



Editor's Choice

The Best of Intentions: A Structural Analysis of the Association between Socioeconomic Disadvantage and Unintended Pregnancy in a Sample of Mothers from the National Longitudinal Survey of Youth (1979)



Akilah Wise, PhD^{a,*}, Arline T. Geronimus, ScD^b, Pamela J. Smock, PhD^b

^a Department of Health Behavior and Health Education, University of Michigan School of Public Health, Ann Arbor, Michigan

^b Population Studies Center, University of Michigan, Ann Arbor, Michigan

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A B S T R A C T

Objectives: Births to less educated women are more likely to be classified as unintended than other births. We question a common interpretation that this association reflects a lack of contraceptive knowledge or self-efficacy among less educated women. We theorize that differences in early life educational advantages structure pregnancy desires and the salience and opportunity costs of precise fertility timing. We hypothesize that net of covariates indicative of early educational disadvantage, mothers with less education are not more likely to report births as unintended compared with mothers who have attained higher levels of education before becoming mothers.

Methods: Using multivariate regression, we analyze a sample of women in the National Longitudinal Survey of Youth (1979) who had their first births by 1994. We test whether an index measure of educational advantage in youth predicts unintended first birth.

Results: Unadjusted results confirm well-documented associations between educational disadvantage and greater likelihood of unintended pregnancy. However, once covariates are controlled, those with high educational advantage in youth are more likely to report their first birth as mistimed (relative risk ratio, 1.57).

Discussion: Educational advantage captures expectations about how much education a young woman will obtain before giving birth and is a structural dynamic that precedes proximate factors related to family planning access and behaviors.

Conclusions: These findings highlight the need to incorporate structural factors that condition perceptions of pregnancy intention in the study of unintended pregnancy and to critically reevaluate the conceptualization and interpretation of pregnancy intention measures.

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Questions pertaining to pregnancy intention were first included in U.S. population-based surveys during the post World War II Baby Boom, initially designed to help study the high fertility rates associated with that period (Campbell & Mosher, 2000). In contrast, such information collected today can be interpreted as a woman's conscious intention to become a

mother for the first time (Luker, 1999). Unintended pregnancy—pregnancy reported by mothers on national surveys² to have occurred too soon or when not wanted—is associated with early childbearing, socioeconomic disadvantage, delayed prenatal care, smoking during pregnancy, low birth weight, and not breastfeeding (Brown & Eisenberg, 1995; Mohllajee, Curtis,

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* Correspondence to: Akilah Wise, PhD, Department of Health Behavior and Health Education, University of Michigan School of Public Health, 1415 Washington Heights, Ann Arbor, MI 48109.

E-mail address: amwise@umich.edu (A. Wise).

¹ Present address: 8 Corporate Boulevard, Mailstop E46, Atlanta GA 30329.

² Prominent examples include the National Survey of Family Growth (NSFG) and Pregnancy Risk Assessment Monitoring System (PRAMS).

Morrow, & Marchbanks, 2007). Under the assumption that unintended pregnancy is an important cause of these adverse outcomes (Black, Gupta, Rassi, & Kubba, 2010), its reduction has been a national public health priority since 1980 (Healthy People, 2020). Yet, more than 35 years later, according to conventional pregnancy intention measures, nearly one-half of all pregnancies in the United States remain classified as unintended (Finer & Zolna, 2016).

The seeming intractability of unintended pregnancy may stem from the complex interplay of several logical possibilities: 1) a conceptual misconstruing of what common pregnancy intention questions measure, 2) an insufficiently tested interpretation of the association between unintended pregnancy and adverse outcomes as causal, or 3) a misdiagnosis of appropriate intervention methods to address unintended pregnancy. Regarding conceptualization, the majority of pregnancies classified as unintended are pregnancies that the mother reports to have wanted later, rather than not wanted at all (Finer & Zolna, 2016). As we will elaborate, characterizing all pregnancies reported as “wanted later” or “not at all” in a forced choice format as equivalently unintended ignores complex and interwoven social, economic, and cultural factors that impact both the desire for children and the salience of precise fertility timing (Geronimus, 2003; Kendall et al., 2005; Luker, 1978; Moos, Petersen, Meadows, Melvin, & Spitz, 1997).

In terms of causality, because women most likely to report births classified as unintended disproportionately come from socioeconomically disadvantaged or racially marginalized backgrounds, prior socioeconomic disadvantage or other correlates of racial marginalization, rather than pregnancy intention, may account for the higher risk of poor outcomes (Joyce, Kaestner, & Korenman, 2000; Kearney & Levine, 2012; Kendall et al., 2005). Without accounting for these fundamental determinants, interventions that aim to reduce unintended pregnancy as a means to improve socioeconomic and health outcomes may be ineffectual (Moos, Bartholomew, & Lohr, 2003; Raymond, Trussell, & Polis, 2007).

Regarding appropriate interventions, many interpret pregnancies classified as unintended as largely attributable to limited access to modern contraception or ineffective contraceptive use among disadvantaged women who would otherwise not become pregnant. Although the subject of scholarly critique (Luker, 1999; Petersen & Moos, 1997), this inference persists, understandably pointing to the promotion of modern contraceptive methods as the frontline approach to reduce unintended pregnancy among socially and economically disadvantaged women, for example, women who are young, poor, uneducated, and Black or Latina (Cohen, 2008; Gubrium et al., 2015; Guttmacher Institute, 2016). Through this lens, robust associations between educational attainment and pregnancy intention have been interpreted to suggest that highly educated women are more skilled and have greater self-efficacy at planning pregnancies compared with their less-educated peers (Cohen, 2008).

