Educational Attainment in the Context of Social Inequality: New Directions for Research on Education and Health

Katrina M. Walsemann¹, Gilbert C. Gee² and Annie Ro²

Abstract
A large literature documents a strong and consistent educational gradient in health: more-educated persons enjoy lower rates of morbidity and mortality. This literature has generally focused on the amount of schooling one completes but has yet to comprehensively examine other facets of education, such as educational quality or school segregation. More importantly, the literature has generally conceptualized education at the level of individual persons and has yet to fully study the structural dimensions of education and the production of educational inequities. The goal of this article is to identify several areas of educational inequity beyond personal educational attainment. These include (a) population differences in the strength of the educational gradient in health, (b) educational quality, (c) school segregation, and (d) the role of place of education among immigrants. We also discuss some emerging issues, such as student debt and pathways to education. Accordingly, there is much work to be done to further our knowledge regarding the relationship between education and health.

Keywords
education, health, inequality

Education has been, and remains, a core indicator of socioeconomic position in health research (Elo, 2009; Kawachi, Adler, & Dow, 2010; Krieger, Williams, & Moss, 2010).

¹University of South Carolina, Columbia, SC, USA
²University of California, Los Angeles, USA

Corresponding Author:
Katrina M. Walsemann, Department of Health Promotion, Education, and Behavior, University of South Carolina, 800 Sumter Street, Room 216, Columbia, SC 29208, USA.
Email: kwalsema@sc.edu
From a public health perspective, educational attainment is of interest because it is amenable to social intervention (Link & Phelan, 1996; Muennig & Woolf, 2007). As noted by Muennig, Johnson, and colleagues (2011), interventions designed to improve education may be “an effective and efficient way to simultaneously improve population health and reduce health disparities” (p. 512). Educational attainment, generally operationalized as years of schooling or degree attained, is an often-used measure of socioeconomic position because it is commonly thought to be simpler to assess compared to indicators such as occupational status or prestige and is often less prone to nonresponse error compared to indicators like income. Implicit in the measurement of educational attainment is the notion that it is a fixed attribute of the individual.

It is becoming increasingly evident that educational attainment itself is insufficient for fully understanding the role of education in health status. The education literature demonstrates that the opportunities that students have within the education system are dependent on existing structures of privilege and power, which result in differential access to high-quality schooling, school diversity, and school resources (Hochschild & Scovronick, 2003; Lewis, 2003; Lewis & Manno, 2011; Mickelson & Everett, 2008; Orfield, 2009; Rubin, 2008). Few studies of health, however, focus on these structural factors.

Numerous excellent reviews of the association between education and health already exist (Cutler & Lleras-Muney, 2006; Eide & Showalter, 2011; Elo, 2009; Kawachi et al., 2010; Mirowsky & Ross, 2003; C. Ross & Wu, 1995). These reviews have focused primarily on the issue of causality and the factors that may mediate the relationship between educational attainment and health. Our article takes a slightly different approach by focusing on the upstream and structural factors that may contribute to inequities in educational attainment and health. We begin with the observation that the relationship between educational attainment and health is not completely uniform across population groups. We then discuss three factors that may potentially impact inequities in educational attainment and health across the life course: (a) educational quality, (b) school segregation, and (c) the place where immigrants complete their education. We also discuss cohort factors and introduce emerging issues related to schooling, such as debt and pathways to education. We conclude by summarizing some potential ideas for future research.

Population Differences and the Role of Income

Education is one of the strongest and most consistent predictors of health and mortality in the United States. With increasing education, individuals experience more favorable health across a range of outcomes, including fewer functional limitations (Freedman & Martin, 1999), depressive symptoms (Miech & Shanahan, 2000; Walsemann, Gee, & Geronimus, 2009), and cardiovascular risk factors (Rehkopf, Dow, & Rosero-Bixby, 2010), better self-rated health (Herd, 2010; Lynch, 2003; Mirowsky & Ross, 2008), and greater longevity (Hummer & Lariscy, 2011; Miech, Pampel, Kim, & Rogers, 2011; Montez, Hummer, & Hayward, 2012).

