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Original Contribution

A Changing Landscape of Health Opportunity in the United States: Increases in the Strength of Association Between Childhood Socioeconomic Disadvantage and Adult Health Between the 1990s and the 2010s

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Understanding the changing health consequences of childhood socioeconomic disadvantage (SED) is highly relevant to policy debates on inequality and national and state goals to improve population health. However, changes in the strength of association between childhood SED and adult health over historic time are largely unexamined in the United States. The present study begins to address this knowledge gap. Data were from 2 national samples of adults collected in 1995 ($n = 7{,}108$) and 2012 ($n = 3{,}577$) as part of the Midlife in the United States study. Three measures of childhood SED (parents' occupational prestige, childhood poverty exposure, and parents' education) were combined into an aggregate index and examined separately. The association between childhood SED (aggregate index) and 5 health outcomes (body mass index, waist circumference, chronic conditions, functional limitations, and self-rated health) was stronger in the 2012 sample than the 1995 sample, with the magnitude of associations being approximately twice as large in the more recent sample. Results persisted after adjusting for age, sex, race, marital status, and number of children, and were similar across all 3 measures of childhood SED. The findings suggest that the socioeconomic circumstances of childhood might have become a stronger predictor of adult health in recent decades.

childhood socioeconomic status; health disparities; secular trends; social epidemiology; social stratification

Abbreviations: BMI, body mass index; MIDUS, Midlife in the United States; SD, standard deviation; SED, socioeconomic disadvantage.

Editor's note: *An invited commentary on this article appears on page 2294, and the authors' response appears on page 2297.*

Understanding the changing health consequences of childhood socioeconomic disadvantage (SED) is highly relevant to policy debates on inequality in countries around the world, as well as to national and state goals to improve population health and optimize economic functioning. Despite the social and scientific significance of health stratification processes, changes in the strength of the associations between childhood SED and adult health over historic time are largely unexamined. Research has instead focused on secular trends in health outcomes (1, 2) or on the association between adult socioeconomic indicators on adult health (3–10). However, several macro-level societal changes in the United States—3 discussed below—suggest that social inequality has increased in ways that likely influence life-course health-stratification processes. Although our focus is on the United States, similar trends are evident to varying degrees across the developed world (11).

Income inequality trends

Income inequality has increased substantially over the past several decades. While incomes of the bottom 60% of the population have remained relatively stagnant, incomes of the top 20% have increased, with the top 1% showing the largest gains (12). Four decades ago, the poor and middle class enjoyed substantially more income growth than the rich (13). But by 2014, this trend had reversed with annual income growth as high as 6% for the richest Americans, 1% for the middle class, and close to zero for those at the bottom of the income distribution (13, 14). Such growth in income and wealth for more affluent segments of the population has led to ongoing increases in economic inequality (11).

Income segregation trends

Accumulating evidence suggests that alongside rising economic inequality, income segregation has also increased. One study showed that in 1970, 65% of families in large metropolitan areas lived in middle-class, mixed income neighborhoods, where the median income was close to that of the metro area as a whole (15). However, by 2009, only 42% of families lived in such neighborhoods. Mixed-income neighborhoods—and accompanying mixed income schools, playgrounds, recreation centers, shopping malls, and the like—were replaced by neighborhoods that were very poor or very affluent (16). This converges with growing research on income segregation (17–19), and this finding has withstood various methodological challenges (20). The evidence thus shows that in the last several decades the United States has become more geographically divided by socioeconomic factors in ways that limit opportunities of those in disadvantaged contexts (21, 22).

Occupation and work environment trends

The labor market in the United States has changed substantially since the mid-twentieth century (23). Between 1960 and 2016, the proportion of manufacturing industry jobs decreased from 30% to 8%, while service industry jobs increased from 55% to 80% (24, 25). Some new jobs in the service sector (e.g., medical professionals) pay a living wage and come with adequate benefits. However, many new service sector jobs (e.g., fast food worker) offer few benefits, and come with little autonomy and control (23, 26). Wages and benefits have increased for the most advantaged segments of the labor market (27), while in less-advantaged segments of the labor market wages have been relatively stagnant and benefits have declined (26, 28). In short, there is growing evidence that for adults with low to moderate levels of education or technical training, the labor market has become less favorable (29), and the relative disadvantage between high and low skilled jobs has grown (30).