However, differing levels of advantage in childhood constrain or amplify socioeconomic opportunities, affecting women's attitudes toward the timing of motherhood and their motivations toward contraceptive use. Studies show that students with greater cultural and social capital—community, family, and school resources—are more likely to be successful academically (Andersen & Hansen, 2012; Dumais, 2002; Roscigno & Ainsworth-Darnell, 1999; Zimdars, Sullivan, & Heath, 2009). College-educated parents have the social and political influence to assist their children in navigating school systems, and a high-

income household can provide supplemental tutoring and enrichment programs (Andersen & Hansen, 2012; Roksa & Potter, 2011). College-educated parents often introduce their children to college and employment networks (Orfield & Eaton, 1996). Additional structural factors also impact the amount and quality of education children receive, and may underlie their divergent academic trajectories. Such factors include unequal historical and institutionalized access to economic and community resources and the power of racialized and gendered ideologies in influencing relevant policies and laws. To illustrate, institutional and historical racism and enforced residential segregation influence a girl's likelihood of having college-educated parents or accessing strong neighborhood schools (Williams & Collins, 2001). Resource inequities across schools are stark and lead to educational achievement gaps by socioeconomic status, race, and place (Darling-Hammond, 2004). Moreover, some find that the material, health, and economic benefits of educational attainment are unequally distributed across racial/ethnic groups (Pearson, 2008).

Early educational advantages also condition social norms, attitudes, and expectations regarding fertility timing. Academically successful young women, who look forward to more prestigious occupations or identities to which they have access, may not view motherhood as a primary social role (Edin & Kefalas, 2011). Qualitative evidence suggests that educational resources and support conferred on female adolescents in home and school settings provide ideals for success that often precede motherhood; however, achieving these ideals also requires delaying childbearing. Youth who experience high levels of scholastic support are more likely to prioritize schooling and economic success, and thus be motivated to delay motherhood through vigilant use of contraception and/or limited sexual contact to prevent pregnancies (Thompson, 1996). In contrast, structurally disadvantaged students have fewer ways to control their academic trajectory and tend to have lower expectations for educational or economic success, which may reduce the opportunity costs and the salience associated with a “poorly timed” pregnancy. Thus, differing ideals for success and motherhood shaped by educational advantage and its precursors precede proximate family planning behaviors, and contraception use in particular. These early formed ideals may be a more apt explanation of the associations between increased educational attainment and reliable pregnancy timing.

If the construct of intended versus unintended pregnancy is more salient to those whose socioeconomic background provides them greater opportunities for investing in social roles other than motherhood (Edin & Kefalas, 2011; Thompson, 1996), the problem with interpreting education primarily as a means to contraceptive knowledge and skill is that it does not consider that vigilant pregnancy prevention among educated women likely reflects a broader strategic response to structured privilege. Studies that document associations between socioeconomic status and pregnancy intention typically use conventional measures of education—years of education or credentials completed. However, studies that measure current level of educational attainment among mothers cannot distinguish the extent to which variations in unintended births by educational level reflect structured educational opportunities, including those associated with race in a race-conscious educational system, that long preceded their pregnancies.

To address the possibility that childhood educational inequities, rather than simply educational attainment, condition whether a pregnancy is classified as unintended, we test the

hypothesis that, net of educational advantage in youth before pregnancy, less educated mothers are not more likely than more educated mothers to have births classified as unintended. We rationalize that educational opportunities in youth and the salience of delayed entry into motherhood are jointly determined—that is, they both may reflect structural advantage and disadvantage, which influences educational opportunities, norms, and the perceived costs and benefits of delayed child-bearing. Under this assumption, accounting for level of educational advantage in youth will attenuate or possibly reverse the association found between level of educational attainment and unintended pregnancy.

If our hypothesis is supported, this would suggest that educational attainment variables in pregnancy intention equations may be better understood as proxies for a cumulative, structural process in which community, family, and individuals influence the acquisition of educational advantage, rather than as a static indicator of knowledge, skills, or resources (Darling-Hammond, 2004; Dumais, 2002; Roscigno & Ainsworth-Darnell, 1999). To test our hypothesis, we use a measure of educational advantage, a composite of education-related items measured before first pregnancy and completed education, that we posit has influence on both educational attainment and pregnancy intention. This measure is an adaptation of an index of educational advantage developed by Walsemann et al. (2008a) that past research demonstrates is associated with adult health outcomes, distinct from the effects of level of educational attainment. We posit that higher scores on this index serve as a proxy for processes that encourage young women to act vigilantly to prevent early pregnancy and delay motherhood to realize the social and economic benefits of college education and substantial careers for those who are already sufficiently advantaged to be able to do so (Edin & Kefalas, 2011; Thompson, 1996).

Materials and Methods

We analyze a sample of non-Hispanic Black and white mothers in the 1979 through 1994 waves of the *National Longitudinal Survey of Youth (1979)* (NLSY79).³ Details of the sampling frame have been described at length elsewhere (*National Longitudinal Survey of Youth, 1979*). In brief, the NLSY79 is a nationally representative sample of 12,686 men and women ages 14 to 22 years old 1979. The cohort was interviewed annually through 1994 and respondent retention rates remained close to 90%. For each interview round, first-time mothers were identified as those who reported a live birth but did not report a birth in previous interview rounds.

Our sample includes the 3,062 mothers who had complete data on their first births, including pregnancy intentions and covariates of interest. We excluded 358 cases for which pregnancy intention of a first reported birth was missing; this accounts for 8.8% of those who reported births. Women who were non-Hispanic Black, younger at the time of their first birth, less educated, and less educationally advantaged in early life were more likely to have missing pregnancy intention data. The implication of missing cases being disproportionately disadvantaged is that estimates of the association between educational advantage and pregnancy intention may be conservative.

