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# CAKRAWALA PENDIDIKAN

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# SOCIOECONOMIC STATUS, PARENTAL INVOLVEMENT IN LEARNING AND STUDENT' MATHEMATICS ACHIEVEMENT IN INDONESIAN SENIOR HIGH SCHOOL

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**Abstract:** The objectives of the research are to examine: (1) the relationship between parents' education level as an indicator of socioeconomic status (SES) with students' mathematics achievement, and (2) the interaction between parents' education level and the intensity of parental involvement in predicting students' mathematics achievement. The sample (N=2,867) was selected through stratified random sampling of Indonesian high school National Examination (NE) test takers in 2016. The sampling was based on careful consideration of the representativeness and the distribution of provinces, gender, type of school (general-vocational), and school status (public-private). Data was analyzed using parallel multiple mediator analyses. The findings highlight that: (1) compared to fathers, mothers' education level had a stronger contribution to students' achievement in mathematics, and (2) mothers' involvement mediated the relationship between mothers' level of education and students' mathematics achievement. However, more intensive parental involvement was associated with lower mathematics achievement.

**Keywords:** *SES, mathematics, parents' education levels, involvement*

## STATUS SOSIAL EKONOMI, KETERLIBATAN ORANGTUA DALAM BELAJAR DAN HASIL BELAJAR MATEMATIKA SISWA SMA DI INDONESIA

**Abstrak:** Penelitian ini bertujuan untuk menguji: (1) kaitan antara tingkat pendidikan orangtua sebagai indikator status sosial ekonomi (SSE) dengan hasil belajar matematika siswa, dan (2) interaksi antara tingkat pendidikan orangtua dengan intensitas keterlibatan orangtua dalam memprediksi hasil belajar matematika anak-anaknya. Sampel penelitian ini (N=2,867) dipilih secara *stratified random sampling* dari peserta Ujian Nasional di Indonesia tahun 2016 jenjang SMA. Pengambilan sampel didasarkan pada keterwakilan dan sebaran provinsi, jenis kelamin, jenis sekolah (SMA/MA atau SMK) dan status sekolah (negeri-swasta). Data dianalisis dengan menggunakan analisis parallel multiple mediator. Hasil penelitian menunjukkan: (1) pendidikan ibu memiliki peran sangat penting karena sangat berkontribusi dalam menunjang hasil belajar matematika anaknya dibandingkan pendidikan ayah, dan (2) keterlibatan ibu dalam belajar anak yang dimediasi tingkat pendidikannya berpengaruh terhadap hasil belajar matematika anaknya. Namun demikian, keterlibatan orangtua yang terlalu intens dalam kegiatan belajar anak justru berdampak kurang baik terhadap hasil belajar matematika anaknya.

**Kata Kunci:** *SSE, matematika, tingkat pendidikan orangtua, keterlibatan*

## INTRODUCTION

Socioeconomic status (SES) refers to the position of an individual or a group within the hierarchy of social structure. SES is measured using a composite of variables, often including level of education, occupation category, income, possessions and place of residence (Sirin, 2005). The focus of this study is on parents' education level as an indicator of SES, since it is known to be related to students' school achievements

(Kiadarbandsari, Madon, Hamsan, & Nouri, 2016; Soni & Kumari, 2017). This study examines the relationships between parents' education level and students' mathematics achievement among a sample of high school students in Indonesia. More specifically, this study investigates the role of parental involvement in the relationship between parents' education levels and students' mathematics achievement.

White's (1982) pioneering study provided early evidence about the influence of family SES on students' learning achievement. Since White's publication, studies in America, Canada and England have shown that socioeconomic factors substantially influence students' learning and achievement (Blanden & Gregg, 2004; Duncan & Murnane, 2011; Ferguson et al., 2007). In general, higher parental education and family income are associated with better students' achievement (Phillips, 2011; Reardon, 2011).

In an Australian study, McConney and Perry (2010) tested the correlation between SES and mathematics achievement. Using the PISA 2003 data, they found that school's SES consistently correlate with mathematics achievement across different groups of students. Students with high SES background tend to have higher mathematic achievement compared to those from low SES.

In an Asian context, a study reported by Kim et al. (2003) reveals similar findings. The higher the parents' education level is, the better the students' achievement. A study in Taiwan also found that parents' income significantly influences students' learning achievement. Students whose parents have high income also achieve better in their learning (Fu, Cheng, Tu, & Pan, 2007).

How can this phenomenon be explained? Theoretically, parents with high SES levels understand the education process and know more about how to succeed in school. They are more attentive towards their children's learning activities and progress. They are more likely to motivate their children to obtain higher academic achievement (Jones, Bradbury, & LeBoutillier, 2011). They also provide better access to books and other resources that support their children learning. Consequently, students from high SES families generally possess higher self-confidence to manage challenges of academic life (Walpole, 2003).

