

The Effect of Family Environment on Children Intelligence

Keye Yu

Yiwu High School, Yiwu, Zhejiang 322000, China
**Corresponding author. Email: ceciliayu0524@qq.com*

ABSTRACT

The external effect on intelligence has been frequently reported, so the effect of family environment on children intelligence is worth studying. This paper will discuss three sections of the family environment and show that the family situation, children attachment and family SES are partly associated with children cognitive abilities. The effect of the family situation on intelligence is inconsistent in different regions, which needs further research with a larger sample and controlled variables. For attachment styles, the present studies show the securely attached children have better cognitive abilities, but few direct relationship about IQ has been founded and comparison between different insecure attached children is lack. Besides, family SES and children's IQ are positively correlated, acting as a mediating role but still with some limitations like bidirectional relationship. Briefly, suitable family situation, secure attachment and high family SES may improve children intelligence. However, the future research needs to alleviate the uncertainties and control more relevant factors to offer a more clear method for parents and the government to create an expectable living environment for children.

Keywords: *Children intelligence, family situation, children attachment, family socioeconomic status*

1. INTRODUCTION

The family environment plays an essential role in every child's early life, affecting their further development deeply. The effect of family environment on emotional intelligence has been studied by researchers but the effect of the external environment on intelligence is always underestimated by the public. Intelligence involves a lot of cognitive activities (e.g. reasoning, imagination) which are tightly associated with the early family environment. Therefore, there may be an underlying relationship between the intelligence and family environment. This article analyzes the influence exerted by three aspects of family environment on intelligence. First is the effect of the family situation, comparing the intelligence of children brought up in different family structures and by sexual minority parents. The second part of the paper shows how four attachment styles (secure, anxious-ambivalent, anxious-avoidant, and disorganized) in the childhood influence intelligence, interacting with early school experience, such as bullying. Then the author discusses the effect of family socioeconomic status on intelligence, through nutrition and breastfeeding, family poverty, and its mediating effect. The relationship between family environment and intelligence is worth studying and more researches should be conducted in these fields, to reveal more factors associated with children intelligence. Knowing the relation between family environment and intelligence provides a clear perspective for parents to make an informed decision about creating a suitable environment and keeping careful to look after their

children, which could alleviate the brain impairment and intelligence degradation. The government and school could also design some relevant policies to help children improve their intelligence and keep them away from bias.

2. ANALYSIS ON THE IMPACT OF FAMILY SITUATION

2.1. Family Structure

In this article family structure mainly focuses on the family size and family composition, and both of them may be closely associated with children intelligence because children living in different family sizes and family composition may receive different levels of stimulation and care. The research about the family martial structure (polygamy vs monogamy) and the intelligence level of the adolescents among Bedouin Arabs in Israel has been conducted. The study chose 210 students from Grade 7 to 12, and by using Raven's Progressive Matrices (RPM) test, the researchers examined the relationship between family structure and IQ by testing for differences in RPM [1]. The result showed that there were no significant test score differences between teenagers from polygamous and monogamous families, while adolescents from two-mothers families represented lower scores than those from three or four mothers' families (Shown in figure 1). However, the relationship between adolescents from two mothers family and other families is not so robust, it may be due to other

factors such as lower education of fathers in families. Therefore, in general, the polygamous family has no deleterious effects on their children intelligence. However, the study only discussed the polygamous and monogamous families which are only two categories of family structure and also the adolescents in certain regions. Little research

has been conducted about other kinds of families, such as single-parents families, nuclear families. The evidence for infancy and kids is also scarce, thus more researches should be conducted on a wider range of samples, among different ages, of different family structures, and in different regions.

