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Breastfeeding as a Proxy for Benefits of Parenting Skills for Later Reading Readiness and Cognitive Competence

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The relationship between early parental practices and school readiness described by Gibbs and Forste provides a new and original perspective on the impact of breastfeeding on development.¹ Their study used direct indicators of parenting practices not used in previous studies and examined school readiness (math and reading) rather than child IQ as the outcome measure at age 4 years.

Using data from the Early Childhood Longitudinal Study survey of early childhood (n = 7500), Gibbs and Forste found that reading to an infant every day as early as age 9 months and sensitivity to the child's cues during social interactions, rather than breastfeeding per se, were significant predictors of reading readiness at age 4 years. In contrast, other practices, such as early introduction of solid foods and putting an infant to bed with a bottle, were unrelated to child cognitive outcomes. Based on these findings, the authors concluded that the association between breastfeeding and cognitive outcome "is better understood as a proxy for parenting practices that foster cognitive development in early childhood." Although not noted explicitly, the data show that children who were breastfed for 6 months or longer performed best on the age 4 year reading assessment, which is consistent with their also having experienced the most optimal parenting practices.

Numerous previous studies have documented better performance on IQ tests in children who were breastfed compared with those who were not.²⁻⁴ This intellectual advantage has been demonstrated in several cultures for full-term infants and even more strongly for preterm and low birthweight infants. The IQ advantage for full-term infants is small, roughly 3-4 points,

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but remarkably consistent across studies. Moreover, the controversy is not about whether there is enhanced cognitive function among the breastfed children, but whether this difference reflects a direct nutritional advantage from breastfeeding or a difference in maternal intellectual competence and socioenvironmental factors, which generally are more optimal among women who breastfeed.

It is well established that women who breastfeed are also more likely to provide a more enriched and cognitively stimulating environment for their children, which could be responsible for these children's more optimal cognitive performance. The Gibbs and Forste study is the first to directly evaluate specific and discrete measures of parenting, such as frequency of reading to the infant and maternal sensitivity, instead of more distal measures, such as socioeconomic status (SES) and maternal education, to examine this association.

Based on data demonstrating a positive relationship between breastfeeding and childhood IQ after controlling statistically for SES and maternal education, previous authors have inferred a nutritional benefit from breastfeeding above and beyond the benefit of a more optimal rearing environment.² In our cohort of Michigan children ($n = 323$), we confirmed previous findings showing a positive association between breastfeeding and higher childhood IQ at age 4 and 11 years, after statistical adjustment for SES and maternal education.^{4,5} However, when we controlled for 2 more direct indicators of parental cognitive stimulation—maternal vocabulary IQ and the Home Observation for Measurement of the Environment (HOME), a semistructured interview and behavioral observation measure that provides an assessment of quality of intellectual stimulation and emotional support provided by the parents—the association between breastfeeding and childhood IQ was no longer evident. Gibbs and Forste extend this finding by identifying 2 specific aspects of parenting practices—early reading and sensitivity—that account, at least in part, for the beneficial effects of breastfeeding on children's cognitive outcomes.

Der et al⁶ reported that among 9 indicators (including breastfeeding) in their regression analysis, maternal IQ was clearly the strongest predictor of child IQ. The importance of including maternal IQ was demonstrated by their demonstration that the association of breastfeeding with child cognitive performance declined from 4.7 points to 0.5 point after adjustment for mother's cognitive competence and other socioenvironmental measures in their National Longitudinal Survey of Youth cohort study ($n = 5475$). They identified maternal IQ, attributable at least in part to heritability, as the principal variable accounting for the apparent association between breastfeeding and child performance. They included only 2 of the HOME subscales in their analysis, however. In our study, which included the complete HOME inventory, maternal verbal IQ and the HOME score contributed equally to the predicted IQ score at age 11 years.⁵ Taken together, these data suggest that both heritability and rearing environment play important roles in explaining the apparent association between breastfeeding and children's cognitive performance.^{6,7}