In contrast to students' from high SES families, those from low SES families often experience poorer socialization. Although the parents may be motivated to support their children's education and wish their children to achieve well in school, they do not have enough knowledge about how to do so effectively (Jones et al., 2011). They are often less appreciative

about academic learning, preferring their children to find secure an income as soon as possible.

Not with standing the aforementioned research findings, the authors' experience of being raised and educated in Indonesia suggests that high SES Indonesian families sometimes foster conditions that hinder children's learning. Students from such families often think there is no need to study hard in school because they believe that their needs and future livelihood is largely secure. On the contrary, students from low SES families are often more diligent compared to those from high SES families (Congeret al., 2010; Sánchez et al., 2011; Suyanto, 2001). They are strongly motivated to improve their family income and to self-support further education through scholarships.

This may partly explain why some studies on SES conducted in Indonesia have produced different findings from that of other countries. For example, parents' SES was found to have no direct impact on students' learning achievement (Rahayu, 2011), and there is no correlation between parents' education levels and income with students' learning achievement (Saniarto, 2013). These findings are interesting and provide an impetus for a more comprehensive study on this topic. Previous studies, however, were typically based on narrow sets of samples, e.g. only from a single school or district.

### **Parents' Education, Parental Involvement, and Achievement in Mathematics**

Students come from diverse family backgrounds. Each family has their own culture, which is shaped in part by the parents' level of education and wealth. This family culture is reflected in parents' perspectives about raising and educating their children. Various studies have shown that parents' education level affects their involvement in their children's learning (Cao, Bishop, & Forgasz, 2006; Kiadarbandsari et al., 2016; Slavin, 2006; Yan & Lin, 2005). Parents with higher education levels typically have higher expectations and appreciation toward their children's intellectual development and academic achievement. They often accompany their children doing homework or school assignment, give compliments to their learning initiatives, take them to bookshops, provide more learning resources and hire private tutors to enrich their children's learning.

Parental involvement can be more effective if the schools engage all parents (not only some of them) and provide information to guide choice regarding tutoring and other home learning activities (Epstein, 2010; Sheldon & Epstein, 2005). A study of a sample of Asian-American students reported by Hong and Ho (2005) found that parental involvement in general affects students' academic achievement. Parents' concern toward their children's learning raises students' motivation to improve their achievement. Other studies have also explored parental involvement in students' learning (see for example Epstein, 2010; Goodall & Montgomery, 2014; Hassan & Al-Jubari, 2016; Rabahi, Yusof, & Awang, 2015). These studies confirm previous findings by Hong and Ho (2005), but also indicate that parental involvement may differ across cultures and societies.

This may apply to the Indonesian context. The Indonesian society is composed of people from 370 ethnic and linguistic groups across 17,508 islands (Lan, 2011; Rachmawati, Pai, & Chen, 2014). This plurality maybe reflected as well in the diversity of perspectives on education. Whether there are identifiable and meaningful patterns of the interaction between parental involvement, parents' education levels, and students' academic achievement across this diversity would need to be empirically tested.

This study focuses on mathematics because it is widely regarded as a core subject in the curriculum (Retnowati & Aqilah, 2017). Mathematics is nationally tested across at the primary and secondary levels of education (Kusaeri, 2018). It is also an important part of the university selection test in Indonesia. Therefore, parents in Indonesia are often more concerned about their children's learning in mathematics compared to other subjects.

Studies in mathematics education have explored the interaction between parental involvement and achievement, but the findings have been inconsistent. A meta-analysis study by Patall, Cooper, and Robinson (2008), for example, found that there is a negative correlation between parental involvement and students' mathematics achievement. This is different from McDonnell, Cavanaugh, and Giesen's (2012) study that found a positive correlation between elementary students' mathematics achievement and parental involvement. They also found that the higher the

students' education level, the correlation between parental involvement and students' mathematics achievement become weaker.

These diverging findings provide a rationale for a more comprehensive study on the topic. Also, to the best of the authors' knowledge, previous studies on parental involvement and mathematics achievement in Indonesia were conducted on relatively small and narrow samples. In addition, those previous studies have not investigated intermediate variables which may play a role in explaining the correlation between parental involvement and students' mathematics achievement.

One of the mediator variables that may play a role in students' mathematics achievement is parents' education level. The quality of parental involvement in their children's learning is likely to be influenced by parents' education level (Kiadarbandsari et al., 2016). Parents who have studied in college can be assumed to have better mastery of subject matters taught at primary and secondary schools, compared to parents with only primary and secondary education. Parents with college degrees also tend to have broader knowledge of good learning strategies at school. In line with this, parents with higher education also tend to be more confident in guiding their children in learning.

Based on the above background and rationales, this study aims to examine: (1) the relationship between parents' education level as an indicator of SES and students' mathematics achievement, and (2) the interaction between parents' education level and the intensity of parental involvement in predicting students' mathematics achievement.