Implications for life-span health-stratification processes

The above 3 trends have important implications for life-span experiences as a function of socioeconomic background. Due to increased stratification of labor markets and living communities, disparities in exposure to adversity across the socioeconomic hierarchy might have widened, with long-term implications for health disparities across the life span. Importantly, research has shown substantial variability in the magnitude of the association between childhood SED and adult health across nations or states and with changes in social policy (31–36). These findings converge with the idea that the broader social context is largely responsible for shaping how socioeconomic background influences adult health (37) and that changes in these contexts over time might lead to changes in the strength of the childhood SED–adult health association. We therefore hypothesize that childhood circumstances, specifically family SED, has become a stronger predictor of adult health in more recent samples of adults compared with equivalent samples from prior decades.

Such thinking extends prior research focused on secular trends in associations between adult socioeconomic indicators and adult health, showing that linkages have heightened over time (6–8). However, the question of whether adult health outcomes have become more stratified by childhood circumstances remains largely unexplored. The present study addresses this gap, thereby bringing into high relief issues of when in the life course policy-related changes are critically needed to offset the adverse life-course health consequences of growing inequality. We focus on physical health outcomes known to have a socioeconomic gradient: body mass index (BMI), functional limitations, chronic conditions, self-rated health, and waist circumference (38, 39).

METHODS

Design and participants

Data are from 2 nationally representative samples of adults collected 17 years apart as part of the Midlife in the United States (MIDUS) study (http://midus.wisc.edu/). The MIDUS Core sample was recruited in 1995–1996 as a national study of 7,108 noninstitutionalized adults from the 48 contiguous states (40). The total Core sample included main random-digit-dialed respondents ($n = 3{,}487$), their siblings ($n = 950$), a city oversample ($n = 757$), and a twin subsample ($n = 1{,}914$). The MIDUS Refresher sample, a second independent national probability sample, recruited 3,577 adults in 2011–2014, with the majority of data collection in 2012 (41). All participants in the Refresher sample were part of a main probability sample. Additional information on sampling procedures, response rates, and other relevant features of the study design are provided in Web Appendix 1 (available at https://doi.org/10.1093/aje/kwab060).

Means and standard deviations for each sample, shown in Table 1, were calculated in both probability samples using sample weights so that values can be interpreted as population estimates. Raw descriptive statistics for the full samples are shown in Web Table 1. To maximize statistical power, our final analytical models compare the complete MIDUS Core sample ($n = 7{,}108$) with the MIDUS Refresher sample ($n = 3{,}577$). The magnitude of reported results were equivalent when excluding MIDUS Core oversamples (i.e., restricting to only the main random-digit-dialed sample). These sensitivity analyses are described in Web Appendix 1 and shown in Web Figure 1.

Measures

Childhood socioeconomic disadvantage. An aggregate index of childhood SED included the sum of 3 socioeconomic indicators: parents' occupational prestige, childhood poverty exposure, and parents' education (42). Combined

Table 1. Mean and Variance Differences Between the 1995 and 2012 Samples of the Midlife in the United States Study

Measure	Core Sample[a] (1995)		Refresher Sample[a] (2012)		Mean Difference[b]	Variance Ratio[b]
	Mean (SD)	%	Mean (SD)	%		
Female sex		51.6		52.1	0.5	
Age, years	45.16 (13.53)		48.82 (13.57)		3.7[c]	1.01
Race/ethnicity						
Black, non-Hispanic		8.7		7.4	−1.3	
White, non-Hispanic		83.6		80.3	−3.3[c]	
Native American		0.9		1.1	−0.2	
Hispanic		3.2		5.4	2.2[c]	
Other		3.5		5.8	2.3[c]	
Married		65.6		62.5	−3.1	
No. of children	1.92 (1.44)		0.88 (1.16)		1.0[c]	1.54[c]
Childhood SED index[d]	2.17 (1.55)		1.87 (1.55)		−0.3[c]	1.00
Parents' education	5.27 (2.82)		6.34 (2.80)		1.0[c]	1.01
Childhood poverty		8.0		9.6	1.6	
Parents' occupational prestige	47.12 (20.44)		51.24 (20.85)		4.1[c]	1.05
Body mass index	26.74 (5.40)		29.33 (7.20)		2.6[c]	1.78[c]
Waist circumference	35.28 (5.90)		38.53 (7.19)		2.7[c]	1.48[c]
Chronic conditions	2.49 (2.62)		3.00 (3.20)		0.5[c]	1.50[c]
Functional limitations	1.62 (0.82)		1.80 (0.93)		0.2[c]	1.29[c]
Self-rated health	2.33 (0.81)		2.36 (0.91)		0.0	1.27[c]

