

# Socioeconomic status and school grades: Placing their association in broader context in a sample of biological and adoptive families

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## Abstract

SES has long interested researchers investigating school achievement. Its effects are often addressed by studying predictors of achievement in economically disadvantaged samples living primarily in biological families, confounding genetic and environmental influences. Little is known about SES's purely environmental effects. We measured them in 617 adoptive and biological families, adjusting for sample restriction of SES range. Controlling for gender, parenting, parental expectations for educational attainment (PEEA), IQ, engagement in school, and genetic and shared environmental influences on sibling pairs, SES still made a small but significant nonshared environmental contribution to school grades. IQ, PEEA, and SES had collinear associations with school grades, as did engagement and parenting. The associations of IQ and engagement with school grades were largely independent of each other. The link between PEEA and IQ was stronger in adoptive than biological offspring. We discuss the implications of these findings. © 2006 Elsevier Inc. All rights reserved.

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## 1. Introduction

Over 20 years ago, White (1982) published a meta-analysis documenting the fact that, measured at the level of the individual, the correlation between socioeconomic status (SES) and academic achievement is rather modest, averaging about .22. At the same time, when measured at the level of some aggregated unit of analysis such as the school or the neighborhood, the correlation is much higher, ranging as high as .80. Though SES is a variable that applies to the individual or family, its much higher

aggregate than single-family correlation with academic achievement implies that people of similar SES tend to cluster together. To the extent this is true, children receive similar SES influences from both their families and their surrounding communities. If the community influences are strong, SES has the potential to be a powerful environmental variable exerting broad-based effects at a population level, despite its relatively modest effects at the level of the individual. It is probably for this reason that SES continues to be so interesting to researchers investigating educational outcomes.

Measured properly at the level of the individual, SES reflects the occupations and thus the underlying levels of education and resulting incomes of the adult members of a household (Jeynes, 2002; White, 1982). It is thus generally considered to be an indication of economic and

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educational opportunity or privilege. In reality, however, SES reflects a much wider range of human qualities that contribute to the ability to attain and maintain any given occupation, including diligence, intelligence, determination, interpersonal skills, materialism, ambition, and passion for life (Jeynes, 2002). In short, it reflects an aspect of culture, an aspect that, because of the importance of educational attainment to occupational status, has some natural associations with academic achievement that transcend mere economic and educational opportunity. This aspect of culture is reflected at the level of the community in which the individual resides as well.

Though SES and culture are both commonly considered environmental variables, there is substantial evidence that the individual personal characteristics contributing to SES and the aspect of culture it reflects are under genetic as well as environmental influence (Bouchard & McGue, 2003). This means that, in the most readily available and commonly used samples of students mostly from biological families, the genetic and environmental effects of SES are confounded. That is, it is unclear to what degree to attribute the association between SES and achievement to the economic and educational opportunities environmentally afforded by SES, to the genetic transmission from parent to offspring of the personal characteristics associated with SES, or to correlation between the two. This is particularly the case because it is uncommon in studies of academic achievement to measure a range of associated individual student and environmental characteristics in such a way that their relative effects can be compared.

A logical approach to quantifying the extent of the environmental effects of SES on achievement is to measure a range of characteristics in a sample of substantial numbers of adoptive offspring that also includes biological offspring that can be used as a basis of comparison. There is, however, one problem with this approach. As Stoolmiller (1999) has pointed out, samples of adoptive families are subject to substantial restriction of range in SES due to the parental circumstances leading them to select themselves into the adoption process in the first place, the adoption agency selection processes that see them through to acquisition of a child, and the parental characteristics associated with willingness to participate in a study of child development. Restriction of range has the well-known effect of reducing the correlation of the range-restricted variable with others. Stoolmiller maintained that the degree of restriction of range in SES can be as high as 70%, rendering it an issue of considerable potential consequence even if his estimate was high. With some understanding of the nature of the range restriction, it is

possible to quantify it and to adjust for its effects. Such adjustment is obviously important because it makes possible estimates of the strength of the association in the full population without range restriction. The ranges of other variables in adoption samples could be restricted as well.

The purpose of this study was to make use of the Sibling Interaction and Behavior Study (SIBS), a sample of adoptive and biological Minnesota families, to quantify the environmental roles of SES and associated parenting variables in predicting academic achievement. In doing so, we placed SES in the context of several parental environment and individual student characteristics and explicitly adjusted for the restriction of range of SES in the sample. We thus addressed four questions. First, to what degree was the range of SES restricted in this sample and were other variables restricted as well? Second, when placed in context with other variables, how was SES related to achievement? What about the other parenting variables? Third, how much difference did adjustment for the effects of range restriction make in the estimates of the associations? Fourth, to what degree did the relations among the variables we considered differ in adoptive and biological families?<sup>1</sup> The parental environment and individual student characteristics we considered in context with SES included gender, parenting practices, parental expectations for educational attainment (PEEA), IQ, and student engagement in school. All have well-established associations with academic achievement in their own rights (e.g., Mau & Lynn, 2001, for gender; Steinberg, Lamborn, Darling, Mounts, & Dornbusch, 1994, for parenting practices; Butler, Marsh, Sheppard, & Sheppard, 1985, for IQ; Gottfried & Gottfried, 1996, for engagement in school; and Kaplan, Liu, & Kaplan, 2001, for PEEA).

## 2. Method

### 2.1. Sample

SIBS consists of a community-based sample of pairs of adoptive and biological siblings and their parents living in the Minneapolis-St. Paul area. Recruitment was initiated in 1998. The SIBS adoptive sample was recruited in collaboration with three large metropolitan area adoption agencies. These agencies minimally screen

<sup>1</sup> It was not our intention to use this study to estimate proportions of variance in SES or any other variable attributable to genetic and environmental influences. Rather, we were interested in focusing on the extent to which SES can be considered an environmental influence on school grades.

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