effects in the future, especially in terms of the child's "executive function" (EF), which is important for life management in the future (Boyd, Barnett, Bodrova, Leong, & Gomby, 2005; Ginsburg, 2007; Prager, Sera, & Carlson, 2016).

Literature on child development also suggests that the development of a child comes from two main components, nature and nurture (Sameroff, 2010), where "nature" comprises factors that are innate or transferred to a child genetically, such as some genetically prone diseases or any abnormality from birth (Hunkapiller, Huang, Hood, & Campbell, 1982; Ulmann et al., 1987), and "nurture" refers mainly to factors from a child's upbringing, such as family wealth, parental education, living arrangement, and having sibling(s) (Aguilar, O'Brien, August, Aoun, & Hektner, 2001; Hernandez, 1997). Parental roles and interaction with a child are proved to be crucial for child development (Maccoby, 1992; Pholphirul & Tiemtad, 2018), and interaction with other individuals and social institutions, such as a main caretaker, family members, neighbors, schools and communities, also help raise the level of child development (Ashiabi, 2000; Bronfenbrenner, 1994; Mize & Ladd, 1990).

A careful literature review by Roopnarine and Davidson (2015) suggests that in developed countries parent-child playful interactions have positive impacts on attachment bonds, the maintenance of physical health, timely development of language, and appropriate social adjustment in children. In addition, Roopnarine and Davidson (2015) report that parent-child playful interaction under a democratic parenting style also encourages the development of non-cognitive outcomes such as self-reliance, independence, helping, and sharing. On the other hand, the lack of parent-child playful interaction in a low social capital neighborhood, as a result of negative attributes such as crime and poverty, can have negative developmental outcomes on children (The UNDP Caribbean Human Development Report, 2012; Krishnakumar, Lutchmie, Jaipaul, & Logit, 2013).

Evidence suggests also that parents in developing countries tend to interact with children less than those in developed countries. Bornstein and Putnick (2012) investigated 28 developing countries and found that only 64% of parents takes their children outdoors and only 25% of parents read to their children, compared to 83% and 95% in the United States (Dyg, 2000). Seventy-five percent of fathers in Australia read stories to their children and play outdoors with four-to-five-year children three or more days per week (Baxter and Smart, 2010). Studies also reveal that there is a trend toward decreased outdoor play and increased sedentary indoor activities across both developing and developed countries (Roopnarine and Davidson, 2015). The gap between indoor and outdoor activities seems to be even wider in developing countries than that in developed countries. For instance, television viewing and outdoor play in developing economies are 78% versus 49%, respectively, compared with 76% versus 60% in newly industrialized countries and

60% versus 63% in technologically developed countries (Singer, Singer, Agostino, & DeLong, 2009)

In the meantime, we observe a decreasing proportion of children living with both a father and mother, especially in developing countries, where parents increasingly have to work outside the home and the rate of female labor force participation is elevated because of constraints on the economic status of the household in a very competitive economic environment. As a result, a mother may have to work outside the home while raising a child or may call on someone else to take a major role in raising the child. These situations are common in some cultures within developing countries, such as Thailand, where living arrangements include other family members or a maid. In any case, having others to take care of a child may also have some effects on a child's development.

This study attempts to discover effects of parent-child activities on cognitive and non-cognitive development in pre-school children in Thailand, as a case study for a developing country in which child development is central in the context of a country's transitioning to an aging society. Over the past 20 years, the birth rate in Thailand has declined, resulting in a lowering proportion of children (Prasartkul & Vapattanawong, 2012). This suggests that Thailand and developing countries alike will face a new phenomenon of "low birth rate and low child quality during which the future labor force will be drastically affected in terms of both quantity and quality.

However, there has not been a national study regarding the effects of various factors on child development at pre-school ages, especially with regard to non-cognitive development in Thailand. Fortunately, data from a nationally representative survey on children have recently been made available by the National Statistical Office of Thailand. This study can provide evidence that nurture can improve children's outcomes under challenging settings in developing countries such as Thailand. In particular, our paper attempts to identify the effects of adult-child interactions through different activities on both cognitive and non-cognitive development of children. We then aim to suggest policy recommendations on child development at pre-school ages, when human capital development is crucial for future labor supply in the developing world. Our study explores the effects of reading, storytelling, singing, going outside, and playing on cognitive and non-cognitive outcomes for pre-school children who live with both parents as well as for those who do not live with both parents. Section II explains the data and variables used. Section III explains the research methodology used. Section IV shows the results from descriptive statistics and regressions. And Section V concludes and provides a discussion of interesting findings.

