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How parents influence school grades: Hints from a sample of adoptive and biological families

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Abstract

Using the biological and adoptive families in the Minnesota-based Sibling Interaction and Behavior Study, we investigated the associations among genetic and environmental influences on IQ, parenting, parental expectations for offspring educational attainment, engagement in school, and school grades. All variables showed substantial genetic influence, and very modest shared environmental influence. No gender differences were evident. There were significant genetic influences common to IQ and parental expectations of educational attainment, parenting and engagement in school, school grades and engagement in school, parental expectations for offspring educational attainment and school grades, and IQ and school grades. A possible interpretation of the common genetic influences involving parenting is that parents use their own experience with school in shaping the ways in which they parent their offspring.

Keywords: Genetic and environmental influences; School grades; Adoption study; Parenting; Parent expectations; School engagement; Gender differences

1. Introduction

Among developmental and clinical psychologists, parenting is considered to be an important influence on children's academic outcomes (e.g., Gadeyne, Ghesquiere, & Onghena, 2004). This is supported by a large volume of evidence from longitudinal (e.g., Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994) and experimental intervention studies (e.g., Forgatch & DeGarmo, 1999), as well as by studies of concurrent associations. Investigations of the mechanisms by which parents exert their effects on academic outcomes tend to follow one of two general traditions Kellaghan, Sloane, Alvarez, & Bloom, 1993: examination of the effects on children of parental actions, or "what parents do", and exploration of the effects on children of "who parents are". The classic parenting

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research focusing on socialization activities by parents in the form of emotional tone, disciplinary practices, responsiveness, and expectations (e.g., Baumrind, 1991) comes from the "what parents do" tradition, as does research on the quality of the home learning environment provided to children (e.g., Bradley, 1994). The "who parents are" tradition is represented by studies positing that socioeconomic and cultural factors carry with them trait-like parental socialization practices with a variety of contextual influences that affect development (e.g., Gallimore & Goldenberg, 2001). Of course, the two research traditions do not necessarily reflect distinct aspects of parenting, as who parents are and what they do are often closely intertwined, and may be especially so with respect to their offspring's academic achievement.

2. Using coevolution to combine the two parenting research traditions

One way to bring together the two parenting research traditions is to think of parenting activities as mechanisms of coevolution. This is the name given to the process by which biological and cultural inheritance factors transact to result in transmission of culturally influenced behaviors and attitudes from one generation to the next through modification of natural selection pressures (Cavalli-Sforza & Feldman, 1981; Durham, 1979). It is thus a form of gene–environment correlation. In addition, however, it includes explicit recognition that the active and evocative aspects of gene–environment correlation, in which the individual seeks out and evokes environmental experiences that are compatible with genetically influenced traits, create selective pressures to form adaptive niches within broader groups of individuals (Johnson, 2007). The coevolutionary process is facilitated because, in most families, the same parents transmit both genetic and cultural influences.

The existence of coevolution has been documented extensively in non-human species, and in humans as well (Laland, Kumm, Horn, & Feldman, 1995). For example, the culturally transmitted domestication of cattle and development of dairying activities and cheese-making processes, taking place over generations, likely altered the environments of self-selected groups of humans sufficiently to select for genes which confer greater adult lactose tolerance today (Aoki, 1986). This example dramatizes the point that culture by definition entails some collection of transmission systems that together provide humans with an extra-genetic inheritance system based on knowledge (Cavalli-Sforza & Feldman, 1981). Often, the knowledge takes the form of social learning (language, standards of conduct, values, technology). There is evidence that the ability to make use of these learned behaviors is evolutionarily adaptive (Betzig, Mulder, & Turke, 1988; Chagnon & Irons, 1979), suggesting genetic involvement in the transmission of cultural processes.

Genetic involvement in the transmission of cultural processes could take either or both of two basic forms. First, there might be genes that predispose learning processes toward the acquisition of adaptive information (Durham, 1979). Learning predispositions of this type are well documented in animals, and there is evidence for them at least in human perception (e.g., Fantz, Fagan, & Miranda, 1975). Such predispositions may help humans to identify what is relevant and adaptive from the range of presented environmental stimuli. Thus, for example, children who all possess these adaptive-information-seeking genes but who differ genetically in other ways might make very different uses of the information presented to all of them in the form of schooling. To the extent this is the case, we should expect genetic influences on school engagement and performance. Evidence for such influence has been reported (Bartels, Rietveld, Baal, & Boomsma, 2002; Johnson, McGue, & Iacono, 2005; Johnson, McGue, & Iacono, 2006).

The second form of genetic mediation of cultural processes involves the possibility of genes that predispose parenting processes toward the teaching of information that they believe will prove adaptive to their children (Perusse, Neale, Heath, & Eaves, 1994) because they found it to be adaptive. Because this knowledge is necessarily context-dependent, these teaching predispositions may also vary considerably. Their own experience with schooling might be one aspect of their overall life experience that parents use to orient their offspring with respect to school and to guide them in responding to the demands of schooling. For such teaching predispositions to be operative, it is of course necessary that parental rearing practices be under genetic influence. Several researchers have provided evidence for this (e.g., McGue, Elkins, Walden, & Iacono, 2005; Perusse et al., 1994), but it is important to develop further evidence. In addition, if such parental teaching predispositions are important in adaptation to schooling, there should be links between the genetic influences on parenting and offspring engagement and performance in school. One of the purposes of this study was to estimate the extent of genetic influences on parental rearing practices and engagement in school and the extent to which these genetic influences were linked.