The general pattern that increasing education is related to better health is often referred to as the educational gradient. Although some studies find that each
additional year of education confers a monotonic increase in health (Elo & Preston, 1996; Lynch, 2003, 2006; Zajacova, 2006), many other studies suggest that the relationship is not monotonic but instead is a step function that reflects degrees earned (Backlund, Sorlie, & Johnson, 1999; Montez et al., 2012; Rogers, Everett, Zajacova, & Hummer, 2010; Zajacova, 2012; Zajacova, Hummer, & Rogers, 2012). That is, there is a greater difference in health between a high school graduate and a nongraduate, compared to a high school senior versus a junior. Hence, education may be not simply about the “dose” of a person’s individual schooling but also about the gatekeeping and credentialing functions of the education system. These functions are often mirrored in patterns of health outcomes (Rogers et al., 2010).

The educational gradient in health, however, is not uniform across U.S. society. The gradient appears most consistently among White males but is sometimes smaller or not present for racial minorities and women (Farmer & Ferraro, 2005; Ihara, 2011; Kimbro, Bzostek, Goldman, & Rodriguez, 2008; Montez et al., 2012; Mustard & Etches, 2003; Walsemann, Ailshire, Bell, & Frongillo, 2012; Williams, Mohammed, Leavell, & Collins, 2010; Zajacova & Hummer, 2009). Using data from the National Health and Nutrition Examination Survey I and the Epidemiologic Follow-up Study, Farmer and Ferraro (2005) found that Black-White disparities in self-rated health widened as educational attainment increased, suggesting that Black adults do not gain the same health benefits from a given level of education as their White counterparts. The gradient is also attenuated for Asian Americans educated in a foreign country compared to those educated in the United States (Walton, Takeuchi, Hertinga, & Alegria, 2009).

For women, the strength of the educational gradient seems to vary across health outcomes. For example, Zajacova and Hummer (2009) reported a modestly weaker gradient in mortality for White women compared to White men. C. Ross, Masters, and Hummer (2012) found a stronger gradient for women than men for self-rated health but a weaker gradient for overall mortality.

Taken together, these studies highlight that the basic relationship between educational attainment and health is not seen equally among all social groups and points to the possibility that the effects of educational attainment intersect with multiple forms of stratification. These observations raise the question of why socially disadvantaged groups often show weaker educational gradients in health.

One likely reason is related to income, which may mediate the relationship between educational attainment and health (Kawachi et al., 2010). Using data from three waves of the National Health Interview Survey (NHIS), Cutler and Lleras-Muney (2006) suggest that income, health insurance, and some demographic factors account for a third of education’s effect on mortality and health behaviors. In another study using the NHIS, Lynch (2006) found that income accounts for 30% of the relationship between education and self-rated health.

The educational gradient may be weaker for racial minorities and women because these groups experience smaller economic returns from schooling compared to Whites and men. Consider the relationship between educational attainment, gender, race, and income (Table 1). First, increasing educational attainment is related to higher income for all groups. Second, men generally earn more than women, and Whites earn more
than racial minorities. A White male with a high school diploma earns $40,338, more than any other group with the same degree (e.g., an Asian male with this degree earns $32,739). A Hispanic woman would need to have a college degree before she earns the equivalent amount of income ($41,288). These income inequities are also seen by nativity, such that U.S.-born individuals earn more than foreign-born persons at equivalent levels of educational attainment, the only exception being women with a postbaccalaureate degree. In this respect, educational attainment is not the “great equalizer” (Mann, 1848) because it does not provide the same economic benefits across race, gender, or nativity (Williams et al., 2010).

In sum, part of the variation in the education gradient may be explained by income, but other factors, such as school resources and quality, may also play a role.

**Educational Quality and Health**

Significant differences in school resources, academic opportunities, and educational quality exist in the United States. Schools in disadvantaged neighborhoods tend to offer fewer advanced placement classes, employ less qualified teachers, have higher student-to-teacher ratios, rely more heavily on outdated books and supplies, and house fewer computer and science laboratories compared to schools in wealthier neighborhoods (Darling-Hammond, 2004; Hochschild & Scovronick, 2003; Lucas, 1999; Mickelson, 2001). School resources are related to student achievement, independent of personal and family resources (Greenwald, Hedges, & Laine, 1996; Klugman, 2012; Lubienski, Lubienski, & Crane, 2008; Rumberger & Palardy, 2005).
An example of these differences is seen in the high schools sampled in the National Longitudinal Survey of Adolescent Health, one of the main studies developed explicitly to study the school environment, other sociocultural and family factors, and health (Table 2). Not surprisingly, wealthy schools have more desirable features than poor schools; wealthy schools have smaller class sizes (19.6 students per class vs. 23.3, respectively) and more students in college preparatory classes than poor schools (80.2% vs. 42.6%, respectively). There is also a strong association between school racial composition and school socioeconomic status (SES). Whites composed 14.3% in low-SES schools and 76.7% in high-SES schools. This pattern was reversed for Black and Hispanic students, who composed 69.3% in low-SES schools and 16.4% in high-SES schools.