Data and analysis

This study uses secondary data from the Multiple Indicator Cluster Survey (MICS-4) in Thailand that was carried out in 2012. The data were collected by the National Statistical Office (NSO) of Thailand using the multiple-cluster survey method and a national sampling frame from the NSO (National Statistical Office of Thailand, 2013). The survey includes data on child development in both cognitive and non-cognitive aspects, family background, caregivers, and factors that are thought to have effects on child development, using standardized and internationally comparable questions developed by the United Nations International Children's Emergency Fund (UNICEF).

While this study focuses on child development, data on child development in the fourth round of the Multiple Indicator Cluster Survey (MICS-4) are available from only children aged 36–59 months (3–4 years). As a result, we only focus our study on the population of pre-school children aged 3–4 years, which limits our sample to only 4,362 children in the data.

In terms of variables and measurements in this study, we divide “child development” into cognitive development and non-cognitive development as dependent variables of interest. The reason for investigating both aspects of child development comes from recommendations by Heckman (2008) that cognitive and non-cognitive should both be emphasized at young ages to increase human capital and labor skills when they become adults. Rukumnuaykit and Pholphirul (2016) also confirm that labor productivity is, in fact, affected by both cognitive and non-cognitive skills used in labor in Thailand.

The level of child development is categorized into two groups, namely normal development, and delayed development. For cognitive development, “Normal Development” refers to the ability of the child to meet these three requirements: (1) knowing numbers 1–10 and being able to count 1–10, (2) knowing at least 10 letters of the alphabet, and (3) being able to read at least four simple, everyday-use words. For non-cognitive development, “Normal Development” refers to the ability of the child to meet these three requirements: (1) being able to get along with other children, (2) refraining from kicking, biting, or hitting other children or adults, and (3) having no attention deficit hyperactivity disorder (ADHD) nor having their attention being easily deviated by others. This scale, however, is stricter than those reported in the MICS surveys’ reports, in which only two of three requirements are used to meet “normal development.” Using the two-out-of-three-requirement scale results in a very high proportion of children with “normal development,” especially for non-cognitive development, where more than 90% of children have “normal development.” Since our study aims at finding predictive factors on child development, we believe that using a stricter requirement is more appropriate in terms of statistical robustness, where the data will have a higher level of variation.

The independent variables of interest in our analysis are the activities that the child did with family members during the previous three days. We use five out of the six activities reported in the survey, namely, (1) reading or looking at a storybook with the child, (2) storytelling with the child, (3) singing to the child, singing with the child, or singing a lullaby to the child, (4) taking the child outside of home, and (5) playing with the child. These variables are dummy variables that take two values; did or did not do the activity. Note that we do not use the sixth activity, learning to name animals or things or counting numbers or drawing objects with the child. This is because the questionnaire on this sixth activity includes too many activities in one question, and disaggregating the factors is not possible in the data.

The control variables used in the analyses are children’s characteristics, household characteristics, adults’ characteristics, and behavioral variables and factors that are known to maybe have effects on child development. Children’s characteristics include age, gender, body mass index, and the history of breastfeeding. Household characteristics include urban/rural residency, region, family wealth status, ethnicity of the household head, the number of household members, the number of elderly in the household, and the number of children in the household. Adults’ characteristics include whether the adult is the main caregiver, the education of the main caregiver, father’s education (which is

available only for children whose father was living in the same household), and the age of the main caregiver. Behavioral variables and other factors include the number of hours per week spent in pre-school, having children's book(s) in the household, playing a toy that was made by a household member, playing with a toy that had been bought, drinking milk, drinking juice, and taking food supplement(s).

Methodology

The analyses in this paper utilize multiple regressions to analyze two dependent variables, cognitive and non-cognitive development of children aged 3–4 years from MICS-4. The two dependent variables are dummy variables, namely normal or delayed development. Children are considered to have “normal cognitive development” in our analysis if they meet all three cognitive requirements, and to have “normal non-cognitive development” if they meet all three non-cognitive requirements mentioned above.