Abbreviations: SD, standard deviation; SED, socioeconomic disadvantage.

[a] Values were calculated for the probability samples using sample weights and can be interpreted as population estimates.

[b] Student's *t* tests and variance ratio tests (for continuous variables) were used to determine significance levels of mean and variance differences between samples.

[c] $P < 0.01$.

[d] Statistics for individual indicators of childhood disadvantage are based on versions prior to recoding and reverse scoring for inclusion in the aggregate childhood disadvantage index: Parents' education was coded on a 12-point scale from no school/some grade school (1) to professional degree (12); childhood poverty is dichotomously coded; and parents' occupational prestige is based on established prestige scores for each occupational category.

indexes of socioeconomic status or disadvantage are frequently used and are optimal when attempting to capture overall disadvantage with a single variable (43). The indicators were also analyzed separately, and the same pattern of findings was present for each (see Web Appendix 1 for a detailed description of each measure and Web Figure 2 for results). Parents' occupational prestige was determined from occupational prestige scores derived from participant reports of each parent's occupation coded into census categories (44). Childhood poverty was assessed from reports of family welfare receipt in childhood (43). Parents' education was coded from participant reports of each parent's level of formal education. All indicators were scored so that higher scores indicate higher levels of disadvantage.

Adult health measures. Five well-validated and frequently used measures of adult physical health were examined (see Web Appendix 1 for a detailed description of each measure). Functional limitations were assessed using an established 7-item measure of difficulties in carrying out instrumental activities of daily living (45). Number of chronic conditions was assessed as the total number of conditions reported by the participant, out of a list of 26 (e.g., diabetes, high blood pressure, cancer) (46). Self-rated health was measured using 2 items: one item from the telephone interview and one item in the self-administered questionnaire (44). BMI was scored from self-reports of height and weight in both samples (47). Waist circumference was assessed in centimeters using established methods (48). To facilitate clear interpretation of sample differences, all measures were z scored to have a mean of zero and a standard deviation of 1 in the pooled sample. A composite adult health index was created by averaging the 5 z-scored measures ($\alpha = 0.76$).

Covariates/control measures. To account for demographic changes that could influence secular trends (49), all analyses adjusted for age (continuous), sex (0 = female, 1 = male), race (Black, White, Hispanic, Native American, and other), marital status (0 = single/divorced/separated/widowed, 1 = married), and number of children (0 to 4 or $\geq$5).

Data analysis

Separate regression models were estimated for the 1995 and 2012 samples using the grouping function in Mplus 8.3 (Muthén & Muthén, Los Angeles, California). All parameters were freely estimated within each sample (i.e., fully stratified), and the likelihood ratio χ^2 test was used to test the statistical significance of differences in associations across samples. The standard errors of beta differences ($\beta_{diff} = \beta_{2012} - \beta_{1995}$) were also calculated using established methods (50). Unstandardized results are reported in the figures and tables. Missing data on individual covariates was handled using full information maximum likelihood estimation (51). Levels of missing data are provided in Web Appendix 1. Differences in means and variances across the 2 samples were considered using Student t tests and variance ratio tests, adjusted by sample weights using the survey package (52) in R (R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Differences in means and standard deviations across the 2 samples are shown in Table 1. For 4 out of 5 health measures, health was poorer and had more variability in 2012 than in 1995. The exception was self-rated health, which had more variability in the later sample but showed no mean differences between the 2012 and 1995 samples. Levels of childhood SED (aggregate index) were also lower in 2012 than 1995.