An emerging literature shows that these kinds of school characteristics may impact health (Muennig, Robertson, et al., 2011; Muennig, Schweinhart, Montie, & Neidell, 2009; Muennig & Woolf, 2007). For example, Walsemann and colleagues (2009)
demonstrated potential health benefits from the type of curriculum students were enrolled in during high school. Using prospective data from the 1979 National Longitudinal Survey of Youth, they found that individuals who were enrolled in college-preparatory course work had fewer depressive symptoms in early adulthood compared to students who were enrolled in the general curriculum. The effects of course work persisted after adjustment for respondents’ childhood SES, educational attainment, and income.

Similarly, Muennig and Woolf (2007) analyzed data from Project STAR, an experiment that randomly allocated children to small (13 to 17 students) or large classrooms (22 to 25 students). Their econometric analysis suggested that smaller classrooms not only would yield more college graduates (72,000 to 140,000 additional graduates annually) but would also add an extra 111,000 to 240,000 additional quality-adjusted life years to these graduates. Although these findings are provocative, another analysis of Project STAR unexpectedly found higher mortality rates at age 29 among those randomized to smaller classrooms (Muennig, Johnson, et al., 2011). This is a relatively young age to consider mortality outcomes, however, and it remains to be seen what patterns appear at older ages.

Other studies find that school characteristics, such as the average pupil-teacher ratio, teacher wages, and length of school term, strengthen the effect of educational attainment on adult self-rated health (Frisvold & Golberstein, 2011; R. C. Johnson, 2010), premature mortality (Frisvold & Golberstein, 2011; Sansani, 2011), smoking, and obesity (Frisvold & Golberstein, 2011). Studies of moderation are just emerging in the literature and have primarily focused on a rather narrow set of school characteristics. It would be informative to study how other forms of educational quality, such as school policies on academic tracking or the range of curriculum provided to students, moderate this relationship.

It would also be useful to adopt a cumulative advantage approach that suggests that it is the totality of these educational experiences that contributes to health inequities (Dannefer, 2003; Ferraro, 2011; O’Rand, 1996). One study that adopted this approach focused on the accumulation of educational advantages that increase the likelihood of completing postsecondary schooling, such as attending a wealthy school, having college-educated parents, and taking college preparatory courses (Walsemann, Geronimus, & Gee, 2008). The authors found that students with many educational advantages had fewer health problems over time than those with few educational advantages and that the gap between the advantaged and disadvantaged widened over time. The gap was also more pronounced among Blacks than Whites.

Thus, the research on education would be greatly advanced by further consideration of broad concepts, such as cumulative advantage, and school characteristics, such as classroom size, type of curriculum, and school resources. These factors have been found to increase educational attainment and wages (Betts, 2001; Card & Krueger, 1996, 1998; Engberg & Wolniak, 2010). It is also possible that nonacademic aspects of the school environment may be important. For example, opportunities to participate in theater, visual, and musical arts; sports and physical education; and student leadership may foster knowledge, confidence, and skills that could translate not only into
more informed decision making but also into higher educational attainment. A comprehensive listing of additional measures of school and educational characteristics are available elsewhere (Board on Testing Assessment, 2012; Miller & Warren, 2011; Organisation for Economic Co-operation and Development, 2011).

Just as importantly, the quality of one’s education may extend beyond the classroom and the school year. A compelling demonstration of this idea was seen in a study by Condron (2009) using data from the Early Childhood Longitudinal Study–Kindergarten Cohort ($N = 21,260$). The data showed two distinct paths for the construction of racial and social class inequities in math and reading skills. Racial inequities grew during the school year but not in the summer months. Conversely, social class inequities grew during the summer months but not during the school year. These patterns were explained by school quality during the academic year, whereby school factors (e.g., school poverty, classroom resources, credentialing of teachers) had the most influence on Black-White inequities. During the summer, however, non-school factors (e.g., food insecurity, day care, parental involvement) seemed to explain class disparities. In a similar respect, social class differentials can be exacerbated during summer months because wealthy students can afford to take unpaid internships, compared to their less wealthy peers, who may have to work during that time (Stuber, 2009). Hence, studies are encouraged to consider the extent to which access to academic extracurricular activities contribute to educational inequities and the resulting impact that such inequities have on health.

