

Every person lives a different life and leaves a different legacy in this world. However, one of the lasting legacies left by many people are their children. For this reason, it is very important to many people to discover ways to engage in many behaviors to optimize the growth and abilities of their children. The question posed by this reader concerned whether or not there are apparent differences in the cognitive abilities of those children who are breastfed versus those who are not. The reader was also curious if the duration of breastfeeding had any effect. This mother cites her busy lifestyle as a hindrance in breastfeeding her child, which is a dilemma for many working mothers. However, through investigating the results of three different studies, it is apparent that there are definite cognitive benefits resulting from breastfeeding.

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Gomez-Sanchiz, M., Canete, R., Rodero, I., Baeza, J.E., & Avila, O. (2003) sought to find the effects on cognitive and motor development by breast-feeding versus formula feeding infants. The researchers used Bayley's Mental and Psychomotor Indices to measure these two quantities. This study observed 249 infants in two diverse geographical areas, urban and rural communities. The infants in the two groups were divided into three subcategories: formula fed; breastfed for less than four months; and breastfed for more than four months. Gomez-Sanchiz et al. (2003) also took into consideration many other variables including mother's age, birth order, the IQ of the infant's parents, number of siblings and whether or not the mother worked outside of the home. The children were tested at the age of eighteen months with the Bayley test to evaluate their cognitive abilities.

Gomez-Sanchiz et al. (2003) found that the infants who had been formula fed scored lower than the breastfed group in every test. Those babies who had been breastfed

for at least four months scored a Mental Development Index (MDI) on average 2.4 points higher than the other groups on the test for mental development. However, when the psychomotor portion of the test was evaluated, there was not a statistical difference between the formula-fed babies and those who had been breastfed. Gomez-Sanchiz et al. (2003) also sought to discover whether the results found in previous studies stating that breastfed children were more cognitively apt were dependent upon the amount of time that the child breastfed. The findings in this research supported the previous studies, showing that the children in the group that had breastfed for more than four months had higher cognitive abilities than the group that had been breastfed for less than four months as well as the group that had never been breastfed. However, the study also found that the group which had been breastfed for up to four months displayed a higher cognitive ability than the group which had never been breastfed. This data illustrates two important points: breastfeeding for any length of time appears to have a positive effect on MDI; and the longer a child is breastfed, the higher their MDI.



While the Gomez-Sanchiz et al. (2003) study showed a strong correlation between cognitive development and breastfeeding, the underlying reasons for this correlation were not examined. In a study by Quinn, P., O'Callaghan, M., Williams, G.M., Najman, J.M., Andersen, M.J., and Bor, M., (2001), the researchers sought to uncover the core reasons for this relationship. Their research studied whether breastfeeding affected cognitive ability due to biological reasons such as nutrients found only in breast milk or whether it was due to psychosocial reasons such as the bonding time spent with the mother during breastfeeding. Quinn et al. (2001) tested a group of 3880 children and assessed their cognitive abilities over a period of five years in relation to the amount of time they were

breastfed, taking into account social and family influences. The mothers of these children were given a questionnaire six months after the child was born which asked them to indicate the length of time that the child had been breastfed. The questionnaire also assessed items such as the mental health of the mother, socio-economic status (SES), marital situation of the mother, etc. When the children reached the age of five, the researcher administered the Peabody Picture Vocabulary Test Revised (PPVT-R), a receptive language test, to evaluate the children's mental ability. Previous studies had shown a positive correlation between breastfeeding and cognitive ability but Quinn et al. (2001) wanted to test this ability at a later stage in the child's development and therefore waited until the children were five years of age.