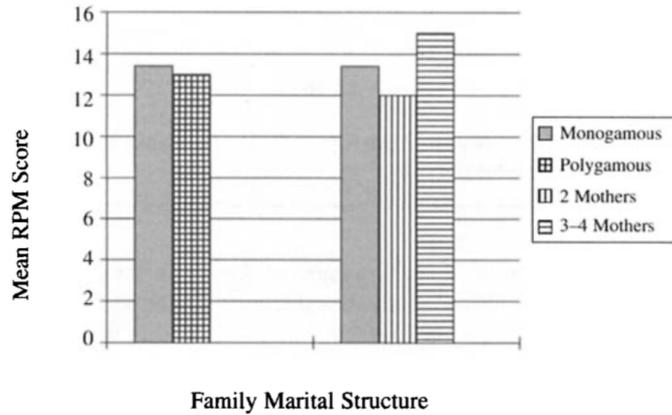


Figure 1. Raven’s Progressive Matrices (RPM) test score, by family marital structure and number of mothers

Besides, some studies have represented that the intelligence of children is influenced by family size and birth order. The resource dilution model shows that parents’ material resources, attention, and energy are limited, so more children in one family means each kid will receive less attention [2]. The higher-order children could consequently suffer from relatively insufficient resources in family and therefore gain lower intelligence and other cognitive abilities. In contrast, the admixture hypothesis suggests that probably the less intelligent parents tend to have a large-sized family, a larger number of children [3]. In such a case, the negative correlation is between parental intelligence and the number of children, creating the relationship between children intelligence and their birth order. In this hypothesis, parents with lower intelligence are more likely to have more children, which creates the relationship between children intelligence and their birth order. Whether the family size and birth-order have effect on children intelligence have been debated widely for a long time. However, until now the results in different researches are still inconsistent. The factors that lead to lower intelligence of high-birth children in the large family remain unclear.

2.2. Sexual Minority Parents

LGBTQ is short for lesbian, gay, bisexual, transgender, and queer identities. Although in some countries, particularly the western developed countries, the acceptance by the public to LGBTQ groups have been increased gradually and the laws have been designed to ensure their rights, social pressure, bias, and prejudices. For example, in China, attitudes towards LGBTQ groups are still severe. The media often report “homosexuality” as a disease and also encourage anti-LGBTQ regulation. What is worse, these groups are labeled as AIDS patients. Under such

circumstances, if lesbian and gay adults in China tend to adopt children and raise them in their family, the influence exerted by lesbian or gay families on their children’s intelligence is worthy of studying. This paper wants to represent a hypothesis that children brought up in the LGBTQ family may tend to show lower intelligence levels due to childhood experience. The children in the LGBTQ family may suffer from more pressure in the society, and in school and are probably bullied by other students, which may damage the cognitive abilities of children, particularly in some developing countries where the stereotype that LGBTQ groups should be discriminated against is commonly known. The research has represented that the children who are bullied in the school show lower level in an intelligence test [4]. However, there is lack of researches to show the accurate relationship between the LGBTQ family and the intelligence level of their adopted children, especially studies conducted in bisexual family, transgender family and queer family, partly because of the policy restrictions and ethical issues arising from this kind of study. Also, in some western countries where LGBTQ groups have been accepted widely, lots of studies pointed out that there is no significant difference between the children raised by lesbian and gay parents and those in heterosexual families through investigating their school experience and observing their development. In different countries, the situation for LGBTQ groups and their children are varying. The children who grow up in the LGBTQ family may be less intelligent than others in heterosexual families if they become bullying victims in their schools, which depends on the social acceptance of this group. Whether or not there is an underlying relationship between children intelligence level and their sexual minority parents, the law should be reformed to protect the minority from discrimination, prejudice, and bullying.