Health researchers should also consider the timing and duration of exposure to quality education. From a life course perspective, the quality of one’s schooling may have a more pronounced effect on health if exposure occurs during certain developmental periods rather than others (Elder, Kirkpatrick Johnson, & Crosnoe, 2003). Schooling has been compared to a tournament: A win allows the competitor to advance to the next round, but a loss knocks the competitor out of the game (Lucas, 1999). To the extent this analogy is applicable, it suggests that early exposure to poor-quality education has a more significant impact than later exposure. Likewise, long-term exposure is likely to compound negative effects over time. Both are empirical questions and warrant further examination.

The importance of educational quality for health could also vary by individuals’ social position. For poor or socially disadvantaged individuals, a quality education may enhance the impact of educational credentials more so than for wealthy or socially advantaged individuals. This is similar to the resource substitution theory, which posits educational attainment has a greater positive impact on health among disadvantaged individuals than among advantaged individuals (C. Ross & Mirowsky, 2006). This is because disadvantaged persons have fewer alternative resources to begin with and, accordingly, have a higher marginal return. Although some studies have documented differential economic returns to educational quantity based on ascribed characteristics, such as gender or race (Kimbro et al., 2008; Masters, Hummer, & Powers, 2012; C. Ross et al., 2012), it is largely unknown whether educational quality shows similar effects. It is plausible that educational quality has the largest impact on those who are most disadvantaged (Brand & Xie, 2010; Turkheimer, Haley, Waldron,
D’Onofrio, & Gottesman, 2003). If this is true, policies that specifically target improving educational quality among marginalized communities may reduce health disparities more so than policies that simply attempt to increase graduation rates.

This idea is partially supported by Brand and Xie (2010), who considered the expected earnings of college graduates. Their study compared people who were least likely to attend college (e.g., poor families, parents with little education) to those who were most likely to attend college (e.g., wealthy families, well-educated parents). Completing college not only increased the wages of the most disadvantaged students but benefited them more than their advantaged counterparts and helped close the gap in earnings between poor and wealthy students. Brand and Xie did not examine health outcomes, but their work suggests the hypothesis that health inequities might be reduced by encouraging college completion among the most disadvantaged.

**School Segregation**

Disadvantaged schools are often racially segregated (Orfield, 2009). School racial segregation is of key concern among educators and policy makers and continues to persist at fairly high levels. As one example, in 2007-2008, the Gini index of school racial segregation was 0.79 (see Frankel & Volij, 2011, for a detailed review of several measures of school segregation), where 0 = perfect equality and 1 = total inequality. School segregation may be related to health through several mechanisms that sometimes work in opposite directions. Segregated schools may have fewer educational resources, such as books, yet may also simultaneously protect minority students from interpersonal racial discrimination. These divergent pathways may translate into differential effects in the short term versus long term.

Some emerging research provides the basis for these theoretical propositions (Botticello, 2009; Goosby & Walsemann, 2012; R. A. Johnson & Hoffmann, 2000; Walsemann, Bell, & Goosby, 2011; Walsemann, Bell, & Maitra, 2011). For example, Black adolescents educated in predominantly minority schools are less likely to initiate daily smoking (R. A. Johnson & Hoffman, 2000), report fewer depressive or somatic symptoms (Walsemann, Bell, & Maitra, 2011), and experience better self-rated health in early adulthood (Goosby & Walsemann, 2012) than Black adolescents educated in predominantly White schools.