³ This study used publicly available data; thus, institutional review board approval was not required, according to the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board (IRB-HSBS).

The key outcome for this study is the pregnancy intention status of a reported first birth, in which pregnancy intention is a trichotomous variable that indicates whether the birth was mistimed, unwanted, or wanted at conception. For each pregnancy reported, respondents were asked whether they used contraception before getting pregnant, or had stopped using contraception before getting pregnant; whether their contraceptive non-use indicated a desire for a baby; and whether they wanted to have a baby then or at any time in the future. Following convention, we classified births to women who responded affirmatively to wanting to become pregnant or stopping contraceptive use because they wanted to become pregnant as wanted. Births to women who wanted to become pregnant later were classified as mistimed, and births to women who did not want to become pregnant at all were classified as unwanted.

Pregnancy intention questions first appeared in the NLSY79 in 1982; therefore, women who reported births occurring between 1979 and 1981 answered pregnancy intention questions up to 3 years after giving birth. We conducted supplemental analyses using a dummy variable to indicate whether the woman gave birth before 1982. We ran models with and without this dummy variable; the resulting patterns did not differ. We report the results of models that exclude this indicator.

The key independent variable is respondent's score on the educational advantage index adapted from that developed by Walsemann et al. (2008b). The NLSY collected detailed information on the educational experiences of respondents, including the type of courses they completed in high school, their educational expectations, and their school demographics. The indicators that comprise the adapted index are a composite of school, individual, and household characteristics that are predictive of college attainment (Lucas, 2001). In exploratory regression analysis, the indicators we included explained 32% of the variance in college attainment after controlling for race/ethnicity and age. As shown in Table 1, they include respondent characteristics before pregnancy that theoretically would be associated with her likelihood of attaining high levels of education (whether or not she expected to attend college in 1979, was enrolled in college preparatory work, or took remedial English or math classes) as well as household characteristics (whether or not her mother or father had a college degree, she lived with two

Table 1
Index of Advantage Variables and Corresponding Survey Indicators

Variable	Indicator
Individual characteristics	
Expected to attend college in 1979	Highest grade completed R expects
Enrolled in college preparatory work	Type of current or last curriculum in grades 9–12
Did not take remedial English	Remedial math taken at this school
Did not take remedial math	Remedial English taken at this school
Household characteristics	
Lived with two married parents at age 14	With whom did R live at age 14
Mother had a college degree	Highest grade completed by R's mother
Father had a college degree	Highest grade completed by R's father
Family subscribed to newspaper at age 14	At age 14, did any household member receive newspapers regularly

Abbreviation: R, Respondent.

married parents at age 14 or whether her family subscribed to a newspaper then). These are best viewed as proxy measures for school and family educational resources, which are often associated with school and neighborhood segregation, as well (Darling-Hammond, 2004; Orfield & Eaton, 1996), rather than as measures of the literal effects of having married parents or a family newspaper subscription per se.

Respondent's current or last high school administrator, depending on enrollment status, provided data on whether a respondent had ever taken remedial English or math in high school. Other information was obtained by respondent self-reports. All indicators are dichotomized, coded 1 to reflect advantage and 0 to reflect disadvantage, and summed into an index to capture cumulative advantage and weighted by their effect on college attainment by age 25. The effects of each variable on the probability of obtaining a college degree by age 25 in our sample, net of respondent's race and age in 1979, are listed in Table 2.

We control for respondents' family poverty status in 1978, their marital status, and interview year. Respondents' marital status is measured as a nominal variable: married, never married, or other, as in an alternative relationship status, most likely cohabitation. Marital status is lagged 2 years before the year of pregnancy to examine the effects of marriage on fertility and not vice versa. Because Black or younger women are more likely to have an unintended pregnancy, we also control for maternal race and age at first birth, including quadratic and cubic age terms to account for any nonlinear effects.

To test the validity of our assumption that the index of advantage measures something distinct from level of education, we include two conventional measures of educational attainment: educational attainment by first birth to capture the relationship between education and fertility, and education by age 25 to measure lifetime educational achievement. Educational attainment before first birth is lagged 2 years before the year of reported first birth to examine the effects of educational attainment on birth without incorporating the effects of birth on education.

We estimate a series of multinomial logistic regression models to examine the association between educational advantage and pregnancy intention of first birth. Each model is nested to test the association between the index of advantage and unintended first births while observing the effect of model covariates.

Suppressing the individual subscripts, the full model can be written as:

$$\begin{aligned} \text{Log} \left[\frac{P_{j(t)}}{1 - P_{j(t)}} \right] = & \alpha_{1j} + \beta_{3j}\text{Race} + \alpha_{2j}(\text{age} - 25)(t) \\ & + \alpha_{3j}(\text{age} - 25)^2(t) + \alpha_{3j}(\text{age} - 25)^3(t) \\ & + \beta_{5j}\text{Poverty} + \beta_{4j}\text{Marital} \\ & + \beta_{2j}\text{Years of Education} + \beta_{1j}\text{EA} \end{aligned}$$

where the logit of a birth intention is an additive function of the covariates, *j* indexes births according to pregnancy intention status, and *t* indexes age at first birth centered at age 25. The parameters α_1 to α_3 represent the value of the log odds of a birth of pregnancy intention status *j* at age *t* when all other covariates are zero. β_{1j} is the coefficient for the main effect of educational advantage index. β_{2j} and β_{4j} represent the estimated coefficients for the sociodemographic controls. We used custom sample weights that adjust for multiple years' worth of data provided by the National Longitudinal Surveys website, to account for the survey's complex sampling design.