## METHODS

### Study Area

This study involved samples from 34 provinces in Indonesia: Aceh, Bali, Bangka Belitung, Banten, Bengkulu, Gorontalo, Jakarta, Jambi, West Java, Central Java, East Java, West Kalimantan, South Kalimantan, East Kalimantan, Central Kalimantan, North Kalimantan, Riau Islands, Lampung, Maluku, North Maluku, West Nusa Tenggara, East Nusa Tenggara, Papua, West Papua, Riau, West Sulawesi, Sulawesi Tenggara, Central Sulawesi, South Sulawesi, North Sulawesi, West Sumatera, South Sumatera

and North Sumatera and Special Region Yogyakarta.

### Research Design

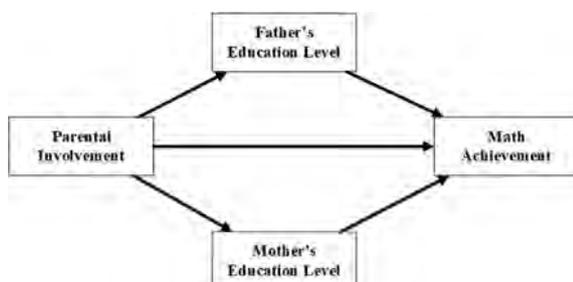
This research used parallel multiple mediator model (Hayes, 2013). The model suits the objectives because this research involves two parallel mediators namely father's education level and mother's education level. The two mediators were assumed to contribute to the degree of correlation between parental involvement and students' mathematics achievement. Figure 1 presents parallel multiple mediator models used

### Participants

The population of this study was all the test takers of NE in Indonesia in 2016 for the level of senior high school (SMA)/Islamic senior high school (Madrasah Aliyah/MA) and vocational high school (SMK). The total number of test takers in 2016 was 2,951,151 from 33,018 SMA/MA and 11,918 SMK (Kemendikbud RI, 2016).

### Sampling Design

The sample of SMA/MA and SMK students were selected using stratified random sampling technique with a thorough consideration of the representativeness and distribution of province, gender composition, type of school (general-vocational), and school status (public-private). The provinces selected for the survey include Aceh, Bangka Belitung, Special District Yogyakarta, West Java, East Java, Kalimantan, Riau Islands, Lampung, Maluku, Papua, West Sulawesi and South Sulawesi. From these provinces, 2,867 students were then selected as the final survey sample. in this research.



**Figure 1. The Interaction among the Variables**

### Research Instruments

Students' mathematics achievement score was obtained from the NE 2016 results. The NE mathematics test consists of 40 multiple choice items with 5 answer options. The same test (parallel versions of the test) was used in all senior high schools throughout Indonesia. Thus, the results can be standardized and used to compare the quality of one school to the other, or one student to the other students in different districts or provinces. The data of NE scores were obtained from the Center for Educational Assessment of the Ministry of Education and Culture (Kemendikbud RI, 2016).

Parents' education level and parental involvement were based on students' self-report through a written questionnaire. Four levels of parents' education were used: not completed primary school/no schooling, graduated from secondary school, graduated from diploma/academy and graduated from bachelor/master/doctorate degree. Parental involvement in their children's learning activities was measured using 7 items, some of which related to parental assistance to children working on their homework (3 items), parents' attention to children's learning activities (3 items), and involvement in discussions about reading materials (1 item). All the seven items consistently bring the index of parental involvement with the reliability coefficient (alpha Cronbach) of 0.79. The seven items also show high degree of validity with the range of corrected item-total correlation between 0.452 to 0.594 ( $M = 0.515$ ).

### Data Analysis

Descriptive statistics (means, standard deviation, minimum and maximum score) of the sample characteristics were computed to address this research problem. The next analysis was conducted by path analysis using M-Plus version 7 (Muthén & Muthén, 1998-2015) which is capable of handling ordinal and interval data. Because, data on mathematics achievement and intensity of parental involvement are interval, while data on father's and mother's education level are ordinal. Path analysis was utilized to measure the interaction between parents' education level and the intensity of parental involvement in predicting students' mathematics achievement.

## FINDINGS AND DISCUSSION

### Findings

#### Sample Characteristics

There were 2,867 students in the sample, consisting of 1,239 (43.2%) male and 1,628 (56.8%) female students. In terms of the school, 50% students were from SMA and the rest were from SMK with 61.8% were from public schools and 38.2% were from private schools. The distribution of the sample in each province was Aceh (1.6%), Bangka Belitung (9.8%), Special Region Yogyakarta (13.3%), West Java (1.6%), East Java (49.5%), Kalimantan (0.4%), Riau Islands (5.7%), Lampung (3.2%), Maluku (4.5%), Papua (6.4%), West Sulawesi (2.5%) and West Sumatera (1.5%).

