



Income differences among grade skippers and non-grade skippers across genders in the Terman sample, 1936–1976



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ARTICLE INFO

Article history:

Received 21 May 2016

Received in revised form

27 August 2016

Accepted 14 October 2016

Available online 24 October 2016

Keywords:

Grade skipping

Full-grade acceleration

Gifted education

Longitudinal studies

Income

ABSTRACT

Full-grade acceleration, also called *grade skipping*, is a widely supported practice among gifted education experts. Yet, the impacts of grade skipping in adulthood are unclear. Using data from Terman's longitudinal study of gifted children, we examined income differences from 1936 to 1976 between grade skippers and non-grade skippers after controlling for birth year, IQ, home environment, personality, and intellectual, social, and activity interests via propensity score modeling. After also controlling for adult education attainment, men who had skipped a grade earned an average of 3.63%–9.35% more annually than non-grade skipping men. The impact for grade skipping women was much smaller: –2.02%–0.42% annually. These results indicate no association between full-grade acceleration and income for women in this historic dataset, but suggest a slight relationship between the two variables for men (though whether this relationship is causal is unknown). Additionally, income gaps between accelerated and non-accelerated students did not narrow until the subjects were nearing the end of their careers. We discuss these findings in the context of gifted education policy and other research on academic acceleration.

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One of the oldest academic interventions for gifted children is full-grade acceleration, which entails permitting a child to skip a grade in order to attend a grade one year earlier than their age peers. Leaders from gifted education's past (e.g., [Hollingsworth, 1926, 1942](#); [Stanley, 1976](#); [Terman, 1954](#); [Terman & Oden, 1947](#)) recognized the potential benefits of full-grade acceleration. These early opinions are still mainstream among gifted education experts, who often find that accelerated gifted children outperform their non-accelerated age peers on academic, social, and self-esteem measures ([Assouline, Colangelo, VanTassel-Baska, & Lupkowski-Shoplík, 2015](#); [Rogers, 2007](#)).

In the 21st century research on full-grade acceleration continues. Recently researchers studying full-grade acceleration have found that accelerated gifted children outperform their (older) classmates on nearly every academic outcome, including high school and college grades, standardized tests, and advanced degree attainment ([Cronbach, 1996](#); [McClarty, 2015a](#); [Park, Lubinski, & Benbow, 2013](#)). These academic benefits usually do not come at a cost to social or

emotional development ([Gagné & Gagnier, 2004](#); [Lee, Olszewski-Kubilius, & Peternel, 2010](#); [Rogers, 2007](#)). The only exception to these results that we were able to find was a Dutch study in which accelerated students' (older) peers rated them less positively as the students who had not been accelerated—especially if the accelerated students were male. However, accelerated students in this study had higher academic self-concepts than their older classmates ([Hoogeveen, van Hell, & Verhoeven, 2009](#)).

Despite the long history of interest in full-grade acceleration among gifted education researchers, few studies have examined long-term adult outcomes of children who skipped a grade. The limited research is mostly focused on academic outcomes (usually in college), social outcomes, and emotional outcomes of full-grade acceleration (e.g., [Cronbach, 1996](#); [McClarty, 2015a, 2015b](#); [Park et al., 2013](#)). Although this research is useful, there has been almost no research on financial outcomes of full-grade acceleration. The few researchers who have investigated economic outcomes (i.e., [Cronbach, 1996](#); [McClarty, 2015b](#)) have not reported effect sizes, a violation of reporting standards that reduces the usefulness of their research ([American Educational Research Association, 2006](#); [American Psychological Association, 2010](#)).

Therefore, teachers, administrators, parents, and advocates of gifted children have little information about the economic consequences of full-grade acceleration—a gap we hope to fill. Given the

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strong support for acceleration among gifted education experts, new information about financial outcomes of acceleration may inform advocacy and scholarly work related to acceleration. Investigating the potential impact of acceleration on incomes is important because higher incomes are associated with a wide array of positive life outcomes (e.g., good health, longevity). Additionally, income is a nearly universal consequence of employment that permits comparisons across individuals. Other measures of career success are often less applicable to a wide population of adults. For example, Lubinski, Benbow, and Kell (2014) measured career success by counting the number of patents, peer review publications, or career awards that subjects earned in their longitudinal study. Although these may be good measures of success within some careers, these variables do not apply to many occupations.

1. Why might grade skippers have higher incomes?

For some readers, the connection between full-grade acceleration and adult income seems unclear. However, there are reasons why one would expect people who skip a grade to earn more income. First, in other samples students who finish high school earlier were more likely to earn a graduate degree in adulthood (e.g., Wai, 2015), which is correlated with higher incomes in adulthood. The causal relationship among these variables is not clear. It is possible that the characteristics that make a child experience acceleration are also the traits that make people more likely to pursue advanced education. Or possibly the greater academic challenge in childhood fosters an interest in learning and education that persists into adulthood (a possibility raised by Lubinski, Webb, Morelock, & Benbow, 2001). Regardless of the causal mechanisms at work, it would not be surprising if grade skippers later were more likely to obtain high levels of education, which then led to greater incomes.