We employ Probit regressions on the dummy variable “normal development” for both cognitive and non-cognitive development and interpret the regression results in the form of marginal effects, showing the effects of each variable on the chance that the child has a normal development. The independent variables of interest are dummy variables representing whether the child engages in reading, storytelling, singing, outings, and playing with any adult family member in the household. We analyze data separately for children who live with both father and mother and children who do not live with both parents. The regressions on cognitive development and non-cognitive development are carried out separately. The estimated probability of having normal development ($Y = 1$) comes from

$$\Pr(Y = 1|X) = \Phi(X^T\beta)$$

where Pr denotes the probability that the child has normal development, and Φ is the Cumulative Distribution Function (CDF) of the standard normal distribution. The parameter β is estimated by maximum likelihood. X^T is the set of independent variables that comprises

- (1) the set of dummy variables indicating whether the child had engaged in the five activities with any adult family member in the household,
- (2) the set of variables indicating individual characteristics of the pre-schoolchild (age, gender, BMI, having been breastfed, and the amount of time spent in pre-school education per week),
- (3) the set of variables indicating the household characteristics (region, living in an urban area, being ethnic Thai, and economic status of the household, the number of household members, the number of elderly in the household, and the number of children in the household),
- (4) the set of variables indicating the characteristics of caregivers and others in the households (having the mother as the main caregiver, caregiver's age, the education of the main caregiver, and father's education), and
- (5) the set of variables indicating other of the child's behaviors and development supporting factors (playing with handmade toys, playing with toys bought from shops, drinking milk, juice, and taking nutritional supplements).

Results and analysis

From the dataset of 4,362 pre-school children aged 3–4 years, only 32.75% of the children had normal cognitive development. The proportion of children who had normal non-cognitive development is higher than that of cognitive development, but the level is still low, at 57.96 percent. As for the activities that children do with their family members, playing is the activity that most children do (99.39% of the children in the sample), followed by going outside (98.88%). Learning the names of animals/things and reading and looking at storybooks are done by 91.32% of the children, with singing and storytelling at 85.69 and 82.57%, respectively.

Noting the proportion of children who had normal cognitive and non-cognitive development among children who engaged in five different activities in [Table 1](#), it is found that children who engaged in activities with caregivers apparently had a higher chance of having “normal development” compared to those who did not. We find a positive relationship between activities and normal development for both cognitive and non-cognitive development for all activities, namely, reading, storytelling, singing, outings, and playing. Moreover, we find similar effects of such activities on children living with both parents and those living with a single parent or non-parent for both cognitive and non-cognitive development. In addition, all five activities have similar effects on children’s cognitive development while storytelling seems to have a bit higher effect on non-cognitive development compared to other activities.

The results from our regression analysis of cognitive development in [Table 2](#) suggests that without controlling for other factors, when children live with both parents, engaging in each activity with adult(s) has a significant positive impact on the cognitive development of the child for all activities (reading, storytelling, singing, outings, and playing). But when children do not live with both parents, only storytelling and outings matter. When controlling for all other factors in the model, we find that only singing, outings, and playing have positive statistical effects for children who live with both parents (with playing having the highest positive effect), but for children who do not live with both parents, the positive effect remains only for singing.

For non-cognitive development, the regression results shown in [Table 3](#) show that after controlling for other factors in the model, only storytelling, singing, and outings have statistically significant positive effects for children who live with both parents (with outings having the highest positive effect). No activities have statistically significant effects on non-cognitive development of children who do not live with both parents. It is interesting to find that, compared to younger children, older children are statistically not significantly different in terms of non-cognitive development, while cognitive development improves (as expected). In addition, we find that getting a pre-school education improves only the cognitive development of pre-school children. It does not seem to have any statistically significant positive effect on non-cognitive development of the child. On the contrary, having more than 34 h per week of pre-school education has significant negative effects on non-cognitive development of the child when the child lives with both parents.