Results of stratified regression models are shown in Table 2. In both 1995 and 2012, the childhood SED index was a significant predictor of all 5 adult health outcomes. In the 1995 MIDUS Core sample, each standard-deviation (SD)-unit increase in childhood SED was associated with a 0.07-SD increase in BMI, a 0.06-SD increase in waist circumference, a 0.07-SD increase in chronic conditions, a 0.09-SD increase in functional limitations, and a 0.12-SD increase in reverse-coded self-rated health. In the 2012 Refresher sample, each SD-unit increase in childhood SED was associated with a 0.20-SD increase in BMI, a 0.15-SD increase in waist circumference, a 0.15-SD increase in chronic conditions, a 0.16-SD increase in functional limitations, and a 0.16-SD-unit increase in self-rated health (reverse scored). The results for the composite adult health index were similar to those of the specific health measures. In the 1995 MIDUS Core sample, each SD-unit increase in childhood SED was associated with a 0.09-SD increase in adult health, and in the 2012 MIDUS Refresher sample, with a 0.17-SD increase.

Figure 1 shows the strength of the association between childhood SED and each adult health outcome for the 1995 and 2012 MIDUS samples. Likelihood ratio χ^2 statistics indicated that the strength of the association between childhood SED and BMI, waist circumference, chronic conditions, functional limitations, and the composite index of adult health was stronger in the 2012 MIDUS sample than the 1995 MIDUS sample (Table 2). The association between childhood SED and self-reported health was marginally stronger ($P = 0.061$) in the 2012 sample than the 1995 sample. An overall test indicated that an unconstrained model, which allowed the association to be different across the 2 samples for all 5 health outcomes, explained the data significantly better than a model that constrained all 5 associations to be equal across samples ($\Delta\chi^2 = 29.42$, degrees of freedom = 5, $P < 0.001$). Individual childhood SED predictors showed similar pattern of findings when analyzed separately (Table 2).

Differences in the strength of association between childhood SED and adult health between the 1995 and 2012 samples were larger for women than for men. For women, the strength of the association was stronger in the 2012 sample than the 1995 for all 5 health outcomes (Figure 2). For men, the pattern of findings was similar but less pronounced (Figure 3). A detailed description of results for men and women is provided in Web Appendix 1. With respect to race differences, although the patterns of associations were in the same direction for Black and White adults, differences in effect sizes between 1995 and 2012 were generally smaller and did not reach statistical significance for Black adults. Also noteworthy was that, in both samples, Black Americans experienced higher levels of childhood SED than Whites. A detailed description of results for Black and White adults is also described in Web Appendix 1 and shown in Web Figure 3.

DISCUSSION

In recent decades, economic inequality has risen substantially in most countries around the world, with particularly large increases in the United States (11, 13). Labor markets have become less favorable for the lower middle class, communities have become more socioeconomically divided, and related disparities in adult health have increased (6, 20, 23, 53). Prior research on historical time trends in the patterning of health outcomes has focused on adult socioeconomic status and its relevance for adult health (primarily life expectancy and disease morbidity) (3–5). The childhood underpinnings of secular changes in health stratification processes, however, remain largely unexamined.

As a first step toward addressing this knowledge gap, the present study utilized data from 2 independent national samples of adults collected in the 1990s and 2010s to examine whether childhood SED has become a more consequential determinant of adult health in recent decades. Results indicated that, for 4 out 5 health outcomes (BMI, chronic conditions, functional limitation, waist circumference), the strength of the association between childhood socioeconomic disadvantage and adult health was approximately twice as large in the 2012 national sample than the 1995 national sample. For self-rated health, the association trended toward statistical significance and was 1.35 times larger in the 2012 sample than the 1995 sample. All results adjusted for sample differences in marital status, number of children, age, sex, and racial composition.