The description of measurement result is presented in Table 1. Table 1 presents the descriptive statistics based on the overall subjects of the research, categorized into male and female subjects. Table 2 further provides preliminary information on the zero correlation (product moment correlations) among research variables. The students' mathematics achievement significantly correlates to parental involvement ( $p < 0.01$ ), fathers' education ( $p < 0.01$ ), and mother's education ( $p < 0.01$ ). Among the three variables (parental involvement, father's

education and mother's education), parental involvement variable has small correlation (0.048). The low correlation between parental involvement and students' mathematics achievement can be further confirmed in Table 4. This invites further inquiry about why parental involvement has little contribution to students' mathematics achievement

Based on the above brief description of the data and to further understand the factors that have contributed to students' mathematics achievement, each of the following sub-sections presents discussion on factors contributing to students' achievement.

### Discussion

#### Parents' Education Level and Students' Mathematics Achievement

Parents' education level is one of the main indicators of SES, a variable that is closely related to students' learning achievement. From the data it was found that there are significant interactions between parental involvement and father's education level to mathematics achievement. It means that the higher the level of father's education is, the higher the students' mathematics achievement is. This fact is consistent with a number findings of previous

**Table 1. Descriptive Statistics of the Variables**

Variable	Min	Max	Means	S.D.
Male ( $N = 1,239$ )				
Mathematics Score	7.5	100	48.8	23.42
Parental Involvement	7	21	14.05	2.87
Father's Education	1	4	2.11	0.91
Mother's Education	1	4	1.95	0.84
Female ( $N = 1,628$ )				
Mathematics Score	5	100	52.0	22.81
Parental Involvement	7	21	14.15	2.82
Father's Education	1	4	2.03	0.90
Mother's Education	1	4	1.91	0.82
Total ( $N = 2,867$ )				
Mathematics Score	5	100	50.62	23.12
Parental Involvement	7	21	14.15	2.84
Father's Education	1	4	2.07	0.91
Mother's Education	1	4	1.93	0.83

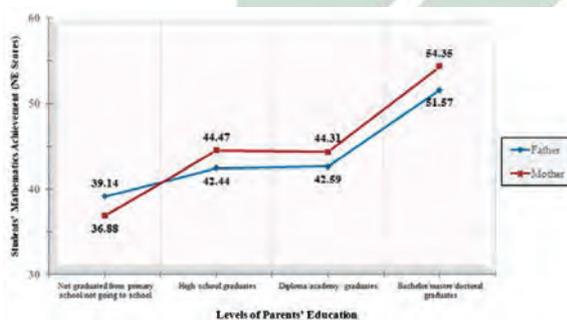
**Table 2. Means, Standard Deviations, and Correlation Among Variables**

Variables	Means	S.D.	1	2	3	4
1. Mathematics Score	50.62	23.12	1			
2. Parental Involvement	14.15	2.84	0.048*	1		
3. Father's Education	2.07	0.91	0.129*	0.143*	1	
4. Mother's Education	1.93	0.83	0.167*	0.145*	0.595*	1

\* $p < 0.01$

studies such as those conducted by Kim et al. (2003), Blanden and Gregg (2004), Ferguson, Bovaird, and Mueller (2007) and Duncan and Murnane (2011).

The significant different levels of father's education are between the groups of students whose fathers did not complete primary school/did not go to school and those with higher levels of education; and between students whose parents were undergraduate/post graduate and those from lower levels. This is indicated by the average of students' mathematics learning achievement of each father's education group as presented in Figure 2.



**Figure 2. The Differences of Average in Mathematics Achievement across Students from Different Groups of Parents' Education Level**

Fathers with high education level tend to have better jobs (Chevalier, Harmon, O'Sullivan, & Walker, 2013). Good jobs bring the implication of better income that can better support family needs, including the support for children's learning and education. This condition has an impact on fathers' ability to provide sufficient learning facilities for their children to have good learning activities. Good learning activities trigger students' learning achievement.

Fathers with higher education level also commonly invest their time to have a discussion with their children regarding what the children do and the problem they face during their day at school. This, according to Takeuchi (2018), can positively motivates students to achieve better at school. This father's indirect involvement potentially brings stronger influence toward students' mathematics achievement compared to father's direct involvement such as helping children to solve some mathematical problems (Cao et al., 2006). This finding is line with Soni and Kumari (2017) statement that the support

and motivation a father gives to his children bring positive correlation toward the children mathematics achievement.

The similar pattern is also found in the relationship between students' mathematics achievement and their mothers' education level. Students whose mothers have higher education also have better mathematics achievement. The difference of students' mathematics achievement based on mothers' education level is bigger compared to the difference based on fathers' education level. In other words, mothers' education level appears to have more roles in students' mathematics achievement in high schools in Indonesia.