We find that, in Thailand, having the mother as the main caregiver of the child makes no difference in terms of cognitive development of the child, while having a mother as the main caregiver has a strong statistically significant negative effect on non-cognitive

Table 1. Adult-child activities and percentage of children with normal development classified by doing activities with parents or with single parent/non-parent.

Doing Activities with household members	All Observations		Children who live with both parents		Children who live with single parent/non-parent	
	Yes	Observations	Yes	Observations	Yes	Observations
A. Cognitive development						
Reading						
Yes	33.97	3,812	33.76	2,408	34.33	1,404
No	19.89	362	16.18	173	23.28	189
Telling						
Yes	34.8	3,445	34.57	2,213	35.23	1,232
No	23.05	729	20.65	368	25.48	361
Singing						
Yes	34.33	3,583	34.02	2,296	34.89	1,287
No	23.18	591	21.05	285	25.16	306
Outings						
Yes	32.95	4,128	32.8	2,552	33.19	1,576
No	15.22	46	13.79	29	17.65	17
Playing						
Yes	32.86	4,148	32.7	2,569	33.12	1,579
No	15.38	26	8.33	12	21.43	14
B. Non-cognitive development						
Reading						
Yes	59.16	3,817	58.82	2,409	59.73	1,408
No	45.25	358	39.18	171	50.8	187
Telling						
Yes	60.04	3,456	60.05	2,213	60.02	1,243
No	47.98	719	42.23	367	53.98	352
Singing						
Yes	59.54	3,589	58.87	2,295	60.74	1,294
No	48.29	586	46.67	285	49.83	301
Outings						
Yes	58.19	4,128	57.8	2,550	58.81	1,578
No	38.3	47	33.33	30	47.06	17
Playing						
Yes	58.02	4,152	57.59	2,568	58.71	1,584
No	47.83	23	41.67	12	54.55	11

Source: Authors' Calculation. Data from Multiple Indicator Cluster Survey (MICS4) in Thailand.

development of children who live with both parents. As for the effects of the education of the caregiver, we find that a higher education level tends to have effects on higher cognitive development of children, while there are no such education effects on non-cognitive development.

In terms of living arrangement, we find that the number of household members has no effect on the cognitive development of the child. However, children who live in a house with more household members tend to have better non-cognitive development in cases where they do not live with both parents. Furthermore, the number of the elderly living in the household seems to have positive effects on cognitive development of the children whether they live with both parents or not, while the number of the elderly living in the household has positive effects on non-cognitive development only on children who live with both parents.

In terms of regional variation, our results suggest that children who live in the northern and southern parts of Thailand seem to be less likely to have normal cognitive development compared to those who live in Bangkok. Fortunately, no inequality pattern emerges from the analysis of non-cognitive development. In addition, we find that economic status

Table 2. Estimated results of adult-child activities on having normal cognitive development.