Results

Descriptive Results

As shown in Table 3, the average respondent is not yet 24 years old at the time of her first birth and has obtained a high school degree; 43% are married. Most respondents are non-Hispanic White (83%); 16% are non-Hispanic Black. A minority (17%) resided in an impoverished household in 1978. Regarding variation in educational advantage, in 1979, 33% of NLSY respondents reported expecting to attend college, whereas 25% were enrolled in college preparatory work. Less than 10% of the sample was enrolled in remedial math or English classes.

The average respondent had a moderate number of educational advantages (minimum, 0; maximum, 14.3), and was more likely to have her first birth classified as wanted (61% compared with 33% mistimed and 6% unwanted). Mothers with the highest educational advantage in youth (>75th percentile on the index) were significantly older, more educated, more likely to be married before their first birth, and non-Hispanic White than either those with moderate (25th–75th percentile) or lowest (<25th percentile) educational advantage in youth ($p < .001$), consistent with our expectations. Among mothers with the highest educational advantage, 68% of births were classified as wanted, 26% classified as mistimed, and 5% as unwanted. Meanwhile, among mothers with the lowest educational advantage, 56% of births were classified as wanted, 36% as mistimed, and 8% as unwanted. The differences between these groups were significant at the $p < .05$ level.

Before adjusting for covariates, unintended pregnancy (mistimed and unwanted) was inversely related to educational advantage, and high educational advantage was linked to high socioeconomic status. We also note that although the educational attainment measures are associated with the educational advantage index at significant levels, the correlation between educational attainment before the first birth and the educational advantage index is 0.57 ($p < .05$), whereas that between educational attainment at age 25 and the educational advantage index is 0.25 ($p < .05$). This suggests that the educational attainment measure and the educational advantage index capture overlapping but distinct concepts.

Table 4 shows that the probability of obtaining a high school or college degree is patterned socially by women's educational

Table 2
Effects of Index of Advantage Indicators on College Degree Attainment by Age 25, Controlling for Respondent's Race and Age in 1979

Indicator	Beta	SE	p Value
Individual characteristics			
Expected to attend college	3.22	0.149	<.001
Enrolled in college preparatory work	1.92	0.113	<.001
Did not take remedial English	2.19	0.510	<.001
Did not take remedial Math	2.20	0.426	<.001
Household characteristics			
Lived with two married parents at age 14	0.87	0.148	<.001
Mother had a college degree	1.29	0.130	<.001
Father had a college degree	1.35	0.111	<.001
Family subscribed to newspaper at age 14	1.26	0.192	<.001

Table 3
Levels and Significance of Sample Characteristics (Column 1) and Index of Advantage (Columns 2 and 3) by Sociodemographic Variables

	Sample Characteristics (n = 3,062) Level	Below 25th Percentile Educational Advantage (n = 828) Level	25th–75th Percentile Educational Advantage (n = 1,583) Level	Above 75th Percentile Educational Advantage (n = 651) Level	Sig.
Index of advantage	7.9	4.7	7.4	12.1	*
First birth pregnancy intention status (%)					
Wanted	60.9	56.1	59.7	68.3	*
Mistimed	33.0	35.9	34.6	25.6	*
Unwanted	6.1	8.0	5.7	5.2	*
Education by first birth (y)	12.3	10.8	11.9	14.7	*
Education at age 25 (y)	12.4	11.1	12.0	14.4	*
Marital status (%)					
Never married	48.5	57.9	47.2	42.0	*
Married	43.6	33.2	44.9	50.8	*
Other	7.9	8.9	7.9	7.2	*
Age at first birth (y)	23.6	21.3	23.1	26.8	*
Family in poverty in 1978 (%)	16.9	31.3	14.4	8.8	*
Race and/or ethnicity (%)					
Non-Hispanic White	83.4	71.9	86.5	86.8	*
Non-Hispanic Black	16.6	28.1	13.5	13.2	*

Note: Column 1 refers to descriptive characteristics of the study sample. Column 2 refers to the percentage of respondents with a low score (<25th percentile) in the Index of Advantage who have a given characteristic. Column 3 refers to percentage of those with middle score with a given characteristic. Column 4 refers to the given characteristic percentage of respondents with a high score (\geq 25th percentile or greater) who have a given characteristic. Analysis of variance was used to determine significance level of differences between columns 2, 3, and 4. Educational level and marital status is measured in the survey 2 years before year of first birth.

* $p < .001$.

advantage in youth. Whether the educational attainment variable is years of schooling attained 2 years before the first birth or years of schooling attained by age 25, only a trivial percentage of those lowest in educational advantage achieve college degrees (0.5% by first birth; 2.2% by age 25) and, conversely, only a small percentage of those with the highest educational advantage attain less than a high school education (8.8% by first birth; 1.5% by age 25). It is also of note that, although 56.3% of women with low educational advantage in youth had not completed high school before their first birth, that proportion decreased to 35.3% by age 25.

Multivariate Regression Results

Table 5 shows results from the multinomial logistic regression models. The primary finding is that educationally disadvantaged first-time mothers are not more likely to report their births as unintended than are their educationally advantaged counterparts, net of individual and household characteristics in youth.

In the unadjusted model (model 1), however, higher levels of educational advantage are associated with a lower chance of one's first birth being unintended. The highest educational

advantage quartile is associated with a significant decrease in mistimed or unwanted first birth. Controlling for race (model 2) attenuates the association between educational advantage and mistimed or unwanted pregnancies. First, births to Black mothers are 2.6 times more likely to be classified as mistimed, and 5.7 times more likely to be classified as unwanted, than first births to White mothers. Although adjusting for race lessens the magnitude of the association between pregnancy intention and educational attainment in the middle (25th–75th) and the lowest (<25th) percentile ranges of advantage, the size of the relationship in the highest educational advantage and intendedness of birth remains robust.