Logically, a child first socializes with his/her mother, from birth until s/he goes to school. In Indonesian context, the main responsibility of a mother is to raise and educate her children (Cholifah, Degeng, & Utaya, 2016). Therefore, the mother can really determine the direction of the children's education, including children's learning activities. Compared to father, mother has more dominant and intensive communication and involvement with the children in their everyday lives. The education level of a mother can influence the way she educates the children. Therefore, a mother with lower level of education may not be able to create conducive learning atmosphere for her children. According to McNeal (2015), the involvement of mother in students' learning can influence the children's attitude and behavior which in turn affect children's learning achievement.

A mother with high education level can induce the values of education (such as self-discipline and good learning and study habit) as the core values to the children (Hymes, 1972). Self-discipline in learning does not form by itself instantly but it is developed through a long process, needs to be nurtured continuously from an early age. A mother plays a central role in this process. The stronger the discipline and the more regular the learning activities are (not only at school but also at home), the higher the students' learning achievement is.

The result of path analysis also shows that mother's education level has a bigger contribution to students' mathematics achievement compared to the contribution of father's education. The data show that the path coefficient of students' mathematics achievement is 0.145 measured

from mother's education and 0.044 from father's education. Combined with the result of analysis of mathematics achievement average, the result of this path analysis signifies the big role of mother's education in developing students' learning achievement, particularly in learning mathematics.

The dominant influence of mother's involvement toward children's mathematics achievement seems to be influenced by the family values in Indonesian cultural context. The *patriarchal* culture in Indonesia (particularly in Java) is still sustained although it may not be as strong as it is in the past. In the *patriarchal* culture, a father is the leader in the family, taking the responsibility as the bread winner, while a mother should invest more time with children and is responsible for caring and educating the children (Putri & Lestari, 2015). This condition builds a closer relationship between children and their mother compared to their father. Soni and Kumari (2017) state that a child who has a close relationship with his mother will have a positive perception. The level of closeness becomes the indicator of children's positive development and plays a role in developing children's ability in mathematics.

### The Interaction of Parental Involvement and Parents' Education Level toward Students' Mathematics Achievement

The initial description indicates that the variable of parental involvement has a small effect correlation on mathematics achievement. Data from path coefficient ( $\alpha$ ) of both variables

are 0.022 with  $p = 0.245$ . This means that parental involvement does not directly affect students' mathematics achievement. Table 3 also shows that although parental involvement is related to father's education ( $p < 0.01$ ) and mother's education ( $p < 0.01$ ), the value is relatively small. These two almost identical data in corroboration inform that there is a relationship between parents' education level and parental involvement and students' mathematics achievement although the relationship is indirect. Mother's education level, although it is small in scale, has a higher contribution to parental involvement compared to father's education level.

Table 3 highlights that the three variables (parental involvement, mother's education and father's education) have positive regression coefficient of 0.048, 0.129 and 0.167 consecutively. To further explore the interaction between parental involvement and parents' education level, path analysis was used to place the variable of parents' education level (both father and mother) as the mediator. The result of the analysis shows that (a) in the indirect path of parental involvement mediated by father's education, its interaction with students' mathematics achievement is not significant ( $\alpha = 0.006$  and  $p = 0.06 > 0.05$ ); and (b) in the indirect path of parental involvement mediated by mother's, there is a significant interaction with students' mathematics achievement ( $\alpha = 0.020$  and  $p = 0.00 < 0.01$ ).

Table 4 shows the effect of father's education level and mother's education level toward students' mathematic achievement.

**Table 3. Multiple Regression Results**

Outcome	Predictor	Regression coefficients (S.E)	Path coefficients (S.E)
Mathematics Score	Parental Involvement	0.048**(0.152)	0.022 (0.019)
	Father's Education	0.129**(0.473)	0.045 (0.023)
	Mother's Education	0.167**(0.513)	0.138** (0.023)
Father's Education	Parental Involvement	0.143** (0.006)	0.143** (0.018)
Mother's Education	Parental Involvement	0.145** (0.005)	0.145** (0.018)

\* $p < 0.05$ , \*\* $p < 0.01$

**Table 4. Direct and Indirect Effects of Parental Involvement towards Students' Mathematics Score**

Path	Effect(S.E)
Parental Involvement → Mathematics Score	0.022 (0.019)
Parental Involvement → Father's Education → Mathematics Score	0.006 (0.003)
Parental Involvement → Mother's Education → Mathematics Score	0.020** (0.004)
Total	0.049*(0.019)

Moderator: *Father's Education and Mother's Education*

\* $p < 0.05$  \*\* $p < 0.01$

The data show that mother's involvement in the process of the children's mathematics learning brings stronger effect toward children's mathematic achievement compared to father's involvement. The results show that mothers' involvement in children's learning and their education level affect the children's mathematics achievement. These results are consistent with Hymes' (1972) and McNeal' (2015) findings that mothers' involvement greatly influences children's attitudes and behaviors. Mothers who have a higher education level will always monitor and direct their children to regularly study and do the tasks well. These attitudes and habits will indirectly affect the children's learning achievement. Mothers' with higher education level tend to have an authoritative involvement in educating their children (Grolnick, 2016).

