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Analysis on Biological and Environmental Factors in Child Development: A Study Based on My Virtual Life Stimulation

Jialin Yu

Ontario Institute of Studies in Education, University of Toronto, Toronto, Canada
lynnyjl@outlook.com

Abstract: *Biological factors (nature) and environmental contexts (nurture) affect child's physical and behavioral maturation. While some early researchers hold their belief of this as an either-or relationship, a large number of developmentalists nowadays believe in an interactionist model that admit joint influences of both. The purpose of this study is to survey how human development determine by genetic and cultural factors, and which factor is a greater determinant in child's maturation process. This study is based on Pearson's online child stimulation program My Virtual Life that allows researchers to raise and observe a virtual child from birth to 18 years old. By analyzing from four different standpoints, the results demonstrate a reciprocal relationship among biological, environmental and parental aspects; suggest that parents should consider genetic factors, environmental interactions, and children's interest while adjusting their parenting styles.*

Keywords: *Child Development, Child, Biological & Environmental Influences*

1. Introduction

Biological factors and environmental contexts, which are interrelated, affect both physical and behavioral maturation (Schmitz et al., 1994). Pearson's online child stimulation program My Virtual Life (MVL) allows researchers to raise a virtual child from birth to 18 years old and observe the impact of parenting choices on the child's development over time. In other words, interaction of environmental and genetic factors can be monitored to determine child's developmental outcomes through the stimulation process. How does human development determine by nature and nurture factors? In this paper, I will answer this question by introducing the virtual child I raised in My Virtual Life program, discuss some specific characteristics of my child in different life stages, and analyze how these features are influenced by genes, environments, and personal engagements. In addition, I will share some of my parenting decisions and inspect the child's changes in characteristics from birth to 18 years.

2. Introduction of My Virtual Child

Aini, meaning "love you" in Chinese, is my virtual child who "inherits" my dark hair, brown eyes, and neutral skin tone.

Aini is outgoing, friendly, and easy to get along well with others. At school, she is a straight-A student who is cooperative and obedient to the rules; at home, she is a good sister who always takes care of her little brother Isaac and a good daughter who helps with house chores constantly. Moreover, Aini is independent and self-reliant, usually adapts well to new situations, and is able to bounce back quickly at the times if she gets upset. From the characteristics above, I would determine her personality type as the resilient category.

Many researchers have argued that personality is reliably associated with academic performance in primary education (Poropat, 2014). Not surprising, Aini has scored above average in language comprehension and vocabulary since early childhood and has shown strong verbal ability and writing skills since grade 7. In the SAT test, she scored in the top 5-10% on all verbal subtests. At age 8, Aini's interest and talent in math have suddenly improved, although she didn't have as much interest as in literacy, she scored top 15% on all math and science tests in SAT.

As for Aini's interests and cognitive ability, she showed demonstrated strength in music and arts since

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5th grade, becoming the lead violinist in the school orchestra and win an award for "leadership in musical performance" with her hard work; at the same time, her paintings and photographs entered a country-wide art fair. Besides, she started to swim and dive at age 6, resulting in an improvement in her health condition.

3. Reflection & Application

Although some early researchers hold their belief of this as an either-or relationship, a large number of developmentalists nowadays believe in an interactionist model that admit joint influences of biological and environmental/cultural aspects.

3.1. Biological Standpoint

The parents' genes play an indispensable role in a child's physical characteristics and development. During the period from ages 2 to 5, Aini has shown some characteristics that were similar to mine, especially when getting along with others.

Before Aini started her preschool program, an early childhood development specialist evaluated her cognitive skills and reported that Aini was somewhat hesitant in the group of children. She spent a few minutes watching them before joining in, but after a while, she latched on to a couple of children and had a good time playing with them. Furthermore, Aini was a bit bashful toward strangers at age 2, usually starting crying if a person tried to get too close. However, after meeting a person two or three times, she started to stare at the person with a shy smile. At age 5, when she was about to attend kindergarten, the teacher assessed Aini by observing her play and noted that Aini was sometimes reluctant to join in new activities with unfamiliar children.

This evidence puts up that her characteristic was typical to me as her parent. As I stated in the personality quiz, I tended to be shy initially with unfamiliar adults or children, and slow to become comfortable in group situations. I also planned and thought things ahead of execution.

Aini's personality and behaviors were very alike and can be best explained by genetic heredity. Before Aini had trouble making friends at preschool and became reluctant to engage in group activities, I had been trying to expand her social experiences by taking her to a friend's house, arranging play dates, and inviting neighbor's kids to my place. However, these environmental influences and parenting decisions seemed to have little effect regarding Aini's personality of getting along with others. In that particular life stage, she was not inclined to make new friends and sometimes refused to play with an unfamiliar group of people until she was well-prepared.

3.2. Nvironmental Standpoint

A central learning theory, known as behaviorism, views development in terms of behavior changes caused by environmental influences (Boyd, Johnson, & Bee, 2020).

I will discuss Aini's musical ability which can be best explained by environmental factors in my opinion. At age 8, Aini started to learn the violin and wanted to take part in the instrumental music program at school. Through puberty, she demonstrated that her musical talent has gradually improved. She started to play in the middle school band at first, and she participated in the high school orchestra as she got better at playing the violin. Finally, she became the lead violinist in the school orchestra and won an award for "leadership in musical performance" by striving.