3. ANALYSIS ON THE IMPACT OF CHILDREN ATTACHMENT PATTERNS

3.1. Attachment theory

Attachment is the emotional bond that connects the infants with caregivers, which causes a lifelong effect on the kids. The attachment theory has been come up with by John Bowlby in 1969. The term defined as attachment pattern is the internalized pattern of children behaviors when they seek for proximity to an attachment figure. Four patterns are categorized, represented as secure attachment, anxious-ambivalent attachment, anxious-avoidant attachment, and disorganized attachment. The sign of securely attached children is missing the mother when she leaves and makes effort to reunite with mother when she returns. For those children in anxious-ambivalent attachment to the mother, they miss the mother but do not become calm when she returns. Children in the anxious-avoidant attachment show few or no signs of missing mother and even they ignore and avoid actively when parents return. In the last pattern, this kind of child has no consistent behavioral pattern.

3.2. Relationship Between Attachment and Intelligence

The child will become securely attached if the mother is responsive to the needs of the child, and this attachment style could facilitate the cognitive development of the kids, including intelligence. The research has been conducted about a longitudinal study about the quality of children attachment in infancy and their intelligence level in kindergarten. The sample was 77 Dutch children of average 24 months old from the upper class. The study used a strange situation to measure attachment quality at 24 months and Leiden Diagnostic Test to measure IQ 5 years ago. The researchers found the children with secure attachment present the higher intelligence level, and the quality of attachment in the second year of life seems to have profound influence on children later cognitive development [5]. However, the limitations is that this study is lack of wide generalization due to the limited sample size: the number of participants, the small age ranges, and similar SES. Besides, infants may become insecurely ambivalent and avoidant if the caregivers do not respond in time to their children's needs. Research has discussed the infants in different ages and show children with insecure attachment patterns at 15 months, and those with avoidant attachment at 36 months had no obvious difference in IQ; but those with ambivalent patterns at 36 months represented lower level of intelligence in the middle childhood. It also discussed several mediators for infants with disorganized patterns, which are low quality of assistance from mothers, school corporations, and greater likability by peers, but no unique ones for those with ambivalent attachment patterns [6].

Although the association between attachment quality and later cognitive abilities is supported by a wider range of studies, the results in different researches, particularly about the children intelligence, are not consistent. Some researches point out that the influence of the children attachment styles is not significant in intelligence. The research about the attachment, intelligence, and academic achievement has been conducted, the sample of which was 24 boys and 26 girls from 8 to 12 years old in the middle, upper-class families. Friend and Family Interview (FFI) is applied to measure attachment pattern and Reynolds Intellectual Assessment Scales (RIAS) is used to test general intelligence and its components, fluid and crystallized intelligence. The result indicated that securely attached children groups obtained higher crystallized intelligence than those children with anxious-avoidant attachment pattern. However, no significantly difference was founded between children in different attachment patterns and overall intelligence level, and no differences could be found in the strength of the relationship between attachment styles and fluid IQ and crystallized IQ [7].

More studies in the future need to be conducted, which should also take other factors into consideration. The first one is the role of the father. Most research has focused on attachment to children's mothers because mother used to be the main caregiver, but an increasing number of mothers have the opportunity to work full-time in recent years and fathers need to adopt caring behaviors more frequently. Second factor is the emotional interventions after the critical period for developing an attachment with parents influence intelligence. Next is the strange environment where research ask the insecurely attached children to participate in IQ test, the increased anxiety, and fear levels may also exert an effect. Lastly, the reciprocal relation between children attachment and their cognitive abilities are also important.

4. ANALYSIS ON THE IMPACT OF FAMILY SOCIOECONOMIC STATUS (SES)

In children's early years, the family SES limits their living condition in various aspects, which could influence their cognitive development considerably. This paper will discuss several reasons why SES influence children development, including the nutrition and breastfeeding, family poverty and mediating effect.