Another possible explanation for the connection between acceleration in childhood and adult income is that “time is money.” For most people, acquiring expertise in a field requires learning new knowledge and developing new skills (Ericsson, Roring, & Nandagopal, 2007). It is likely that becoming an expert in many fields—especially a highly paid expert—takes time. By embarking on higher education and their careers earlier, grade skippers may earn higher incomes simply because they are further along in their careers and have developed their skills more fully. This extra time may also help them build a professional network or obtain the human capital needed to receive a high paying job.

Notwithstanding the theoretically plausible relationship between full-grade acceleration and adult income, it is important to recognize that other variables have relationships with adult income. One well-known correlate with income is gender, with men earning higher incomes than women both in the general population (Blau & Kahn, 2007) and in high ability populations (Lubinski et al., 2014). Another well established predictor of income is educational attainment, with better educated individuals generally earning higher incomes (Herrnstein & Murray, 1996; Nyborg & Jensen, 2001). Similarly, students with higher academic achievement tend to grow up to earn higher incomes (Strenze, 2007).

Some psychological traits are also positively correlated with income in adulthood. Motivation (Long, 1995; Lubinski et al., 2014) and intelligence (Jensen, 1998; Strenze, 2007; Warne, 2016) are well known examples of psychological variables with robust positive correlations with adult income. Lesser known is that among the “Big Five” personality traits, openness and conscientiousness are positively correlated with income, while neuroticism correlates negatively with income (O’Connell & Sheikh, 2011). It is possible that some of these variables are correlated with grade skipping. Therefore, any researchers who conduct a nonexperimental study

on the economic impacts of grade skipping must attempt to control for these variables and thereby reduce the degree to which they could confound the results.

2. Research on adult income: two critical prior studies

Research on these issues is still in its infancy. Indeed, there have only been two prior studies in which researchers investigated the economic impact of grade skipping (Cronbach, 1996; McClarty, 2015b). Both of these studies produced results showing that children who experienced full-grade acceleration earned higher incomes as adults. However, both studies have shortcomings that make further research on the issue necessary, and it is not entirely clear that there even is a link between grade skipping and adult income. In this section of the article we will discuss these two studies and explain the need for our research.

Cronbach (1996)—using data from Terman’s (1926) longitudinal study—first compared the adult income of gifted men who skipped at least one grade with a matched group of non-accelerated men. He found that income was higher in the accelerated group, but only among sample members without an advanced degree. Among sample members with an advanced degree, there was no difference between incomes in the two groups.

Cronbach’s (1996) study was the first study on the adult incomes of grade skippers, but it has shortcomings. First, Cronbach did not report an effect size or any other statistic that would indicate the magnitude of the income differences in Terman’s sample. Therefore, it is not clear how much of a financial advantage accelerated students could gain in their adult years. Second, Cronbach only matched the grade skippers and the non-grade skippers in the Terman sample on a limited number of variables: high school graduation year, final adult education status (both through weighting the two groups until they were equivalent), and gender (by only analyzing data from male subjects).

The characteristics of McClarty’s (2015b) study are similar to those of Cronbach’s (1996) study. Using data from the NELS:88 sample, she compared grade skippers with similar non-grade skippers and found that accelerated students held more prestigious jobs and higher incomes, but their job satisfaction did not differ. McClarty did provide annual income differences between the two groups (ranging from \$920 approximately five years after high school graduation to \$5112 approximately eight years after graduation). However, no standard deviations were reported, which makes calculating an effect size impossible. Like Cronbach, McClarty (2015b) also controlled for a small number of confounding covariates—gender, race, socioeconomic status, and eighth grade achievement—though she controlled for these covariates through the more sophisticated Coarsened Exact Matching (CEM) method (see Iacus, King, & Porro, 2011).

Although neither Cronbach (1996) nor McClarty (2015b) made methodological errors when attempting to control for pre-existing group differences, both CEM and Cronbach’s weighting methods have been surpassed by other methods of simulating the causal impact of a treatment in a non-experimental setting, namely propensity score modeling (Guo & Fraser, 2010). Propensity score modeling is an improvement over weighting and CEM because propensity score modeling permits researchers to control for a much larger number of variables than these methods (e.g., Warne, Larsen, Anderson, & Odasso, 2015). We designed this study to build upon the previous efforts of Cronbach and McClarty to examine the long-term economic impacts of full-grade acceleration. Specifically, the study is designed to answer three research questions:

1. After controlling for childhood covariates and adult education level, what is the size of the income gap between full-grade

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