Prior research on trends in population health in the United States have documented stagnation and even declines in life

Table 2. Model Results Showing Differences in the Strength of the Association Between Childhood Socioeconomic Disadvantage and Each Adult Health Measure, Midlife in the United States Study, 1995 and 2012 Samples

Variable	1995[a]		2012[a]		β_{diff}	SE_{diff}	$\Delta\chi^2$ (1)	*P* Value
	β	SE	β	SE				
Body mass index								
Childhood SED index	0.069[b]	0.012	0.196[b]	0.024	0.127	0.027	22.90	<0.001
Parents' education[c]	0.080[b]	0.012	0.177[b]	0.024	0.097	0.027	12.76	<0.001
Childhood poverty	0.005	0.012	0.113[b]	0.024	0.108	0.026	16.70	<0.001
Parents' occupation[c]	0.065[b]	0.013	0.143[b]	0.024	0.078	0.027	8.51	0.004
Waist circumference								
Childhood SED index	0.061[b]	0.011	0.154[b]	0.022	0.093	0.025	13.95	<0.001
Parents' education[c]	0.067[b]	0.012	0.135[b]	0.023	0.068	0.026	6.99	0.008
Childhood poverty	0.006	0.011	0.091[b]	0.022	0.085	0.025	11.85	<0.001
Parents' occupation[c]	0.059[b]	0.012	0.115[b]	0.022	0.056	0.025	5.04	0.025
Chronic conditions								
Childhood SED index	0.067[b]	0.012	0.146[b]	0.023	0.079	0.026	9.41	0.002
Parents' education[c]	0.041[b]	0.013	0.103[b]	0.023	0.062	0.026	5.59	0.018
Childhood poverty	0.066[b]	0.012	0.130[b]	0.022	0.064	0.025	6.49	0.011
Parents' occupation[c]	0.026	0.013	0.068[b]	0.022	0.042	0.026	2.67	0.102
Functional limitations								
Childhood SED index	0.086[b]	0.012	0.159[b]	0.020	0.073	0.023	9.87	0.002
Parents' education[c]	0.077[b]	0.012	0.144[b]	0.021	0.067	0.024	7.73	0.005
Childhood poverty	0.044[b]	0.012	0.101[b]	0.020	0.057	0.023	6.29	0.012
Parents' occupation[c]	0.059[b]	0.013	0.101[b]	0.020	0.042	0.023	3.18	0.074
Self-rated health								
Childhood SED index	0.115[b]	0.012	0.156[b]	0.019	0.041	0.022	3.51	0.061
Parents' education[c]	0.107[b]	0.012	0.134[b]	0.019	0.027	0.023	1.32	0.251
Childhood poverty	0.066[b]	0.011	0.104[b]	0.018	0.038	0.021	3.28	”0.”070
Parents' occupation[c]	0.078[b]	0.013	0.097[b]	0.018	0.019	0.022	0.77	0.380
Adult health composite								
Childhood SED index	0.088[b]	0.009	0.166[b]	0.016	0.078	0.018	18.09	<0.001
Parents' education[c]	0.086[b]	0.009	0.140[b]	0.016	0.054	0.019	8.01	0.005
Childhood poverty	0.043[b]	0.009	0.113[b]	0.015	0.070	0.018	15.86	<0.001
Parents' occupation[c]	0.062[b]	0.010	0.106[b]	0.016	0.044	0.019	5.70	0.017

Abbreviations: SE, standard error; SED, socioeconomic disadvantage.

[a] Estimates are unstandardized and from stratified regression models that adjusted for sex, age, racial composition, marital status, and number of children. The predictor and outcome variables shown were *z* scored to have a mean of zero and a standard deviation of 1 in the pooled sample.

[b] $P < 0.01$.

[c] Parents' education and parents' occupational prestige are reverse scored so that higher scores indicate higher levels of childhood socioeconomic disadvantage.

expectancy in recent decades, particularly among middle-aged Whites and those less advantaged socioeconomically (6, 54, 55). Interpretations of these findings have suggested that less-educated Whites in particular have experienced cumulative disadvantage due to polarization of labor market opportunities and subsequent erosion of the blue collar, middle-class lifestyle (56). Others have emphasized a longer-term decline in trust and well-being within the broader population, suggesting the need to shift narrative away from a specific focus on Whites and toward all individuals at the lower end of the socioeconomic distribution, irrespective of race/ethnicity (57, 58). Recent findings consistent with these perspectives have shown that physical and mental health has declined in recent decades for the population as a whole, and that these declines have been most pronounced among less-advantaged socioeconomic groups (59, 60).