Part of this pattern may be due to less racial discrimination in minority schools (Feagin, Vera, & Imani, 1996). A recent study found that Black students had higher levels of depressive and somatic symptoms as the proportion of White students attending their school rose (Walsemann, Bell, & Maitra, 2011). This pattern was mediated by self-reported discrimination and school attachment. Hence, once the authors accounted for discrimination and school attachment, there was no association between the proportion of White students at their school and these health outcomes among Black students. The authors also noted a nonlinear association between school racial composition and Black students’ reports of discrimination (Figure 1). Most notably, in schools that were about 90% White, over half of the Black students reported prejudice by peers and more than 20% reported unfair treatment by teachers.
The effects of school segregation may possibly vary by time scale. For some outcomes, being in predominantly minority schools may have short-term benefits for minority students via protection from everyday discrimination. At the same time, it is also plausible that minority students in predominantly White schools receive some health benefits in the long term via increases in their social mobility related to school resources and access to academic opportunities more commonly found in predominantly White schools (cf. Walsemann, Bell, & Goosby, 2001). Indeed, academic achievement and adult income is often higher for Black students attending predominantly White schools (Ashenfelter, Collins, & Yoon, 2006; Hanushek, Kain, & Rivkin, 2009; Reber, 2010) or schools that underwent desegregation (Guryan, 2004; R. C. Johnson, 2011) than for Black students attending predominantly minority schools. For example, studies find that the Black high school dropout rate declined somewhere between 3% and 6% in school districts that underwent desegregation compared to school districts that did not (Guryan, 2004; R. C. Johnson, 2011). Consistent with these ideas, R. C. Johnson (2011) showed that Black individuals who attended desegregated schools in the period between 1960 and 1990 had better self-rated health in adulthood than Black individuals who attended segregated schools.

**Figure 1.** Predicted probability of reporting that students at school were prejudiced and teachers treated students unfairly, National Longitudinal Study of Adolescent Health, Wave I, Black students (n = 3,909).

Note: Adapted from supplementary tables available upon request from the authors (Walsemann, Bell, & Maitra, 2011).
Additionally, research should examine the interrelated issues of segregation between and within schools. Redistricting and busing policies can reduce between-school segregation, but those policies may have no effect on within-school segregation (Reardon & Yun, 2001; Reardon, Yun, & Eitle, 2000). For example, school policies around academic tracking have been found to increase racial segregation within schools, as Black students are more often assigned to less rigorous courses than White students (Darling-Hammond, 2004; Mickelson & Everett, 2008; Oakes, 2005). To our knowledge, only one study has examined the effects of within-school segregation on adolescent health (Walsemann & Bell, 2010); none has examined its effects on adult health. Such nuanced experiences are important to consider in future investigations.

Immigrants and Place of Education

Another important dimension of educational stratification is nativity; foreign-born individuals display much weaker educational gradients in health compared to U.S.-born persons (Kennedy, McDonald, & Biddle, 2006; Kimbro et al., 2008; Stoddard & Adler, 2011; Walton et al., 2009). Kimbro et al. (2008) found a 7% difference in fair or poor health between those with a high school degree and those with a college degree among U.S.-born White men. Smaller differences were seen for foreign-born Blacks, Hispanics, and Asians (2%, 4%, and 4%, respectively). This weaker gradient was also seen for smoking, obesity, and work limitations, regardless of gender.

One popular explanation for the weaker education gradient among immigrants is health selection (Jasso, Massey, Rosenzweig, & Smith, 2004). Healthier individuals are more likely to migrate because they may gain the most economic benefit from migration and because the act of moving itself requires good health. In this way, health differences across levels of educational attainment are diminished, as immigrants must meet a minimum health criterion. Health selection seems particularly protective for immigrants with low educational attainment, as they have better health outcomes than U.S.-born persons with similar levels of educational attainment (Kimbro et al., 2008).

Additional factors beyond health selection are also likely to affect the educational gradient. Walton and colleagues (2009) showed place of education to be an important moderator of the relationship between educational attainment and self-rated health among Asian immigrants. An important feature of their study was that they did not simply focus on immigrants versus nonimmigrants. Rather, they distinguished between three groups: (a) Asians born and educated in the United States, (b) Asians born in Asia but educated in the United States, and (c) Asians born and educated in Asia (and currently residing in the United States). Among those who received their education in the United States—regardless of nativity—the educational gradient was as expected; less educated individuals had higher odds for poor self-rated health compared to persons with a college degree. Among the foreign-educated group, the educational gradient was weaker. This suggests that an education obtained abroad does not produce the same health benefits as a U.S. education.
An education obtained abroad does not usually translate to commensurate economic gains in the U.S. labor market. Immigrants experience a wage penalty in the U.S. labor market ranging from 8% (Epsenshade, Usdansky, & Chung, 2001; Hanley, 2011; Kaushal, 2011) to 28% (Tiagi, 2012), which varies by occupation and duration in the United States. This penalty, however, appears to be primarily explained by place of education. Using the 1990 Census data, Zeng and Xie (2004) found no difference in earnings among U.S.-born Whites, U.S.-born Asians, and foreign-born Asians educated in the United States. Asian immigrants educated abroad, however, experienced a 16% wage penalty compared to the other three groups.