4.1. Nutrition and Breastfeeding

Sufficient nutrition and environment stimulation play essential roles in children brain development at an early age. However, in the low SES family, enough nutrition and environment stimulation cannot be guaranteed. Infants in low SES family are always suffering from famine and isolation and receiving less frequent breastfeeding, which possibly leads to nutrient deficiency and the damage in

intelligence level. The research involved the school-age children who suffered from severe acute malnutrition and those who receive sufficient nutrition. The result generally showed that the malnourished children had lower intelligence level, as well as other cognitive abilities like reading and language [8]. However, most studies have not investigated the long-term outcome in malnourished kids and the possibility for them to recover if they receive enough certain supplementation later. Also, the exact period when the nutrition deficiency deteriorates intelligence level most severely has not been found yet.

Breastfeeding has been shown as an efficient way to improve infants' brain development, providing ample nutrition, and also promoting the mother-infant attachment. The positive correlation may be explained in the composition of breast milk, such as DHA, and enhanced infant attachment. The micro-elements in breast milk may provide nourished substance to brain and promote intelligence. Moreover, the infants could be fostered with secure attachment [9], with the help of breastfeeding experience. Linking the family SES and breastfeeding, in high SES families, mothers may get a better understanding of the benefits in breastfeeding, and also the level of family SES and education is associated with the duration of breastfeeding. However, the evidence about the breastfeeding and family SES is little. Additionally, the causal effect of breastfeeding intelligence also needs to be taken into consideration although the promoting effect is widely accepted.

4.2. Family Poverty

Poverty is the prominent characteristics in low SES family, the relationship between family poverty and intelligence are still not clear yet. Poverty could increase the stress level in families and also deteriorate the education condition for children, leading to the deficiency of learning. In impoverished areas, the stress and anxiety caused by

poverty exacerbate children's learning behavior, increasing the possibility of suffering from the learning disorder, which could be represented in hyperactivity, memory impairment, and social maladjustment [10]. The increased levels of stress and anxiety also come from the bully and discrimination experience due to the poor family background. Handling this kind of complicated thing for kids is challenging and also it exerts a terrible effect on brain development.

Poverty in the family also leads to an inferior physical environment for children to develop their intelligence. Those children who live in rural areas are more likely to suffer from diseases, due to the poor environment (e.g. toxin exposure, unhealthy food and unclear water source). The poisons may damage the nerves in the human brain and influence brain development negatively. However, a majority of low SES families, could neither provide advanced equipment for kids to study nor the basic needs could be guaranteed, at least by state. The government always aims to improve the basic infrastructure in rural areas, particularly in developed countries so as to ensure every citizen could lead a healthy life.

4.3. Mediating Effect

Gene-environment interaction has debated for so many years and nowadays, it is still a worthy-exploring topic. The findings in research show the children in high SES families get higher scores in IQ test than those who come from low SES families. Therefore, family socioeconomic status may exert a mediating effect on children intelligence that was thought to be dominated by genes.

Research tested a model for moderated mediation to illustrate the effect of family SES on children intelligence (See figure 2). The figure shows the final children intelligence outcome is the product of parental IQ and parental SES.

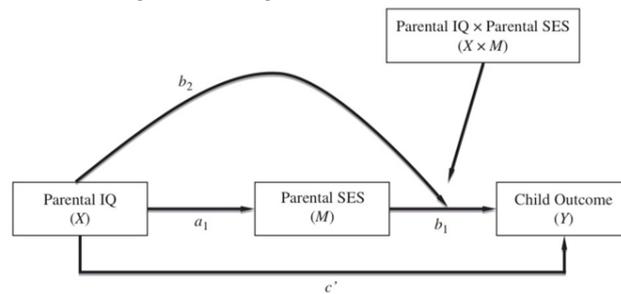


Figure 2. Conceptual moderated mediation model in which the independent variable moderates the mediated path

The result in research has proved that family SES is an essential factor in children early cognitive development. The improvement in family SES or environment could exert a positive effect on children IQ which is also tightly associated with their parental intelligence. The result also represented the degree of the effect in different maternal cognitive abilities, revealing that the stronger mediating effect of family SES would be seen in children whose

mothers have low cognitive abilities but the weak effect in those raised by high IQ mothers [11]. However, this research only focused on maternal cognitive abilities but ignore the impact on intelligence from father, and children gender differences.