As shown in model 3, net of educational advantage and race, an increase in age at first birth is related to a small but significant decrease in the chances that a birth is reported as unintended. Although being Black remains associated at statistically significant levels with the odds of reporting an unintended birth, the magnitude of that association decreases substantially once age is taken into account. Importantly, once age is controlled, the direction of the estimated association between educational advantage and pregnancy intention changes direction such that higher levels of educational advantage are now associated positively with the odds of having an unintended birth. This association is significant for mistimed, but not for unwanted, births.

Results for model 4 show that—once educational advantage, race, and age are controlled—poverty in adolescence has no independent relationship with pregnancy intention. Model 5 shows that, all else equal, being married is associated with substantially lower odds of reporting a birth as mistimed or unwanted than being never married. Controlling for marital status increases the positive association between higher educational advantage and having first births classified as unintended.

Table 6 addresses the question of whether the educational advantage measure captures more than educational attainment. Models 1 and 2 show the estimated effects of the explanatory variables net of educational attainment at first birth or by age 25, respectively. After controlling for either educational attainment

Table 4
Years of Schooling Attained by EA in Youth, NLSY 1979–1994

Educational level, years (%)	Low EA	Middle EA	High EA
Distribution of years of education by age 25 by educational advantage			
0–11	35.3	17.8	1.5
12–15	60.7	76.0	49.5
\geq 16	2.2	6.3	43.2
Distribution of years of education by first birth by educational advantage			
0–11	56.3	30.8	8.8
12–15	43.2	64.0	52.5
\geq 16	0.5	5.2	38.7

Abbreviations: EA, educational advantage; NLSY, National Longitudinal Survey of Youth.

$p < .0001$ (χ^2).

Table 5
RRR of Mistimed and Unwanted First Birth and Education Advantage Percentiles, Unadjusted and Adjusted for Covariates, NLSY ($n = 3,062$)

	Model 1			Model 2			Model 3			Model 4			Model 5																	
	Mistimed		Unwanted																											
	vs Wanted			vs Wanted			vs Wanted			vs Wanted			vs Wanted																	
	RRR	SE	Sig.																											
Index of advantage (below 25th percentile ref.)																														
25th-75th percentile	0.90	0.104		0.73	0.135	+	1.03	0.123		0.98	0.186		1.30	0.166	*	1.29	0.268		1.35	0.179	*	1.42	0.307		1.42	0.194	**	1.47	0.327	+
>75th percentile	0.61	0.087	***	0.53	0.127	**	0.69	0.101	*	0.69	0.171		1.45	0.239	*	1.44	0.422		1.60	0.279	**	1.62	0.493		1.70	0.301	**	1.88	0.573	*
Race and/or ethnicity (non-Hispanic White ref.)																														
Non-Hispanic Black				2.60	0.247	***	5.69	0.906	***	1.85	0.190	***	3.73	0.642	***	1.90	0.207	***	3.18	0.592	***	1.54	0.178	***	2.37	0.468	***			
Age at first birth										0.85	0.018	***	0.90	0.032	**	0.84	0.018	***	0.90	0.033	**	0.86	0.021	***	0.93	0.036	+			
Age squared										1.01	0.002	***	1.02	0.003	***	1.01	0.002	***	1.02	0.003	***	1.01	0.002	***	1.02	0.003	***			
Age cubed										1.00	0.000	*	1.00	0.003		1.001	0.000	*	1.00	0.000		1.000	0.000		1.00	0.000				
Family poverty status 1978 (not in poverty ref.)																														
In poverty																														
Marital status (never married ref.)																														
Married																														
Other																														

Abbreviations: ref., reference; RRR, relative risk ratio; SE, standard error.

Note: Age is centered on 25 years of age. All models account for sampling design. Standard errors are indicated in italics.

* $p < .05$, ** $p < .01$, *** $p < .001$, + $p < .10$.

Table 6
RRR of Mistimed and Unwanted First Birth and Education Advantage Percentiles, Adjusted for Educational Attainment

	Model 1						Model 2					
	Mistimed			Unwanted			Mistimed			Unwanted		
	vs Wanted						vs Wanted					
	RRR	SE	Sig.	RRR	SE	Sig.	RRR	SE	Sig.	RRR	SE	Sig.
Index of advantage (<25th percentile ref.)												
25th–75th percentile	1.35	<i>0.187</i>	*	1.47	<i>0.333</i>	+	1.39	<i>0.191</i>	*	1.46	<i>0.327</i>	+
>75th percentile	1.38	<i>0.265</i>	+	1.86	<i>0.603</i>	+	1.57	<i>0.287</i>	*	1.82	<i>0.555</i>	*
Education at age 25 (y)							1.04	<i>0.020</i>	+	1.01	<i>0.030</i>	
Education by first birth (y)	1.11	<i>0.043</i>	**	0.99	<i>0.065</i>							
Race and/or ethnicity (non-Hispanic White ref.)												
Non-Hispanic Black	1.49	<i>0.174</i>	***	2.41	<i>0.480</i>	***	1.52	<i>0.177</i>	***	2.36	<i>0.468</i>	***
Age at first birth	0.84	<i>0.023</i>	***	0.93	<i>0.043</i>	+	0.86	<i>0.021</i>	***	0.92	<i>0.038</i>	+
Age squared	1.01	<i>0.002</i>	***	1.02	<i>0.003</i>	***	1.01	<i>0.002</i>	***	1.02	<i>0.003</i>	***
Age cubed	1.000	<i>0.000</i>		1.00	<i>0.000</i>		1.000	<i>0.004</i>		1.00	<i>0.000</i>	
Family poverty status 1978 (not in poverty ref.)												
In poverty	0.86	<i>0.114</i>		1.17	<i>0.249</i>		0.85	<i>0.113</i>		1.18	<i>0.251</i>	
Marital status (never married ref.)												
Married	0.38	<i>0.047</i>	***	0.21	<i>0.061</i>	***	0.40	<i>0.049</i>	***	0.21	<i>0.059</i>	***
Other	0.88	<i>0.203</i>		0.95	<i>0.318</i>		0.90	<i>0.204</i>		0.93	<i>0.313</i>	

Abbreviations: ref., reference; RRR, relative risk ratio; SE, standard error.