The wage penalty also varies by country of origin. Studies using data from the 1970, 1980 (Schoeni, 1997), and 1990 U.S. Census (Bratsberg & Terrel, 2002) show that the wage penalty is most severe for immigrants from Latin America. For example, each additional year of education was associated with a 6.8% increase in annual wages for Canadian immigrants in the United States (Bratsberg & Terrell, 2002). Similar rates were seen for Norwegians (7.9%) and Japanese (8.2%). These rates were much lower for immigrants from the Dominican Republic (2.1%), El Salvador (2.2%), Guatemala (2.1%), Haiti (2.0%), Honduras (2.3%), and Mexico (2.0%). Although these studies are dated, they do suggest that wage penalties appear highest among immigrants from countries where persons are classified as Black or Latino in the United States. In sum, the place-of-education penalty for foreign-born workers may be influenced by additional upstream factors related to race and ethnicity in the United States.

Some other factors specific to immigrants may also be important, including English proficiency and access to social networks. For example, Walton and colleagues (2009) found that English language proficiency was the strongest mediator between place of education and self-rated health among Asian Americans. Persons educated in foreign countries may also have access to less diverse social networks, particularly in their host countries where they hope to find employment (Hagan, 1998). Social relationships are clearly related to health (Berkman & Glass, 2000; Smith & Christakis, 2008; Umberson, Crosnoe, & Reczek, 2010). Therefore, future work should examine whether place of education is mediated in part by social networks.

Researchers have yet to explore how place of education varies by gender. Most research on the wage gap has focused on immigrant men (Schoeni, 1997; Zeng & Xie, 2004), but the limited work on women indicates distinct employment characteristics and wage patterns. Some immigrant women do not have the same wage penalty as immigrant men (Goyette & Xie, 1999; Schoeni, 1998), although they may have higher underemployment (De Jong & Madamba, 2001). Immigrant women are also concentrated in service jobs that do not require a high command of English (Espiritu, 1999). Immigrant women also utilize social networks differently both in terms of their employment search as well as health resources (Hagan, 1998; Harley & Eskenazi, 2006). Exploring gender differences is likely to uncover important information about the mechanisms underlying the link between place of education and health.

Current immigration policy prioritizes skilled and educated immigrants over unskilled and less educated immigrants. However, the findings on place of education
suggest that a college education abroad does not ensure labor market success and positive health patterns in the United States. Future immigration policy must also consider how to successfully transition educated immigrants into positions that utilize their trainings and skills.

One of the major limitations of place of education research is that most population-level surveys do not ask respondents about where they received most (or all) of their education. As a result, researchers are often forced to rely on an approximate measure of place where education was completed by comparing age at migration to a fixed age at which education is assumed to be completed, such as 25 years (Tiagi, 2012). For example, immigrants who enter the United States when they are older than 26 years are assumed to have completed their total education abroad. This supposes that immigrants begin their education at age 6 and are continuously enrolled in school (Kaushal, 2011). This assumption will mischaracterize immigrants who have extended absences from school or come to the United States to complete additional schooling, often at older ages. Accordingly, place of education should be assessed in health research to avoid biasing estimates of the effect of education on health among immigrants.

Some Emerging Issues in Educational Inequity

Rates of educational attainment have risen dramatically over the past century. For example, high school graduation rates in the United States rose from 24.5% in 1940 to 87.1% in 2010. Moreover, in recent decades, the U.S. economy has shifted from an industrial-based to an information- and service-based economy (Louie, 2007). Partly due to this shift, a college degree has become increasingly necessary to attain a middle-class lifestyle. According to data from the American Community Survey, the relative wage gap for those with a college degree and those with a high school diploma increased by 41% from 1970 to 2010 (Ruggles et al., 2010).