	Live with both parents			Live with single parent / non-parent		
	-1	-2	-3	-1	-2	-3
Activities (ref. = no activity with any household member)						
Reading	0.139***	0.067	0.0258	0.0244	-0.0182	0.011
Telling	0.0383	0.0292	0.0187	0.113*	0.110*	0.0724
Singing	0.125***	0.117***	0.116***	-0.00186	0.122*	0.134*
Outing	0.182**	0.185**	0.142*	0.324***	0.284***	0.191
Playing	0.208*	0.144	0.182*	-0.343	-0.0275	-0.0115
Age (ref. = 36-41 months)						
42-47	-	0.102**	0.0808*	-	0.128	0.0953
48-53	-	0.219***	0.182***	-	0.207***	0.135*
54-59	-	0.283***	0.241***	-	0.217***	0.158**
Male (ref. = female)	-	-0.0298	-0.0277	-	-0.103**	-0.108**
BMI (ref. = normal)						
underweight	-	-0.0389	-0.0367	-	-0.0108	-0.0302
overweight	-	-0.0422	-0.0355	-	-0.238***	-0.179**
obesity	-	-0.0229	-0.042	-	0.106	0.136
Breastfed (ref. = never)	-	-0.209**	-0.200**	-	-0.0323	-0.00991
Urban (ref. = rural)	-	-0.0303	-0.00841	-	-0.0552	-0.0767
Region (ref. = Bangkok)						
Central	-	0.0578	0.0323	-	-0.000484	-0.0138
Northern	-	-0.0951*	-0.151***	-	-0.228**	-0.299***
Northeastern	-	0.0243	-0.0125	-	-0.126	-0.192*
Southern	-	-0.0641	-0.0986*	-	-0.210**	-0.251***
Economic Status (ref. = very poor)						
Poor	-	0.0598	0.0609	-	0.01	-0.0257
Moderate	-	0.0494	0.0408	-	0.061	0.0577
Rich	-	0.0652	0.0662	-	-0.0127	-0.0407
Very rich	-	0.0842	0.0854	-	0.206*	0.158
Thai ethnicity (ref. = others)	-	0.0127	0.00655	-	0.116	0.0115
Number of household members	-	-0.0173	-0.0148	-	-0.0236	-0.0316
Number of elderly in household	-	0.0480*	0.0452*	-	0.0643	0.0683*
Number of children in household	-	-0.0084	-0.00207	-	0.0266	0.0415
Having mother as main caregiver (ref. = others)	-	-0.185	-0.305	-	-0.0509	-0.0736
Main caregiver's education level (ref. = lower secondary)						
Secondary	-	0.0201	0.0159	-	0.000478	0.0216
Higher secondary	-	0.146**	0.137**	-	0.189*	0.174*
Father's education level (ref. = lower secondary)						
Secondary	-	-0.0314	-0.0508	-	-	-
Higher secondary	-	-0.024	-0.0347	-	-	-
Main caregiver's age	-	-0.000476	-0.0073	-	-0.0174	-0.0191
Getting preschool education (ref. = never)						
less than 1 hour per week	-	-	0.125*	-	-	0.0596
1-12 hours per week	-	-	0.235***	-	-	0.240**
13-25 hours per week	-	-	0.150**	-	-	0.0846
26-34 hours per week	-	-	0.264***	-	-	0.333***
more than 34 hours per week	-	-	0.277***	-	-	0.290***
Having books for children (ref. = have not)	-	-	-0.0497	-	-	-0.0253
Playing with handmade toys (ref. = not playing)	-	-	0.022	-	-	0.0761
Playing with toys from shops (ref. = not playing)	-	-	0.157**	-	-	0.122
Drinking milk (ref. = no)	-	-	-0.0207	-	-	-0.0644
Drinking juice (ref. = no)	-	-	0.0388	-	-	0.123**
Eating/drinking nutritional supplements (ref. = no)	-	-	0.056	-	-	0.0973
Observations	2,581	2,384	2,325	1,593	869	853
Adjusted R Square	0.0201	0.0915	0.116	0.0163	0.121	0.172

Source: Authors' Calculation. Data from Multiple Indicator Cluster Survey (MICS4) in Thailand.

*** p < 0.01, ** p < 0.05, * p < 0.1

Table 3. Estimated results of adult-child activities on having normal non-cognitive development.