Note: Age is centered on 25 years of age. All models account for sampling design. Standard errors are indicated in italics.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, + $p \leq .10$.

variable, independent and positive effects of educational advantage on the odds of unintended birth remain robust, reinforcing the view that the educational advantage index captures a different construct than current educational attainment alone.

Discussion

To our knowledge, this is the first study to test the hypothesis that women who experienced educational advantages in youth are as or more likely than their less advantaged peers to have births resulting from pregnancies classified as unintended. We find that having greater educational advantage in youth, although associated with lower odds of having an unintended first birth in the unadjusted model, is associated robustly with a greater odds of having an unintended first birth once covariates are controlled. In particular, controlling for maternal race attenuates the association and controlling for age reverses it. The resulting positive association between adolescent educational advantage and unintended first births remains in the presence of controls for marital status, childhood poverty, and educational attainment by age at first birth or by age 25 years.

Educational advantage captures expectations of educational attainment, conditional on structured circumstances related to the quality of educational resources available to girls in youth. Research documents that these resources are related to socioeconomic position and race in the United States and disparities in childhood educational resources in youth reflect educational inequity (Darling-Hammond, 2004; Roscigno & Ainsworth-Darnell, 1999). Importantly, race stratifies early educational opportunity in the United States and is strongly associated with pregnancy intention. Once race effects are accounted for, the positive association between pregnancy intention and educational advantage attenuates.

Age at first birth is also an important confounder of the association between educational advantage and pregnancy intention. If we interpret educational advantage as structured educational expectations in youth, this confounding of age, race, and educational advantage becomes almost mechanistic. Simply

put, if normative age at first birth increases with level of expected education, as much research suggests (Afable-Munsuz, Speizer, Magnus, & Kendall, 2006; Edin & Kefalas, 2011; Geronimus, Korenman, & Hillemeier, 1994; Martin, 2000), then the older a woman is at first birth the more she will have exceeded her normative first birth age if she is a member of a less educationally advantaged population. Thus, young women from educationally advantaged circumstances, who tend to have higher normative first birth age and expectations for educational attainment, will be more likely to characterize their first births as mistimed than their less advantaged counterparts. In some sense, at older ages only women from advantaged backgrounds can report their births as earlier than wanted, or mistimed, which is the category comprising the majority of unintended pregnancies (Finer & Zolna, 2016). Interestingly, in conventional coding schemes, births occurring later than desired are classified as wanted rather than mistimed—a process that may reflect the dominant culture's emphasis on avoiding births that occur “too early” (Geronimus, 2003).

Taken together, the findings of this study, the classification of pregnancies reported as occurring too soon (rather than also too late) as mistimed, and the mechanics outlined above, suggest that the concept of having an unintended birth is a relative and imposed, rather than an objective, construct. A birth is mistimed only relative to fertility-timing norms that themselves vary with overall structural advantage and race in the United States (Geronimus, 2003). Because there is little societal support for family policy to facilitate significant child caretaking responsibilities during the years of women's advanced educational and initial career development, highly advantaged women may take more time than disadvantaged women to accrue the resources needed to reconcile their previously established educational and professional ambitions with the anticipated demands of having a baby (Johnston & Swanson, 2006).

In addition, we found the impact of educational advantage in youth is independent of the impact of conventional educational attainment measures. The coefficients on the educational advantage index remained stable and positive in models that also included either educational attainment variable: years of

education before first birth or years of education by age 25. And these educational attainment variables showed some small effects, independent of the educational advantage index. After controlling for educational advantage, the coefficient for either educational attainment variable can be interpreted as the number of years of schooling a mother obtained relative to expectation. The finding that mothers whose births are classified as mistimed are estimated to have achieved higher levels of education than expected suggests that mistimed births are not responsible for the average lower educational attainment of mothers who report their births as mistimed. Educational attainment at first birth has no association with whether a birth is unwanted, raising questions about the validity of the convention of grouping unwanted and mistimed births together as unintended.

Our findings complicate pervasive wisdom that unintended birth is a valid construct or objective categorization. They also suggest that increasing access to modern contraception, while meritorious on the grounds of autonomous reproductive rights,⁴ cannot be expected to reduce dramatically births classified as unintended or the prevalence of poor birth outcomes among the socioeconomically disadvantaged. If educational attainment, maternal and child health outcomes, and the probability that women's answers to pregnancy intention questions are classified as unintended, all spring from broader structural inequities that precede pregnancy, focusing on modern contraceptive use as a pivotal intervention cannot be expected to yield sizeable socioeconomic or health benefits universally across populations (Gubrium et al., 2015). This approach also unjustifiably puts the onus on individual young women and health service providers to address social and public health problems that are likely better addressed by promoting health and educational equity for all youth.