Gibbs and Forste contrasted the nutritional benefits of breastfeeding with maternal education, IQ, and quality of parenting, questioning which constitutes the primary pathway through which breastfeeding influences child cognitive outcome. They did not consider the role of maternal IQ (both genetically contributing to child cognitive ability and as an

indicator of a potentially more enriched and stimulating environment), because this measure was not available in their dataset. In several studies that attempted to show that the link between breastfeeding and cognitive outcome was not attributable to social factors, failure to include maternal IQ led to underestimation of a critically important factor⁴⁻⁶; however, in the Gibbs and Forste study, in which the authors demonstrated that their direct measures of parenting practices are sufficient to explain the association between breastfeeding and child academic achievement, inclusion of maternal IQ was not necessary.

It is noteworthy that the Gibbs and Forste study is the third study to show that, in contrast to maternal IQ and quality of child rearing, maternal depression did not mediate the relation between breastfeeding and later child cognitive achievement. Both our Michigan study^{4,5} and the study of Der et al⁶ also found that maternal depression did not mediate this association on child IQ.

The importance of the nutritional benefits of breastfeeding for a broad range of health outcomes should not be underestimated, however. These include reduced rates of asthma, allergies, and atopy; improved body mass index and reduced obesity rates; reduced rates of cardiovascular disease; and marked decreases in mortality, particularly in resource-poor settings.⁸ The *Lancet* Child Survival Series estimates that exclusive breastfeeding through age 6 months would prevent 13% of all deaths in children under age 5 years worldwide.⁹ Moreover, a large body of research has demonstrated protective effects of breastfeeding against infectious diseases, particularly gastrointestinal and respiratory illnesses, in both resource-rich and resource-poor settings.⁸ In areas with a high infectious disease burden, repeated infections have been associated with poor growth and cognitive deficits. Thus, improved immunity may be a mechanism through which breastfeeding confers cognitive benefits, particularly in resource-poor settings.

Gibbs and Forste examined infants in the US, where federal programs, such as the Special Supplemental Nutrition Program for Women Infants, and Children, ensure that most infants who are not breastfed have access to commercial formula that is designed to closely approximate the nutritional content of breast milk and often contains even higher concentrations of key nutrients known to impact cognitive and emotional development, including iron,^{10,11} choline,^{12,13} and long-chain polyunsaturated fatty acids.¹⁴ In contrast, commonly used alternatives to breastfeeding in resource-poor settings include lower quality and/or diluted formulas, cow's milk (also often diluted), and adult foods too complex for the immature digestive tract. In addition, breastfeeding may promote more secure and less-disorganized infant-mother attachment,¹⁵ thereby fostering better parenting behaviors, such as maternal sensitivity, which was associated with both math and reading skills in the regression models in the study of Gibbs and Forste.

Their findings have led Gibbs and Forste to conclude that more emphasis is needed on fostering better parenting behaviors rather than on encouraging breastfeeding to promote school readiness, especially for disadvantaged children. Parents often do not recognize how early an infant responds to being read to. For the practitioner, these data may be particularly relevant when caring for a mother who may be considering foregoing or curtailing breastfeeding for various reasons, such as the need to take antiepileptic or antidepressant

medication or undergo chemotherapy that might be transferred to the infant via breast milk or the need to resume employment. These data indicate that one consideration—a potential adverse long-term impact on the child’s cognitive function—need not be of concern. Nonetheless, when there is no risk to the infant or major inconvenience for the mother, encouragement of breastfeeding for other reasons, including health benefits to the infant and enhancement of mother–infant attachment, should not be underemphasized and warrants attention from pediatricians and other health care providers. There is considerable merit to the recommendation that both breastfeeding and good parenting practices should be promoted.

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Glossary

HOME	Home Observation for Measurement of the Environment
SES	Socioeconomic status

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