Further analysis on the nature of parental involvement found a different pattern between one form of involvement from the other toward the achievement of learning mathematics. It was done by comparing the mathematics achievement between groups of students on each item of involvement, such as discussing the reading, asking what the children learn, helping the children to do the school tasks, asking the children about the school events, and checking and reminding the children about their homework.

In the first form of involvement, students whose parents discuss their reading every day have mathematics achievement with five points higher than students whose parents have never done so. Activities of discussing reading at a moderate level (indicated by 'sometimes' option in the questionnaire), also have a positive impact on students' mathematics achievement, a drift of about 3 points compared to the points of students whose parents never do such activities.

Parents who want to be engaged and often discuss about the subject matters with their children commonly have the knowledge related to the material being discussed Takeuchi (2018). In addition, the frequency of discussion about subject matters other matters between the parents and the children indicates the harmonious communication within the family. With the provision of harmonious communication, parents can know the difficulties of their children so as to lead their children to achieve better in their learning.

In contrast, high involvement (marked by a statement of 'every day' in the questionnaire) in some forms of involvement is in fact associated with a low achievement. For example, students who are assisted by their parents in doing their school tasks everyday tend to have lower learning achievement (about 4 points) than other students. Students whose parents regularly ask about what is learned at school also tend to have lower mathematics achievement (about 5 points) than those whose parents only occasionally check. In addition, students whose parents ask questions about what is happening at schools everyday tend to get a lower mathematics achievement (about 2 points lower) than students whose parents never do.

The above issue happens because parents who continually want to be involved in providing assistance to their children cause the lack of independence in children. It can also cause the children to feel depressed and unable to freely express and expend all the potentials they have to support the attainment of optimal learning achievement. What the children need is involvement within a reasonable threshold, such as by providing direction and role models to the children about the importance of learning, and by always building a harmonious relationship within the family. Thus, this can create a comfortable home atmosphere for children. Such atmosphere can encourage the children to be more enthusiastic in learning.

Another form of involvement is checking homework. Even the moderate-level involvement has a negative impact on students' mathematics achievement. Students whose parents sometimes or daily check the homework have a lower mathematics achievement than those whose parents never do the checking. On the other hand, parents who constantly remind their children to do homework also negatively affect their children's mathematics achievement. Students whose parents remind them to do homework each day has 4 points lower in their mathematics achievement compared students whose parents never give such a reminder (Clinton & Hattie, 2013).

Overall, the role of parental involvement in children's learning activities does not support the initial predictions. In some indicators, parental involvement is linked to students' lower mathematics achievement. It is indicated that too

intense involvement even brings a bad impact on students' mathematics achievement. Why does this pattern happen? There are at least two possible explanations for this situation.

First, the pattern may reflect a lack of parents' ability to facilitate high-school-age children's learning activities. Therefore, the way parents help with the assignments, check the homework, and pay attention to learning activities are not effective and even bring bad effect if these are done too often. Second, parental involvement reflects their perception about their children's abilities. Parents who feel their children are not ready for the exam will be urged to motivate and remind their children, check their children's homework and help them with the assignments (Kompas, 2011; Sugito, 1994). This behavior appears as a form of parents' anxiety in seeing their children's lack of readiness for the exam.

It is possible that students whose parents are engaged intensively are students who have low readiness and/or low ability to face a test like the NE. However, because parents do not have sufficient ability to help, their involvement is ineffective or even negative. This emphasizes the importance of parents' knowledge and education in assisting their children and engaging in the learning activities (Wilder, 2014).

## CONCLUSION

Corroborating previous studies, the findings of this study highlight the importance of parents' education level for students' academic achievement. More specifically, this study indicates that mothers' education level has a more central position in students' mathematics achievement, more so than fathers' education level. Furthermore, the relations between mother's involvement and students' achievement was found to be mediated by mothers' level of education, further underscoring the important role of mothers' education level. Additional analysis suggests that some forms of parental involvement are more beneficial than others, and that the relationship between parental involvement and achievement may not be linear.