	Live with both parents			For children live with single parent/ non-parent		
	(1)	(2)	(3)	(1)	(2)	(3)
Activities (ref. = no activity with any household member)						
Reading	0.108	0.0925	0.108	0.0504	0.133	0.152
Telling	0.131**	0.118**	0.132**	0.0427	0.0472	0.0437
Singing	0.100*	0.114**	0.111*	0.0269	0.0974	0.0732
Outing	0.199	0.349***	0.356***	0.338***	-	-
Playing	-0.0800	-0.158	-0.172	-0.343***	-	-
Age (ref. = 36–41 months)						
42–47	-	0.0165	0.0227	-	-0.0864	-0.0895
48–53	-	-0.00778	0.00298	-	0.0262	0.0375
54–59	-	0.0243	0.0537	-	-0.119	-0.108
Male (ref. = female)	-	-0.0828***	-0.0956***	-	-0.0912*	-0.100**
BMI (ref. = normal)						
underweight	-	-0.0193	-0.0238	-	-0.0150	0.0112
overweight	-	0.0695	0.0671	-	-0.177	-0.159
obesity	-	-0.0632	-0.0534	-	-0.0355	-0.0636
Breastfed (ref. = never)	-	-0.0351	-0.0466	-	-0.0855	-0.102
Urban (ref. = rural)	-	-0.0245	-0.0229	-	-0.0209	-0.00871
Region (ref. = Bangkok)						
Central	-	0.0631	0.0661	-	-0.196*	-0.176*
Northern	-	-0.0287	0.000831	-	-0.0567	-0.0124
Northeastern	-	-0.0674	-0.0675	-	-0.119	-0.0776
Southern	-	-0.0791	-0.0592	-	-0.0993	-0.0602
Economic Status (ref. = very poor)						
Poor	-	0.0796	0.0501	-	-0.0992	-0.0894
Moderate	-	-0.00961	-0.0235	-	0.0227	0.0472
Rich	-	0.00850	-0.0152	-	-0.187*	-0.181*
Very rich	-	-0.0448	-0.0736	-	0.0111	0.0454
Thai ethnicity (ref. = others)	-	0.0435	0.115	-	-0.335***	-0.347***
Number of household members	-	-0.00340	-0.00133	-	0.0685***	0.0573***
Number of elderly in household	-	0.0597**	0.0757***	-	0.0419	0.0569
Number of children in household	-	-0.0354	-0.0408*	-	-0.0701*	-0.0665*
Having mother as main caregiver (ref. = others)	-	-0.366***	-0.365***	-	0.0268	-0.0225
Main caregiver's education level (ref. = lower secondary)						
Secondary	-	-0.0315	-0.0195	-	-0.00269	0.00293
Higher secondary	-	-0.0321	-0.0253	-	-0.00951	-0.00487
Father's education level (ref. = lower secondary)						
Secondary	-	-0.0517	-0.0441	-	-	-
Higher secondary	-	0.0229	0.0181	-	-	-
Main caregiver's age	-	0.0184	0.0229	-	0.0274	0.0195
Getting preschool education (ref. = never)						
less than 1 hour per week	-	-	-0.0662	-	-	-0.00584
1–12 hours per week	-	-	-0.0563	-	-	-0.0766
13–25 hours per week	-	-	-0.00732	-	-	-0.162
26–34 hours per week	-	-	-0.0280	-	-	-0.117
more than 34 hours per week	-	-	-0.124**	-	-	-0.0588
Having books for children (ref. = have not)	-	-	-0.0156	-	-	0.00201
Playing with handmade toys (ref. = not playing)	-	-	-0.0179	-	-	-0.155a
Playing with toys from shops (ref. = not playing)	-	-	-0.148	-	-	0.00313
Drinking milk (ref. = no)	-	-	0.0265	-	-	0.0821
Drinking juice (ref. = no)	-	-	-0.0120	-	-	0.0922*
Eating/drinking nutritional supplements (ref. = no)	-	-	0.0788*	-	-	-0.0643
Observations	2,580	2,385	2,326	1,595	860	845
Adjusted R Square	0.0227	0.0567	0.0672	0.00996	0.0856	0.113

Source: Authors' Calculation. Data from Multiple Indicator Cluster Survey (MICS4) in Thailand.

*** p < 0.01, ** p < 0.05, * p < 0.1

of the household does not have a statistical impact on either cognitive or non-cognitive development of children.

Conclusion and discussion

We find that in Thailand, the level of children's participation in activities that are known to positively contribute to child development is relatively high, compared to other developing countries studied before. Playing and going outside with caregivers are among the top two activities being carried out. Even though we find a positive relationship between child activities and cognitive and non-cognitive development in the raw data, only one-third of the children had normal cognitive development. While the proportion of children with normal non-cognitive development is higher than that for cognitive development, the proportion is only around 58%, suggesting that there is some room for improvement in the area of improving the quality of child development in developing countries such as Thailand.

We find also in our descriptive statistics that there does not seem to be any difference between children who live with both parents and those who do not in terms of both cognitive and non-cognitive development. However, we find that adult-child activities are more effective when children live with both parents than when they do not. These findings are in line with the theory on social learning that states that having both father and mother is most conducive for optimal socialization (Lansford, Ceballo, Abbey, & Stewart, 2001). Such explanation is also consistent with what Maccoby (1992) concludes regarding the importance of both parents doing activities with their children, namely, that three things occur during doing activities together: attachment, modeling, and altruism, for both sides. (In other words, when parents are more into doing activities with their own children compared to doing so with other family members, children can feel that they are truly loved and cared for by their parents).