The strength of this study comes from the detailed, prospective, and longitudinal data on educational advantage in youth and later life fertility timing and intention available via the NLSY. However, we had no direct measures of school resources, relying instead on proxies to construct the educational advantage index. Data limitations also precluded us from performing direct tests of our interpretation that the often described association between intendedness of birth and birth outcome is confounded by selection into population differences in childbearing timing norms that are, themselves, conditioned by early social advantage or disadvantage. The findings of other studies directly addressing the questions of whether race, maternal age, or reports of pregnancy intendedness cause the poor birth outcomes with which they are associated are nonetheless consistent with our interpretations (Geronimus, 2003; Joyce et al., 2000; Kearney & Levine, 2012; Kendall et al., 2005).

Excessive rates of poor maternal and child health outcomes among the socioeconomically disadvantaged and Blacks in the United States are compelling health inequities that must be addressed. Our findings suggest that structural factors conditioning future opportunities, childbearing norms, and local perceptions of whether a birth is mistimed are likely to be more important sources of population disparities in maternal and child health than whether births are classified from national survey responses as intended or unintended. By constructing unintended pregnancy as a public health problem that stems from a

lack of correct or skillful “planning” or self-efficacy in contraceptive use, rather than as a distinction that is culturally and socioeconomically variable, policies and programs that aim to decrease its rate may be misguided and unnecessarily stigmatizing to already marginalized subgroups of women, rather than health promoting for mothers and children.

Implications for Practice and/or Policy

Based on this evidence, we suggest researchers strive to increase conceptual clarity regarding what pregnancy intention variables measure and, in particular, reconsider its common use as a measure of access to and self-efficacy in using contraception, or as an important cause of maternal and child health disparities. Instead, the lens for considering pregnancy intention statistics would benefit from a focus on the structural inequities that condition a woman's opportunities throughout her life course and frame the trade-offs she faces in fulfilling multiple social roles. The desire and ability to control the various domains of life needed to “intend” a pregnancy are sensitive to social inequities that produce differential socioeconomic opportunities, support systems, levels of academic preparation, and barriers to reproductive autonomy and maternal and child well-being (Macleod, 2015). We also suggest that clinicians who see women—particularly young or disadvantaged women—develop structural competency and humility, or the recognition of structural constraints in their lives (Metzl & Hansen, 2014), and adopt an approach that prioritizes young women's socially situated family planning and health priorities and is sensitive to disparities in the structural challenges and opportunities women face in a multicultural and unequal society (Gubrium et al., 2015).

This shift to a reproductive justice framework in research and practice acknowledges the role of social inequities in reproductive health. Policies to promote reproductive equity are likely to be of greater benefit to women's and children's health than preventing so-called unintended pregnancies.

References

- Afable-Munsuz, A., Speizer, I., Magnus, J. H., & Kendall, C. (2006). A positive orientation toward early motherhood is associated with unintended pregnancy among New Orleans youth. *Maternal and Child Health Journal*, 10(3), 265–276.
- Andersen, P. L., & Hansen, M. N. (2012). Class and cultural capital—The case of class inequality in educational performance. *European sociological review*, 28(5), 607–621.
- Black, K. I., Gupta, S., Rassi, A., & Kubba, A. (2010). Why do women experience untimed pregnancies? A review of contraceptive failure rates. *Best Practice & Research Clinical Obstetrics & Gynaecology*, 24(4), 443–455.
- Brown, S. S., & Eisenberg, L. (1995). Unintended pregnancy and the well-being of children and families. *JAMA*, 274(17), 1332.
- Campbell, A. A., & Mosher, W. D. (2000). A history of the measurement of unintended pregnancies and births. *Maternal and Child Health Journal*, 4(3), 163–169.
- Cohen, S. A. (2008). Abortion and women of color. *Conscience*, 29(3), 37.
- Darling-Hammond, L. (2004). The color line in American education: Race, resources, and student achievement. *Du Bois Review*, 1(02), 213–246.
- Dumais, S. A. (2002). Cultural capital, gender, and school success: The role of habitus. *Sociology of Education*, 75(1), 44–68.
- Edin, K., & Kefalas, M. (2011). *Promises I can keep: Why poor women put motherhood before marriage*. Berkeley and Los Angeles, CA: University of California Press.
- Finer, L. B., & Zolna, M. R. (2016). Declines in unintended pregnancy in the United States, 2008–2011. *New England Journal of Medicine*, 374, 843–852.
- Geronimus, A. T. (2003). Damned if you do: Culture, identity, privilege, and teenage childbearing in the United States. *Social Science & Medicine*, 57(5), 881–893.
- Geronimus, A. T., Korenman, S., & Hillemeier, M. M. (1994). Does young maternal age adversely affect child development? Evidence from cousin comparisons in the United States. *Population and Development Review*, 20(3), 585–609.

⁴ To be clear, we aver that universal access to autonomous reproductive decision making and the means to implement it is the foundation of reproductive rights (Luna & Luker, 2013).