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## REFERENCES

- Blanden, J., & Gregg, P. (2004). Family income and educational attainment: A review of approaches and evidence for Britain. *Oxford Review of Economic Policy*, 20(2), 245-263. doi:10.1093/oxrep/grh014
- Cao, Z., Bishop, A., & Forgasz, H. (2006). Perceived parental influence on mathematics learning: A comparison among students in China and Australia. *Educational Studies in Mathematics*, 64(1), 85-106. doi:10.1007/s10649-006-9033-5.
- Chevalier, A., Harmon, C., O'Sullivan, V., & Walker, I. (2013). The impact of parental income and education on the schooling of their children. *IZA Journal of Labor Economics*, 2(1), 1-22. doi:10.1186/2193-8997-2-8
- Cholifah, T. N., Degeng, I. N. S., & Utaya, S. (2016). Pengaruh latar belakang tingkat pendidikan orangtua dan gaya belajar terhadap hasil belajar siswa pada kelas IV SDN Kecamatan Sananwetan Kota Blitar. *Jurnal Pendidikan: Teori, Penelitian*, 1(3), 486-91.
- Clinton, J., & Hattie, J. (2013). New Zealand students' perceptions of parental involvement in learning and schooling. *Asia Pacific Journal of Education*, 33(3), 324-337. doi:10.1080/02188791.2013.786679
- Conger, R. D., Conger, K. J., & Martin, M. J. (2010). Socioeconomic status, family processes, and individual development. *Journal of Marriage and Family*, 72(3): 685-704. doi: 10.1111/j.1741-3737.2010.00725.x
- Duncan, G. J., & Murnane, R. J. (2011). *Whither opportunity? Rising inequality, schools,*

- and children's life chances. New York, NY: Russell Sage Foundation.
- Epstein, J. L. (2010). School/Family/Community partnerships: Caring for the children we share. *Phi Delta Kappan*, 92(3), 81-96. doi:10.1177/003172171009200326.
- Ferguson, H. B., Bovaird, S., & Mueller, M. P. (2007). The impact of poverty on educational outcomes for children. *Paediatrics & Child Health*, 12(8), 701-706.
- Fu, M. L., Cheng, L., Tu, S. H., & Pan, W. H. (2007). Association between unhealthful eating patterns and unfavorable overall school performance in children. *Journal of the American Dietetic Association*, 107(11), 1935-1943. doi:10.1016/j.jada.2007.08.010
- Goodall, J., & Montgomery, C. (2014). Parental involvement to parental engagement: a continuum. *Educational Review*, 66(4), 399-410. doi:10.1080/00131911.2013.781576
- Grolnick, W. S. (2016). Parental involvement and children's academic motivation and achievement. In W. C. Liu, J. C. K. Wang, & R. M. Ryan (Eds.), *Building autonomous learners: Perspectives from research and practice using self-determination theory* (pp. 169-183). Singapore: Springer.
- Hassan, A., & Al-Jubari, I. (2016). Motivation and study engagement: A study of muslim undergraduates in Malaysia. *Pertanika Journal of Social Sciences & Humanities*, 24(3), 937 - 951.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: The Guilford Press.
- Hong, S., & Ho, H.-Z. (2005). Direct and indirect longitudinal effects of parental involvement on student achievement: Second-order latent growth modeling across ethnic groups. *Journal of Educational Psychology*, 97(1), 32-42. doi:10.1037/0022-0663.97.1.32
- Hymes, D. H. (1972). On communicative competence. In J. B. Pride & J. Holmes (Eds.), *Sociolinguistics: Selected readings* (pp. 269-293). Harmondsworth, UK: Penguin Books.
- Jones, P., Bradbury, L., & LeBoutillier, S. (2011). *Introducing social theory* (2nd ed.). Cambridge, UK: Polity Press.
- Kemendikbud RI. (2016). *Laporan hasil ujian nasional tahun 2016*. Jakarta, Indonesia: Pusat Penilaian Pendidikan Badan Penelitian dan Pengembangan.
- Kiadarbandsari, A., Madon, Z., Hamsan, H. H., & Nouri, K. M. (2016). Role of parenting style and parents' education in positive youth development of adolescents. *Pertanika Journal of Social Sciences & Humanities*, 24(4), 1465-1480.
- Kim, H.-Y. P., Frongillo, E. A., Han, S.-S., Oh, S.-Y., Kim, W.-K., Jang, Y.-A., . . . Kim, S.-H. (2003). Academic performance of Korean children is associated with dietary behaviours and physical status. *Asia Pacific Journal of Clinical Nutrition*, 12(2), 186-192.
- Kompas (2011). Orangtua kok mengerjakan PR Anak? Retrieve from <https://nasional.kompas.com/read/2011/01/20/11461571/quotlhoquot.orangtua.kok.mengerjakan.pr.anak.tanggal.25.Oktober.2018>.
- Kusaeri, K. (2018). The Portrait of Madrasah Aliyah In Indonesia: a critical evaluation of the Mathematics Score in the National Examination. *Journal of Physics: Conference Series* (pp. 1-7). IOP Publishing.
- Lan, T. J. (2011). Heterogeneity, politics of ethnicity, and multiculturalism: What is a viable framework for Indonesia? *Wacana*, 13(2), 279—292.