Furthermore, we find that having the mother as the main caregiver has no significant impacts on the cognitive development of the child. This suggests that in the context of developing countries, where migration might be widespread, even though we should advocate policies encouraging living arrangements that improve the chance that children live with both parents, other caregivers might act as good substitutes for the mother in terms of child development outcomes of the children. The finding is in line with Erikson's theory (Erikson, 1963) that children in pre-school begin to learn the roles of different family members from being close to or doing activities with family members who are not the parents.

As expected, we find that pre-school education in young children helps improve cognitive development. But interestingly, it does not have effects on non-cognitive development. This suggests that going to school early has no effects on the non-cognitive development of the child, even in light of the many efforts and programs to improve non-cognitive skills of children for the twenty-first century.

Furthermore, as a reflection of the impact of quality of care, such as from appropriately choosing the resources to take care of a child or a pre-school (allocative effects), we expect to find positive effects of caregiver's education on child development. We find that in Thailand, the education of the caregiver has positive effects on the child's cognitive development while these effects do not exist for non-cognitive development. This could

mean that the already-low level of non-cognitive development of children is not different for children with respect to their caregivers' education. These results should be alarming to policymakers.

In the context of a transitioning economy in a developing country as it evolves into an aging society, having an elderly person in the household or maintaining an extended-family setting could have a benefit on children living in the household. We also find that living in a house with more household members tends to mitigate the effects of not living with both parents in terms of children's non-cognitive development.

Even with evidence that suggests regional variation in terms of children's cognitive development, we find that the economic status of the household does not have a statistically significant impact on either cognitive or non-cognitive development of children. This suggests that adult-child activities could mitigate the effects of low economic status and lack of child support systems that characterize poor areas and poor households. We find that simple activities that have positive effects on cognitive development of children are singing, outings, and playing, all of which can be easily carried out by adult(s) and children together regardless of their living arrangement or economic status.

Lastly, limitations of this research remain as it uses secondary data that lack important variables that could have significant impacts on children's development, such as parents' jobs, the number of siblings, and parenting style.

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References

- Aguilar, B., O'Brien, K. M., August, G. J., Aoun, S. L., & Hektner, J. M. (2001). Relationship quality of aggressive children and their siblings: A multiinformant, multimeasure investigation. *Journal of Abnormal Child Psychology*, 29(6), 479–489.
- Ashiabi, G. S. (2000). Promoting the emotional development of preschoolers. *Early Childhood Education Journal*, 28(2), 79–84. doi:10.1023/A:1009543203089
- Baxter, J., & Smart, D. (2010). *Fathering in Australia among couple families with young children, Occasional Paper No37*, Canberra, Australia: Commonwealth of Australia.
- Bornstein, M. H., & Putnick, D. L. (2012). Cognitive and socioemotional caregiving in developing countries. *Child Development*, 83(1), 46–61. doi:10.1111/j.1467-8624.2011.01673.x
- Boyd, J., Barnett, W. S., Bodrova, E., Leong, D. J., & Gomby, D. (2005). *Promoting children's social and emotional development through preschool education*. New Brunswick, NJ: National Institute for Early Education Research.
- Bronfenbrenner, U. (1994). Ecological models of human development. *Readings on the Development of Children*, 2, 37–43.
- Dyg, I. (2000). *What grown-ups understand about child development: A national benchmark survey*. Retrieved from <http://www.buildinitiative.org/files/grown-ups.pdf>