- Gubrium, A. C., Mann, E. S., Borrero, S., Dehlendorf, C., Fields, J., Geronimus, A. T., ... Kimport, K. (2015). Realizing reproductive health equity needs more than long-acting reversible contraception (LARC). *American Journal of Public Health*, 106(1), e1–e2.
- Guttman Institute. (2016). *Unintended pregnancy in the United States*. Available: <https://www.guttman.org/pubs/FB-Unintended-Pregnancy-US.html>. Accessed: September 18, 2016.
- Healthy People, 2020: Family Planning [Internet]. Washington, DC: U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Available: <https://www.healthypeople.gov/2020/topics-objectives/topic/maternal-infant-and-child-health>. Accessed: May 1, 2015.
- Johnston, D. D., & Swanson, D. H. (2006). Constructing the "good mother": The experience of mothering ideologies by work status. *Sex Roles*, 54(7–8), 509–519.
- Joyce, T. J., Kaestner, R., & Korenman, S. (2000). The effect of pregnancy intention on child development. *Demography*, 37(1), 83–94.
- Kearney, M. S., & Levine, P. B. (2012). Why is the teen birth rate so high in the United States and why does it matter? *Journal of Economic Perspectives*, 26(2), 141–163.
- Kendall, C., Afable-Munsuz, A., Speizer, I., Avery, A., Schmidt, N., & Santelli, J. (2005). Understanding pregnancy in a population of inner-city women in New Orleans—Results of qualitative research. *Social Science & Medicine*, 60(2), 297–311.
- Lucas, S. R. (2001). Effectively maintained inequality: Education transitions, track mobility, and social background effects. *American Journal of Sociology*, 106(6), 1642–1690.
- Luker, K. (1978). *Taking chances: Abortion and the decision not to contracept* (Vol. 381). Berkeley and Los Angeles, CA: University of California Press.
- Luker, K. C. (1999). Forum: A reminder that human behavior frequently refuses to conform to models created by researchers. *Family Planning Perspectives*, 31(5), 248–249.
- Luna, Z., & Luker, K. (2013). Reproductive justice. *Annual Review of Law and Social Science*, 9, 327–352.
- Macleod, C. I. (2015). Public reproductive health and 'unintended' pregnancies: Introducing the construct 'supportability'. *Journal of Public Health*, 38, e384–e391.
- Martin, S. P. (2000). Diverging fertility among US women who delay childbearing past age 30. *Demography*, 37(4), 523–533.
- Metzl, J. M., & Hansen, H. (2014). Structural competency: Theorizing a new medical engagement with stigma and inequality. *Social Science & Medicine*, 103, 126–133.
- Mohllajee, A. P., Curtis, K. M., Morrow, B., & Marchbanks, P. A. (2007). Pregnancy intention and its relationship to birth and maternal outcomes. *Obstetrics & Gynecology*, 109(3), 678–686.
- Moos, M.-K., Bartholomew, N. E., & Lohr, K. N. (2003). Counseling in the clinical setting to prevent unintended pregnancy: an evidence-based research agenda. *Contraception*, 67(2), 115–132.
- Moos, M.-K., Petersen, R., Meadows, K., Melvin, C. L., & Spitz, A. M. (1997). Pregnant women's perspectives on intendedness of pregnancy. *Women's Health Issues*, 7(6), 385–392.
- National Longitudinal Survey of Youth. (1979). *Sample Design and Screening Process*. National Longitudinal Surveys. Available: <https://www.nlsinfo.org/content/cohorts/nlsy79/intro-to-the-sample/sample-design-screening-process>. Accessed: November 1, 2015.
- Orfield, G., & Eaton, S. (1996). *Dismantling desegregation. The Quiet Reversal of Brown v. Board of Education*. New York, NY: The New Press.
- Pearson, J. A. (2008). Can't buy me whiteness. *Du Bois Review: Social Science Research on Race*, 5(01), 27–47.
- Petersen, R., & Moos, M.-K. (1997). Defining and measuring unintended pregnancy: issues and concerns. *Women's Health Issues*, 7(4), 234–240.
- Raymond, E. G., Trussell, J., & Polis, C. B. (2007). Population effect of increased access to emergency contraceptive pills: A systematic review. *Obstetrics & Gynecology*, 109(1), 181–188.
- Roksa, J., & Potter, D. (2011). Parenting and academic achievement intergenerational transmission of educational advantage. *Sociology of Education*, 84(4), 299–321.
- Roscigno, V. J., & Ainsworth-Darnell, J. W. (1999). Race, cultural capital, and educational resources: Persistent inequalities and achievement returns. *Sociology of Education*, 72(3), 158–178.
- Thompson, S. (1996). *Going all the way: Teenage girls' tales of sex, romance, and pregnancy*. New York: Macmillan.
- Walsemann, K. M., Geronimus, A. T., & Gee, G. C. (2008a). Accumulating disadvantage over the life course. *Research on Aging*, 30(2), 169–199.
- Walsemann, K. M., Geronimus, A. T., & Gee, G. C. (2008b). Accumulating disadvantage over the life course evidence from a longitudinal study investigating the relationship between educational advantage in youth and health in middle age. *Research on Aging*, 30(2), 169–199.
- Williams, D. R., & Collins, C. (2001). Racial residential segregation: a fundamental cause of racial disparities in health. *Public Health Reports*, 116(5), 404–416.
- Zimdars, A., Sullivan, A., & Heath, A. (2009). Elite higher education admissions in the arts and sciences: Is cultural capital the key? *Sociology*, 43(4), 648–666.

Author Descriptions

Akilah Wise, PhD, is a pre-doctoral trainee at the Population Studies Center at the University of Michigan. Her research interests include social determinants of population health and racial health disparities, racial/ethnic differences in reproductive health, birth outcomes, social stratification, and chronic disease.

Arline T. Geronimus, ScD, is a Professor within the Department of Health Behavior and Health Education at the University of Michigan's School of Public Health. She also serves as Research Professor at the University of Michigan's Population Studies Center. Her research include understanding social and biological mechanisms that mediate racial disparities in health along the pathway from the environmental to the cellular level, including the cultural influences on population variation in family structure and age-at-first birth.

Pamela J. Smock, PhD, is a Professor of Sociology at the University of Michigan. She also serves as Research Professor at the University of Michigan's Population Studies Center. Her research include family patterns and change in the United States, unmarried cohabitation, the economic consequences of divorce and marriage for women, men, and children, and racial/ethnic differences in family patterns.