The children were divided into the following six groups: never breastfed, breastfed less than three weeks, three weeks to less than seven weeks, seven weeks to less than four months, four months to less than six months, or still breastfeeding at six months. The breastfed children began to exhibit higher PPVT-R scores after they had been breastfed for at least seven weeks. This allowed the researchers to conclude that once a child had been breastfed for at least seven weeks, they began to show higher cognitive abilities than their non-breastfed counterparts and these abilities were apparent at the age of five. When tested at the age of five, the children who had still been breastfeeding at six months of age showed a mean PPVT-R score of almost ten points higher than the children who had never been breastfed with their mean scores being 103.6 and 94.2, respectively. Although the correlation between PPVT-R scores and length of breastfeeding decreased once the social factors such as maternal education, socio-economic status and birth weight had been taken into account, the difference between the

children who had been breastfed for seven weeks or more and those who had never been breastfed was still significant. This led the researchers to believe that breastfeeding did have a positive impact on cognitive abilities. This study was designed to find whether cognition was affected by biological or psychosocial factors. The researcher concluded that the positive correlation between breastfeeding and cognition must in part be due to nutrients in the milk since the correlation was still significant even after many psychosocial aspects such as time the child spent in daycare, stimulation they received from the parents and the number of siblings in the home when the child was age five, had been taken into consideration. Quinn et al. (2001) cited the biological influence to most likely be due to the presence of long-chain polyunsaturated fatty acids and docosahexaenoic acid (DHA). These are components of breast milk cited by the researcher as important aspects of proper neural and visual development. DHA and long-chain polyunsaturated fatty acids are not present in formula, so the children who were not breastfed did not receive these nutrients, possibly affecting their cognitive ability.

*Quinn*

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The findings of the Quinn et al. (2001) study are similar to the Gomez-Sanchiz et al. (2003) study. They both illustrate that cognitive ability is affected by breastfeeding as well as the length of time that the infant is breastfed. Both studies also showed that the cognitive abilities carry past infancy. While Gomez-Sanchiz et al. (2003) only tested for a correlation at eighteen months, Quinn et al. (2001) found the positive correlation to still be strong at five years of age.

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Although Quinn et al. (2001) and Gomez-Sanchiz (2003) both found similar results relating breastfeeding and cognitive ability, these studies shared a common flaw—they could not completely adjust for the varying environments in which the children were

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raised and the IQ of the parents. Evenhouse and Reilly (2005) completed a similar study, but it had a unique factor. It attempted to eliminate the bias that is present in most breastfeeding studies by comparing the effects of breastfeeding on cognitive ability between siblings who were breastfed for different durations. In this way, the SES, mental capacity, and many of the factors influenced by the mother would be uniform in both situations. Evenhouse et al. (2005) studied the direct effects of breastfeeding on fifteen different categories involving physical and mental health as well as cognitive ability on 16,903 adolescents. This group included 2,734 sets of siblings that had been breastfed for different durations. The study found that the scores on the PVT (Peabody Picture Vocabulary Test), a test which measured cognitive ability, were 4.9 percentiles higher in the children who had been breastfed versus those who had not been breastfed. However, once the child had been breastfed for twelve months or longer, the positive correlation decreased, showing that once children reach a certain age breastfeeding does not provide them with additional benefits and could possibly be negative. These results lasted into adolescence, asserting that breastfeeding does not just affect infantile development, but increases cognitive ability at least into adolescence.

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The Evenhouse et al. (2005) study had several strengths not exhibited in the other studies. One advantage to this method was that it over sampled lower SES groups which are more apt to formula feed and show higher incidence of health problems. Another asset of this study was that it measured these variables in adolescence rather than infancy or childhood and showed more of the long-lasting results of breast-feeding. The use of siblings in order to see the direct results of breastfeeding without having to adjust for factors such as SES and parental IQ was another strength. However, this also could be a

caveat because a sibling study is presumed to eliminate all bias, but this cannot be the case. Parents might allocate their resources in different manners on the children, or their economic situation may change, masking the effects of breastfeeding.

good point

All three studies exhibited a positive association between breastfeeding and cognitive abilities. The results of the Gomez- Sanchiz et al. (2003) study are interesting in light of the Evenhouse et al. (2005) study because both studies found that cognitive ability increased with the length of time a child was breastfed. However, Evenhouse et al. (2005) discovered that this correlation becomes negative after twelve months. Gomez-Sanchiz (2003) did not test for as many intervals and generalized the results to a positive correlation when still breastfeeding at four months of age. Each study assessed the cognitive ability of the children at a different period the child's life and development. However, a positive correlation between breastfeeding and cognitive ability was found at every age. Quinn et al. (2001) found the positive correlation at as young as eighteen months while Evenhouse et al. (2005) claimed that the positive correlation was still present in adolescence.