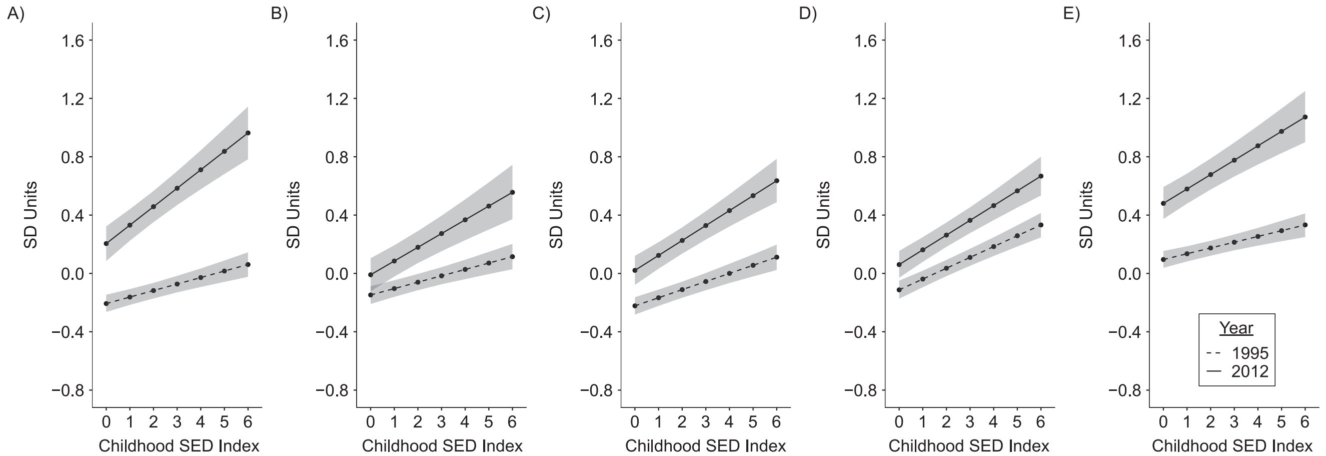

Figure 1. Differences in the strength of association between childhood socioeconomic disadvantage and adult health measures in the 1995 and 2012 samples of the Midlife in the United States study. A) Body mass index; B) chronic conditions; C) functional limitations; D) reverse-scored self-rated health; E) waist circumference. Results are from stratified regression models that adjusted for age, sex, race, marital status, and number of children. Shaded regions indicate 95% confidence intervals. Self-rated health is reverse coded so that higher scores are indicative of poorer health. SD, standard deviation; SED, socioeconomic disadvantage.

The present results add to this evolving literature by suggesting that changing experiences and opportunities across the life span patterned by background socioeconomic status play an important role in shaping the changing distribution of adult health outcomes. Specifically, our results suggest that socioeconomic circumstances in childhood have become more strongly associated with multiple aspects of adult health in more recent compared with earlier national samples. Additional research is needed to link these findings—which focus on the increasing salience of childhood circumstances—to prior work on the changing nature of adult exposures and outcomes across the socioeconomic hierarchy (6, 59, 60). Large and well-documented changes in economic inequality, including increases in income stratification within the K-12 education system, and its various consequences for individuals and communities are important factors to consider alongside labor market trends (19–21).

Another salient future direction is examination of mechanisms that help explain changes in the childhood SED–adult health association over time. The consequences of rising economic inequality are likely to be numerous and could include more economically separated communities, lower levels of trust, and more unfair treatment (61, 62). Shifting job opportunities and work environments stemming from labor market changes for the lower end of the socioeconomic distribution are also macro-level candidate