Moreover, it is not simply that more people are more educated and the value of education has changed but that the effect of education on health specifically appears to be increasing for some groups. Using data from the 1986 to 2004 waves of the National Health Interview Survey, Masters and colleagues (2012) found, as expected, a gap in mortality between those who did not complete high school versus those with more education. However, this gap was wider among more recent cohorts. This cohort effect was seen for White men and White women and was also present, but attenuated, for Black men but was not present for Black women. The authors suggest that the decline in child mortality and the shift to chronic disease mortality in adulthood among younger cohorts has made educational attainment and its associated health benefits a stronger factor in overall mortality patterns. While the differences across Whites and Blacks may encompass some of the larger societal inequities we have discussed in this article, the Masters et al. study nonetheless raises the intriguing idea that educational inequities must also be historically contextualized.

A fuller consideration of cohort effects leads us to anticipate what aspects of the current educational system will drive future educational inequities. Numerous issues
have been identified, such as the development of charter schools, changes in college admissions policies, and many others (T. Ross et al., 2012). Here, we focus on two that illustrate the need to think beyond educational attainment.

**Student Debt**

One of the most pressing economic issues in contemporary education is student debt (Dwyer, McCloud, & Hodson, 2012). Despite several calls to study wealth and debt (Cubbin et al., 2011; Oliver & Shapiro, 1995; Shapiro, 2004), little empirical evidence has surfaced regarding student debt. Unlike most other loans (e.g., mortgages, car loans), student loans are typically not forgiven, even in standard bankruptcy filings (Sallie Mae, 2012). Congressional legislation and court decisions have made it increasingly difficult over the past three decades for students to discharge their loans (Hancock, 2009). As of March 2012, student loans amounted to a staggering $1 trillion in the United States, making it the largest source of loans second only to home mortgages (Chopra, 2012). Further, all nonstudent sources of debt (mortgages, credit cards, etc.) fell a combined $1.53 trillion between 2008 and 2012, whereas student loan debt rose by $293 billion (Quarterly Report on Household Debt and Credit, 2012). Part of this increase is attributed to the sharp rise in tuition and also to policy changes in eligibility and repayment plans for federal loans (Advisory Committee on Student Financial Assistance, 2010; Ionescu, 2009).

Some emerging research has shown that debt is related to illness. Potential mechanisms include stress and worry over debt as well as the financial problems arising from debt (Fitch, Hamilton, Bassett, & Davey, 2011; Richardson & Elliott, 2011). A study of 8,500 persons in the United Kingdom found that debt was associated with risk for mental disorders, after controlling for income (Jenkins et al., 2008). A study of university students in the United States found that having a credit card debt of at least $1,000 was correlated with obesity and other outcomes (Nelson, Lust, Story, & Ehlinger, 2008). If these correlations are causal, these statistics are troubling given that in 2011, the average student loan balance was $23,300, and 40.1% of persons under age 30 had student loan debt (Brown, Haughwout, Lee, Mabutas, & van der Klaauw, 2012).

Student debt is also patterned by race (Table 3). Among college graduates, Black students are the least likely to be debt-free (19%) and are the most likely to have debt of over $30,500 (27%). Considering the data together, we see that Black students are
more likely to be burdened with debt and to earn less than their White counterparts. An area of future investigation should be to examine how racial inequities in debt contribute to racial variation in the educational gradient in health.

**Age of Education**

Another pressing contemporary issue is the age at which education is completed. In the literature, educational attainment is typically assumed to be completed by age 25. Yet this assumption does not hold for many people. More than one in four persons attending postsecondary school were over the age of 25 in 1970. By 2010, the share of older students had increased to 38.8% and 45.5% for men and women, respectively. The vast majority (70% to 73%) of these older students are enrolled in undergraduate programs. Moreover, approximately a third of college students experience interruptions in their college education (Goldrick-Rab, Carter, & Wagner, 2007), and 37% of undergraduates attend college part-time (National Center for Education Statistics [NCES], 2011). Thus, while many students follow a “traditional” path from high school to college, others follow more disrupted, discontinuous, or delayed pathways. Moreover, such pathways are more common among more recent cohorts (Hussar & Bailey, 2008; NCES, 2009), minorities (Ewert, 2010), and women (Goldrick-Rab, 2006; Hostetler, Sweet, & Moen, 2007).