At the very start, I didn't expect Aini to achieve any accomplishment in music, but I still let her interest guide the learning process and support her with an appropriate condition (financially and emotionally) in further learning because music is valued as self-expression as far as I concerned. For example, after knowing some families have already enrolled their 5-year-old children in music classes, I began to sing popular songs with Aini and taught her some simple keyboard melodies. One year later, I decided to send Aini to play the piano and take voice lessons with a neighbor who is a music teacher. Moreover, when Aini was in grade 11, I advised her to choose the leading violin in school orchestra rather than put all efforts into getting top grades and test scores.

The environmental factors, which I believe to be more influential than genetics, were essential to Aini's musical development. In the cognitive quiz I took before raising my virtual child, I admitted that I am not good at understanding music and producing musical sounds. Facts proved that although Aini

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didn't show talent in music during her early childhood period, she has been slowly inspired after my enlightenment.

3.3. Personal Standpoint

Nature and Nurture account for the development of a human being. Ability in literacy, as an example, is shaped by both biological factors and postnatal education. The skills, such as phonological awareness and oral reading fluency, strongly predict reading comprehension skills in the later elementary grades (Boyd, Johnson, & Bee, 2018).

Aini's language skills have developed rapidly since she turned 18 months, and she always scored above average in all aspects of language development through the early childhood period. She was able to hold conversations with adults at 4 years old, retell a detailed experience from memory at 6 years old, and invent her own stories at 8 years old. In addition, Aini scored in the top 5-10% on all verbal subtests at the age of 17 and proved her ability in literacy.

In the personality and cognitive quiz, I evaluated myself as that I was not only good at using words to understand and communicate ideas but also self-disciplined in my work, practice, and study habits. On the other hand, I have constantly had lots of conversations with Aini since the first day she tried to speak; by taking her to museums and parks, I tried to enrich her vocabulary and broaden her horizon. When Aini was able to read some words in the preschool, I read the books with her, encouraged her to read aloud, and tried to answer all of her questions. When Aini turned 8 years old, I suggested her to bring a book under all circumstances and promoted her to retell stories with questions.

I would argue that both genetic and environmental factors play a part in the evolution of language difficulties (Howard et al., 2011). Natural advantages empower Aini to understand words quickly, make her focus on reading the books, and give her a lot of confidence in the learning process. Meanwhile, education and my personal engagement stimulate Aini's potentials and regulate her behaviors in learning, which assist her to achieve better academic performances.

3.4. Random Standpoint

There are also developmental outcomes that I cannot explain with nature, nurture and personal intervene. For example, I was quite surprised that Aini decided to follow a religion and attend her friend's family's place for worship at age 16. Although I was skeptical that her commitment will last for a long time, I did not interfere with her decision.

As I selected in prior questions, my partner and I don't have religions, and we never brought Aini to the church or let her participate in any kinds of worship, which means this characteristic appears to have developed randomly. The best explanation toward this development I could think about would be that, as a parent, I usually don't impose my ideas on Aini. Since she was a little girl, I let her make decisions on her own, tried to build her critical thinking ability, and advised her to research on her own. Thus, Aini is educated to become an independent thinker, and I will have to respect the fact that she is learning and growing in new ways.

4. Parting Parenting Advice

A range of studies has mentioned the importance of parenting for child development. For instance, toddler development is operated by organismic factors, the environmental and specifically the child–parent context which is fundamental to the successful maturation of skills (Morawska & Sanders, 2007).

Therefore, it's necessary to make every choice carefully during a child's growing process. At this point, seeking for professional advices and experts' reports can be helpful. Such reports were conducted by professional educational specialists through observing a child's play or assessing conversations with him/her. Each report covers different dimensions of temperament and cognitive abilities, with appropriate advice given at the end. Take Aini for example, I followed the advice stated in the reports and received great results. For instance, in the age 3 development testing report, the specialist advised me to continue to follow Aini's interests and work on the academic skills indirectly, rather than to try to teach them directly. keeping her suggestions in mind, I continued to read aloud, play counting games, and go on outings of interest to Aini in order to stimulate and broaden her knowledge base. As a result, Aini showed much interest in learning and made a surprising process on academic performance. Moreover, some reports also indicate parent's warmth and affection level displayed with child, as well as the amount of

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discipline and control parent exercised with his/her child. Objectively speaking, the experts' suggestions are rational and scientifically based, so I would recommend other parents to take the reports seriously and adopt the specialists' suggestions and take some of its ideas as supplementary advice to adjust their parenting decisions in the future.

5. Conclusion

To conclude, biological and genetic factors (nature), environmental/cultural contexts (nurture) and parental interactions play an indispensable role in child development. Although there is no clear evidence showing which is a greater determinant of Aini's maturation process, it's generally proved that development is reciprocal to one degree or another. In my opinion, genes may determine a child's potential advantage, setting up her starting point; while the environment has a cumulative influence and will determine how far he/she could go with the proficiency. In short, development is an age-related change in our bodies, behaviors, thinking, emotions, social relationships, and personalities (Boyd, Johnson & Bee, 2020). Parents should consider genetic factors, environmental interactions, and children's interest while adjusting their parenting styles.

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