These three studies produced conclusive statistics that seem to mirror the results of past studies which state breastfeeding can improve a child's cognitive abilities. The length of time a child is breastfed does appear to have a positive effect on cognitive ability as well, but according to Quinn (2001) any amount of breastfeeding after seven weeks will benefit the child. A common source of error in these studies is the absence of specification of the way a child was breastfed. Some of the children might have been completely breastfed while others might have been partially breastfed and partially formula fed. This differentiation could greatly skew the results and their meaning.

In response to the mother who is questioning the benefits of breastfeeding her child, it is evident that breastfeeding does have an effect on cognitive ability. According Quinn et al. (2001) if she even breastfeeds the child for up to seven weeks he or she will begin to show increased cognitive abilities later in life. The Evenhouse et al. (2005) study shows that the amplified cognitive ability due to breastfeeding will still be present in adolescence, therefore it is possible that breastfeeding affects adult cognizance as well. In light of the benefits of breastfeeding on cognitive ability, this mother should take the time to breastfeed her child, even if she is unable to maintain breastfeeding for an extended period of time. She could possibly breastfeed during her maternity leave and then continue to feed the infant breast milk through a bottle once she has returned to her job. In this way the child will be provided with nutrients that are found to be instrumental in neural development. Breastfeeding also provides both the mother and child with a time of bonding and oneness. If this mother is looking for ways to improve her child's long-term cognitive abilities, it appears that breastfeeding is a positive method with a direct influence.

*Excellent Paper!*

## Works Cited

- Evenhouse, Eirik, Reilly, Siobhan. (2005). Improved Estimates of the Benefits of Breastfeeding Using Sibling Comparisons to Reduce Selection Bias. *Health Services Research* 40.6, 1781-1802.
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**Paper Grading Rubric**

Points:	Exemplary 10	Good 7	Limited 4	Unsatisfactory 2
<b>Introduction</b>	Thesis is clearly defined and focused	Thesis is clear; provides some direction for paper	Thesis is inappropriate, unclear, or incomplete	Ineffective or missing introduction
<b>Study 1 Description</b>	Accurate, appropriate level of detail	Sufficient and accurate	Partly inaccurate, incomplete, or unclear	Missing, inappropriate study
<b>Study 2 Description</b>	Accurate, appropriate level of detail	Sufficient and accurate	Partly inaccurate, incomplete, or unclear	Missing, inappropriate study
<b>Study 3 Description</b>	Accurate, appropriate level of detail	Sufficient and accurate	Partly inaccurate, incomplete, or unclear	Missing, inappropriate study
<b>Synthesis</b>	Interesting, sophisticated, insightful integration of findings of 3 studies (note that this may be integrated into the body of the paper);	Sufficient and accurate integration/comparison of 3 studies	Inaccurate, incomplete, or unclear synthesis/comparison; summarizes previously stated information	Missing comparison/synthesis of 3 studies
<b>Conclusion/ Recommendations</b>	Extends and connects ideas; insightful comments	Satisfactory: Purposeful; appropriate comments	Unclear, incomplete, or inappropriate; Summarizes previously stated information	Missing
<b>Total Points Earned</b>				
Points:	4	3	2	1
<b>Paragraph Order</b>	Contributes to effective arguments; reinforces main point	Demonstrates a plan	Ineffective or inconsistent	Random
<b>Transitions</b>	Effective and varied	Clear and functional	Mechanical	Absent
<b>Sentence Structure</b>	Complete and varied/interesting	Complete and correct	Some errors are evident	Repetitious; fragments and run-ons are frequent
<b>Word Choice</b>	Engaging, powerful choice of words	Appropriate to task	Uneven	Inappropriate or incorrect words are frequent
<b>References</b>	Complete list of references; studies are clearly referred to in text	Complete list of references; studies not always clearly referred to in text	Reference list is incomplete	Reference list is absent
<b>Total Points Earned</b>				

Overall Points Earned: 79 (out of 80)

Letter Grade: A