The present researches about family SES and children intelligence still have a lot of limitations. The genetic effect and family SES effect are always involved, which increases

the uncertainties. The relationship between whether the low IQ mothers are more likely to have low family SES is discussed and the bidirectional relationship between family SES and parental intelligence may exist. Besides, when attempting to control the genetic effect, whether the children IQ reaches their parental level (genetic level) cannot be ensured.

5. CONCLUSION

Children intelligence is always one of the most important things that parents concern about, so when the parental cognitive levels are fixed, figuring out the effect of family environment on children IQ development becomes crucial and cannot be neglected. Several research in family environment and intelligence, including family situation, children attachment and family SES has been conducted, showing the potential relationship between them. General view held is that suitable family structure (e.g. family provides sufficient attention), secure attachment and high family SES improve children intelligence development. However, the results shown in different studies are inconsistent, probably because of ignoring some other factors, such as different regions, genetic effect, bidirectional relationship and biased measurement scale. Future studies should take more influencing factors into consideration, using unbiased measurement, analyzing bidirectional effect and trying to separate the genetic effect and environmental effect. Addressing these limitations could provide more clear results and also offer suggestions for parents and government to intervene and create a most expectable environment for children to develop their intelligence in an early age.

ACKNOWLEDGMENT

Thank for Professor Denez Szucs and TA Susan Zuo teaching me about relevant knowledge so I could have the ability to write this paper. Besides, sincere gratitude for Academic Paper writing teacher Jane, who helped me to choose the paper topic and organize the paper outline. Owing to all of your help, I could finish my writing successfully.

REFERENCES

- [1] Elbedour, Salman, W. M. Bart, and J. Hektner. "Intelligence and family marital structure: the case of adolescents from monogamous and polygamous families among Bedouin Arabs in Israel" *J Soc Psychol* 143.1(2003):95-110.
- [2] J. Blake, "Family size and the quality of children." *Demography* vol. 18,4 (1981): 421-42.
- [3] Page, Ellis B., and Gary M. Grandon, "Family configuration and mental ability: Two theories contrasted with US data." *American Educational Research Journal* 16.3 (1979): 257-272.
- [4] T. L. Liu, et al. "Relationships of bullying involvement with intelligence, attention, and executive function in children and adolescents with attention-deficit/hyperactivity disorder." *Research in Developmental Disabilities* 70(2017):59-66.
- [5] Ijzendoorn, Marinus H. Van, and S. V. Vliet-Visser, "The relationship between quality of attachment in infancy and IQ in kindergarten", *The Journal of Genetic Psychology* 149.1(1988):23-28.
- [6] K. West, Katara, B. L. Mathews, and K. A. Kerns, "Mother-child attachment and cognitive performance in middle childhood: An examination of mediating mechanisms", *Early Childhood Research Quarterly* 28.2(2013):259-270.
- [7] Wacha, Victoria Helen, "Attachment patterns relationship to intelligence and academic achievement in school-age children" (2010).
- [8] Sally, Grantham McGregor, "A review of studies of the effect of severe malnutrition on mental development", *Journal of Nutrition suppl* 8:2233S.
- [9] J. R. Britton, H. L. Britton, and V. Gronwaldt, "Breastfeeding, Sensitivity, and Attachment", *Pediatrics* 118.5(2006):e1436.
- [10] Bigelow, J. Brian, "There's an Elephant in the Room: The Impact of Early Poverty and Neglect on Intelligence and Common Learning Disorders in Children, Adolescents, and Their Parents", *Developmental Disabilities Bulletin* 34 (2006): 177-215.
- [11] Torres, D. Diego. "Understanding how family socioeconomic status mediates the maternal intelligence-child cognitive outcomes relationship: a moderated mediation analysis", *Biodemography Soc Biol* 59.2(2013):157-177.