- McConney, A., & Perry, L. B. (2010). Socioeconomic status, self-efficacy, and mathematics achievement in Australia: A secondary analysis. *Educational Research for Policy and Practice*, 9(2), 77-91. doi:10.1007/s10671-010-9083-4
- McDonnall, M. C., Cavanaugh, B. S., & Giesen, J. M. (2012). The relationship between parental involvement and mathematics achievement for students with visual impairments. *The Journal of Special Education*, 45(4), 204 –215. doi:10.1177/0022466910365169
- McNeal, R. B. (2015). Parent involvement and student performance: The influence of school context. *Educational Research for Policy and Practice*, 14(2), 153-167. doi:10.1007/s10671-014-9167-7
- Muthén, L. K., & Muthén, B. O. (1998-2015). *Mplus user's guide* (7 ed.). Los Angeles, CA: Muthén & Muthén.
- Patall, E. A., Cooper, H., & Robinson, J. C. (2008). Parent involvement in homework: A research synthesis. *Review of Educational Research*, 78(4), 1039-1101. doi:10.3102/0034654308325185
- Putri, D. P. K., & Lestari, S. (2015). Pembagian peran dalam rumah tangga pada pasangan suami istri Jawa. *Jurnal Penelitian Humaniora*, 16(1), 72-85. doi:10.23917/humaniora.v16i1.1523
- Rabahi, M., Yusof, H., & Awang, M. (2015). Leading learning: A grounded theory perspective of orang asli parental involvement and engagement. *Procedia - Social and Behavioral Sciences*, 211, 94-103. doi:10.1016/j.sbspro.2015.11.015
- Rachmawati, Y., Pai, Y.-F., & Chen, H.-H. (2014). The necessity of multicultural education in Indonesia. *International Journal of Education and Research*, 2(10), 318-328.
- Rahayu, W. P. (2011). Analisis intensitas pendidikan oleh orang tua dalam kegiatan belajar anak, status sosial ekonomi orang tua terhadap motivasi belajar dan prestasi belajar siswa. *Jurnal Pendidikan dan Pembelajaran*, 18(1), 72-80.
- Retnowati, E. dan Aqiilah (2017). Efektivitas strategi pengelompokan berpasangan dalam pembelajaran matematika Model CORE. *Cakrawala Pendidikan*, 36(1), 13-23.
- Sánchez, F.J, Liu, W.M., Leathers, L. Goins, J. and Vilain, E. (2011). The Subjective Experience of Social Class and Upward Mobility Among African American Men in Graduate School. *Psychology of Men & Masculinity*, 12(4): 368–382. doi:10.1037/a0024057.
- Saniarto, F. (2013). *Pola makan, status sosial ekonomi keluarga dan prestasi belajar pada anak stunting usia 9-12 tahun di Kemijen Semarang Timur*. Semarang, Indonesia: Universitas Diponegoro.
- Sheldon, S. B., & Epstein, J. L. (2005). Involvement counts: Family and community partnerships and mathematics achievement. *The Journal of Educational Research*, 98(4), 196-207. doi:10.3200/JOER.98.4.196-207
- Sirin, S. R. (2005). Socioeconomic status and academic achievement: A meta-analytic review of research. *Review of Educational Research*, 75(3), 417-453. doi:10.3102/00346543075003417
- Slavin, R. E. (2006). *Educational psychology: Theory and practice* (8<sup>th</sup> ed.). Boston, MA: Pearson, Allyn and Bacon.
- Soni, A., & Kumari, S. (2017). The role of parental math anxiety and math attitude in their children's math achievement. *International Journal of Science and Mathematics Education*, 15(2), 331-347. doi:10.1007/s10763-015-9687-5
- Sugito, S. (1994). Interaksi dalam keluarga sebagai dasar pengembangan kepribadian anak. *Cakrawala Pendidikan*, 13(2), 49-58.

- Suyanto, B. (2001). Kemiskinan dan pemberdayaan masyarakat miskin, *Masyarakat, Kebudayaan dan Politik*, 14(4), 25-42.
- Takeuchi, M. A. (2018). Power and identity in immigrant parents' involvement in early years mathematics learning. *Educational Studies in Mathematics*, 97(1), 39-53. doi:10.1007/s10649-017-9781-4
- Walpole, M. (2003). Socioeconomic status and college: How SES affects college experiences and outcomes. *The Review of Higher Education*, 27(1), 45-73. doi:10.1353/rhe.2003.0044
- Wilder, S. (2014). Effects of parental involvement on academic achievement: a meta-synthesis. *Educational Review*, 66(3), 377-397. doi:10.1080/00131911.2013.780009
- Yan, W., & Lin, Q. (2005). Parent involvement and mathematics achievement: Contrast across racial and ethnic groups. *The Journal of Educational Research*, 99(2), 116-127. doi:10.3200/JOER.99.2.116