- Erikson, E. H. (1963). *Childhood and Society*. New York, NY: Norton.
- Ginsburg, K. R. (2007). The importance of play in promoting healthy child development and maintaining strong parent-child bonds. *Pediatrics*, 119(1), 182–191. doi:10.1542/peds.2006-2697
- Heckman, J. J. (2008). The case for investing in disadvantaged young children. In *Big Ideas for Children: Investing in Our Nation's Future*. (pp. 49–58). Washington, USA: First Focus.
- Heckman, J. J., & Masterov, D. V. (2007). The productivity argument for investing in young children. *Applied Economic Perspectives and Policy*, 29(3), 446–493.
- Hernandez, D. J. (1997). Child development and the social demography of childhood. *Child Development*, 68(1), 149–169. doi:10.2307/1131933
- Hunkapiller, T., Huang, H., Hood, L., & Campbell, J. H. (1982). The impact of modern genetics on evolutionary theory. In R. Milkman (Ed.), *Perspectives on Evolution* (p. 55). Sunderland, MA: Sinauer.
- Krishnakumar, A., Lutchmie, N., Jaipaul, L. R., & Logit, C. (2013). A multilevel analysis of the role of parental and community variables on young children's health. *Journal of Pediatric Psychology*, 38(10), 1144–1154. doi:10.1093/jpepsy/jst059
- Lansford, J. E., Ceballo, R., Abbey, A., & Stewart, A. J. (2001). Does family structure matter? A comparison of adoptive, two-parent biological, single-mother, stepfather, and stepmother households. *Journal of Marriage and Family*, 63(3), 840–851. doi:10.1111/j.1741-3737.2001.00840.x
- Maccoby, E. E. (1992). The role of parents in the socialization of children: An historical overview. *Developmental Psychology*, 28(6), 1006. doi:10.1037/0012-1649.28.6.1006
- Mize, J., & Ladd, G. W. (1990). A cognitive-social learning approach to social skill training with low-status preschool children. *Developmental Psychology*, 26(3), 388. doi:10.1037/0012-1649.26.3.388
- National Statistical Office of Thailand. (2013). *Multiple indicator cluster survey 2012*. Bangkok, Thailand: Text and Journal Publication (Thailand).
- Pholphirul, P. (2017). Pre-primary education and long-term education performance: Evidence from Programme for International Student Assessment (PISA) Thailand. *Journal of Early Childhood Research*, 14(4), 410–432. doi:10.1177/1476718X15616834
- Pholphirul, P., & Tiemtad, S. (2018). Living with parents and educational outcomes in developing countries: Empirical evidence from PISA Thailand. *Journal of Population Research*, 14(1), 87–105. doi:10.1007/s12546-017-9196-1
- Prager, E. O., Sera, M. D., & Carlson, S. M. (2016). Executive function and magnitude skills In preschool children. *Journal of Experimental Child Psychology*, 147(July), 126–139. doi:10.1016/j.jecp.2016.01.002
- Prasartikul, P., & Vapattanawong, P. (2012). Birth. In C. Kanchanachitra, et al. (Ed.), *Thai health report 2012: food security–The illusion of money vs the reality of food* (pp. 12–13). Nakhon Pathom, Thailand: Institute for Population and Social Research, Mahidol University.
- Roopnarine, J. L., & Davidson, K. L. (2015). Parent-child play across cultures: Advancing play research. *American Journal of Play*, 7(2), 228–252.
- Rukumnuaykit, P., & Pholphirul, P. (2016). Human capital linkages to labour productivity: Implications from Thai manufacturers. *Journal of Education and Work*, 29(8), 922–955. doi:10.1080/13639080.2015.1104658
- Sameroff, A. (2010). A unified theory of development: A dialectic integration of nature and nurture. *Child Development*, 81(1), 6–22. doi:10.1111/j.1467-8624.2009.01378.x
- Singer, D. G., Singer, J. L., Agostino, H. D., & DeLong, R. (2009). Children's pastimes and play in sixteen nations: Is free-play declining? *American Journal of Play*, 1(Winter, 2009), 283–312.
- Ulmann, M. H., Diamond, G. W., Ruff, H. A., Belman, A. L., Novick, B. E., Rubinstein, A., & Cohen, H. J. (1987). Developmental abnormalities in children with acquired immunodeficiency syndrome (AIDS): A follow-up study. *International Journal of Neuroscience*, 32(3–4), 661–667.
- United Nation Development Programme. (2012). *UNDP Caribbean human development report. 2012: Human development and the shift to better citizen security*, Retrieved from http://hdr-caribbean.regionalcentre.acundp.org/images/PDF/caribbean_hdr2012.pdf
- Wood, C. (2002). Parent-child pre-school activities can affect the development of literacy skills. *Journal of Research in Reading*, 25(3), 241–258. doi:10.1111/jrir.2002.25.issue-3