These patterns imply several methodological and conceptual issues for future study. Methodologically, we face the tension between the use of parsimonious versus comprehensive measures of educational attainment. Perhaps the simplest step would be to raise the age at which educational attainment is assumed to be completed. This change should be empirically driven and specific to gender and possibly race. However, this ignores the possibility that the effect of following a disrupted, discontinuous, or delayed educational pathway may uniquely contribute to health over and above educational attainment.

A more informative approach would be to ask about not only educational attainment but also current school enrollment and the year the highest degree was attained. The value of a more detailed approach was seen in a recent study. Adults who returned to school after age 25 and earned at least a bachelor’s degree generally had fewer depressive symptoms and better self-rated health at midlife compared to adults who maintained the level of educational attainment they had achieved at age 25 (Walsemann, Bell, & Hummer, 2012).

Conceptually, many important questions arise when one views educational attainment as a dynamic process rather than a static attribute. For example, delayed and disrupted education may yield a weaker educational gradient in health, since delays and disruptions can increase the cost of college, reduce the social benefits of college, or lower the earnings from a college degree (Elman & O’Rand, 2004; Ewert, 2010; Goldrick-Rab, 2006). Moreover, disruptions and delays in schooling are often due to life circumstances, such as the inability to pay for school, unemployment, and the need to care for others (Ewert, 2010; Hostetler et al., 2007). Given many policy initiatives designed to encourage adults to return to school, it seems timely to investigate how returning to school later in life may or may not contribute to health inequities.
Conclusion

Our review is meant to stimulate new dialogue in research related to education and health. We argue that it is not enough to simply measure years of schooling or degree attainment. The differential educational gradient across race, nativity, and gender suggest that systems of stratification are also replicated in the educational system. Structural factors, such as educational quality, school segregation, and place of education, are also related to health, independent of educational attainment (Frisvold & Golberstein, 2011; Walsemann et al., 2009; Walsemann, Bell, & Goosby, 2011; Walton et al., 2009). Clearly, educational attainment is not only a matter of individual human capital but is also a function of these higher-order influences. Accordingly, education and health researchers should investigate indicators across these multiple levels.

Viewing education as a multilevel process, rather than an individual-level characteristic, also raises questions about the initial sorting of students into educational opportunities. On average, poor children attend poor schools, whereas wealthy children attend wealthy schools, though the extent to which this occurs varies by race (Orfield, 2009). These sorting patterns are determined by districting boundaries, housing policies, and other social and economic factors. What this implies is that future research should also consider educational attainment as a mediator of these more fundamental processes. It also implies further research on the factors that sort students into more advantageous or disadvantageous educational opportunities.

We used three examples in this article to highlight the broader social factors that sort individuals into different levels of educational attainment or explain variation in the educational gradient in health: educational quality, school segregation, and place of education. Such considerations raise important unanswered questions about the effects of broader educational policies. For example, significant evidence documents the link between school integration and a range of short-term and long-term educational, economic, and social outcomes (cf. Mickelson & Nkomo, 2012). This suggests that recent Supreme Court rulings related to local control over school integration policies will significantly impact these educational, economic, and social outcomes. To what extent will such legal precedent impact health and health disparities? This remains an unanswered question but one that is worthy to pursue. Due to space considerations, we highlight this one example of an educational policy that may also affect health, but such studies should be the topic of further investigation (cf. Kawachi et al., 2010).

Clearly, educational attainment does not sufficiently capture the breadth of experiences that occur within the school system or the processes that underlie who attains and benefits from education. Renewed attention to the facets of education beyond the individual and further attention to secular changes in education are warranted in order to more fully understand and reduce educational inequities in health.

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References


Louie, V. (2007). Who makes the transition to college? Why we should care, what we know, and what we need to do. *Teachers College Record, 109*(10), 2222-2251.


**Author Biographies**

**Katrina M. Walsemann**, PhD, MPH, is an Assistant Professor in the Department of Health Promotion, Education, and Behavior in the Arnold School of Public Health at the University of South Carolina. Her work focuses on understanding how educational inequalities and institutional discrimination influence health and racial health disparities across the life course.

**Gilbert C. Gee**, PhD, is a Professor in the Department of Community Health Sciences in the Fielding School of Public Health at UCLA. His work focuses on health inequities among racial/ethnic and socioeconomically diverse populations.

**Annie Ro**, PhD, was a University of California President’s Postdoctoral Fellow in the Fielding School of Public Health at UCLA at the time of publication. She studies social and economic influences on immigrant health.