

Early Reading Development News

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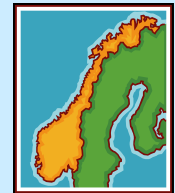


Some Analyses from the Early Reading Study

We have conducted a number of different analyses of genetic and environmental influences on prereading and early reading development. Our early reports of different patterns of genetic and environmental influences on different prereading skills have been confirmed in the completed preschool twin samples from Australia, Colorado, and Scandinavia (Samuelsson et al., 2005; 2007; Byrne et al., 2005; 2006; 2007). Namely, shared environment is the main influence on individual differences in preschool print knowledge, vocabulary, and grammar/morphology, while genes are the main influence on individual differences in memory, phoneme awareness, and rapid naming. Longitudinal analyses showed that the limited but significant genetic influence on preschool print knowledge was highly correlated with the higher genetic influence on word reading at the end of kindergarten. Genetic influence at the end of kindergarten was strongest in Australia where students have begun formal reading instruction in full day classes, of medium strength in Colorado where reading instruction is less intense and consistent in half day classes, and weakest in Scandinavia where there is little or no formal reading instruction. Thus, the degree of genetic influence on individual differences in word reading appears to depend on when formal reading instruction is introduced. In all countries, once the twins have completed a year of formal reading instruction at the end of first grade, the heritability for individual differences in word reading, spelling, and reading comprehension are quite high. Moreover, at this early stage of reading development, the genetic correlations between word reading, spelling, and reading comprehension are all above .9, indicating that it is largely the same genes that are influencing individual differences in these skills. We completed analyses of the country differences in genetic and environmental influences from preschool through first grade, and a publication based on these analyses is currently in press (Samuelsson et al., in press).

Preliminary analyses of twin data from the follow up assessment at the end of grade 2 show a similar pattern of dominant genetic influence for reading and spelling, but individual differences in vocabulary continue to be mostly influenced by shared environment, as they were in preschool. One paper on our second grade follow up study of orthographic learning has been completed and published (Byrne et al., 2008). This study demonstrated that the genetic influence on learning rate for the spelling of novel orthographic patterns was highly correlated with genetic influences on spelling achievement and on word decoding.

Finally, we have continued our analyses of teacher and school effects on individual differences in early reading development in Australia and the U.S. The results show that twins who share the same first grade teacher are not significantly more similar than twins with different first grade teachers, at least across the Colorado front range and in the Sydney Australia area.



Thank You!

Thank you again for continuing to support the Early Reading Development Study. We have now finished testing almost all twins who have finished 2nd grade. We'll be calling in the late spring to talk about the follow-up 4th grade visit.

We are currently seeking funding to see the twins after they have finished 8th grade. It seems impossible to believe that some of the twins in the study are close to that point! We hope that they will still want to participate in the reading study as they enter their busy and exciting teenage years.

CSAP Scores

We've had a great response rate this fall from families sending in CSAP scores. Thank you very much! We know it takes time to get the scores together and we appreciate your efforts. If you haven't sent in the scores yet we would still love to receive them.



What Heritability Means

The Implications of heritability data are commonly misunderstood. Heritability is a statistical measure, expressed as a percentage, describing the extent to which genetic factors contribute to variations on a given trait among the members of a population.

The fact that genes influence a trait does not mean, however, that “biology is destiny”. Indeed, genetics research has helped confirm the significance of environmental factors, which generally account for as much variance in human behavior as genes do. If intelligence is 50 percent heritable, then environmental factors must be just as important as genes in generating differences among people.

Moreover, even when genetic factors have an especially powerful effect as in some kinds of mental disability, environmental interventions can often fully or partly overcome the genetic “determinants”. For example, the devastating effects of phenylketonuria, a genetic disease that can cause a mental disability, can often be nullified by dietary intervention.

Finally, the degree of heritability for a given trait is not set in stone. The relative influence of genes and environment can change. If, for instance, environmental factors were made almost identical for all the members of a hypothetical population, any differences in cognitive ability in that population would then have to be attributed to genetics, and heritability would be closer to 100 percent than to 50 percent. Heritability describes what is, rather than what can be.

Robert Plomin and John C. Defries



What is Shared Environment?

Shared environment are those factors (family and school) that make twins within a family more similar to each other. For example, vocabulary is one area where shared environment plays an important part.

Mission

The mission of IBG, an organized research unit of the University of Colorado at Boulder, is to conduct and facilitate research on the genetic bases of individual differences in behavior and to conduct research training in this interdisciplinary area. Throughout its history, IBG has been characterized by the breadth of its interdisciplinary research and training programs. Although the methodology of behavioral genetics is generally applicable to the study of individual differences for any character, current research at IBG is focused on behaviors of obvious societal relevance.

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