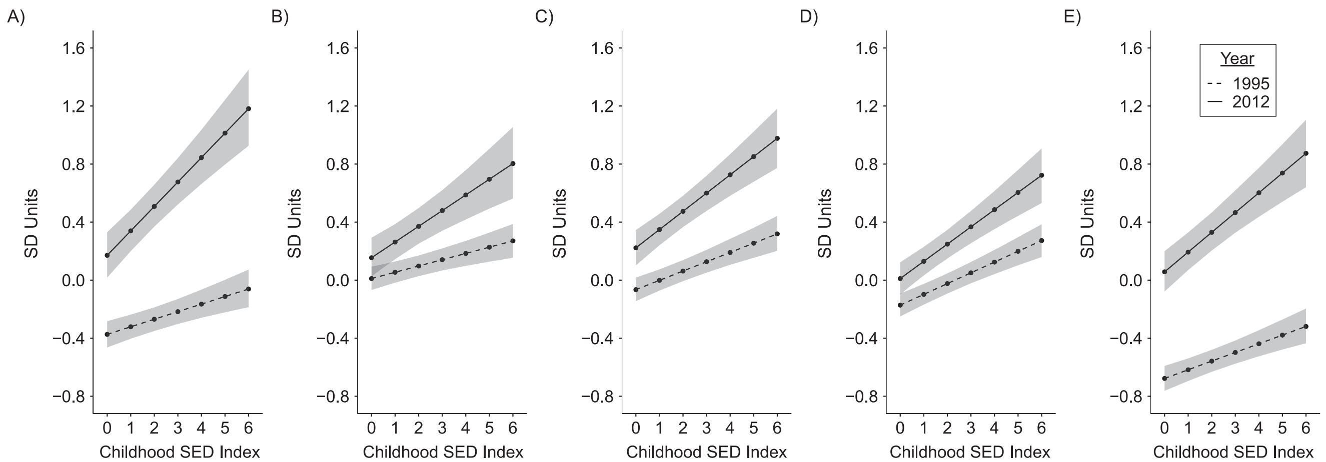

Figure 2. Differences in the strength of association between childhood disadvantage and adult health measures in the 1995 and 2012 samples of the Midlife in the United States study for women. A) Body mass index; B) chronic conditions; C) functional limitations; D) reverse-scored self-rated health; E) waist circumference. Results are from stratified regression models that adjusted for age, sex, race, marital status, and number of children. Shaded regions indicate 95% confidence intervals. SD, standard deviation; SED, socioeconomic disadvantage.

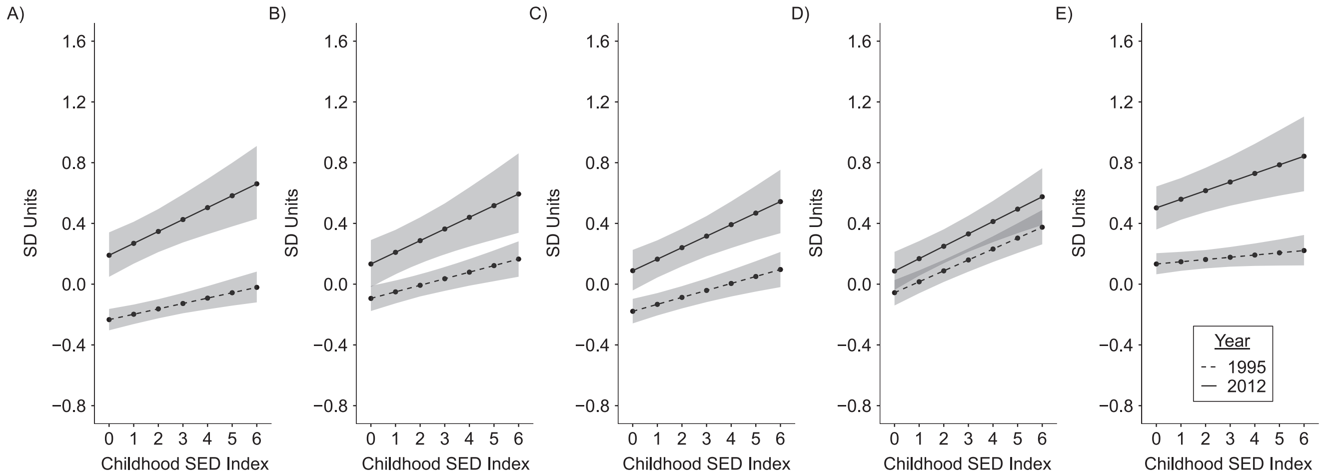

Figure 3. Differences in the strength of association between childhood disadvantage and adult health measures in the 1995 and 2012 samples of the Midlife in the United States study for men. A) Body mass index; B) chronic conditions; C) functional limitations; D) reverse-scored self-rated health; E) waist circumference. Results are from stratified regression models that adjusted for age, sex, race, marital status, and number of children. Shaded regions indicate 95% confidence intervals. SD, standard deviation; SED, socioeconomic disadvantage.

mechanisms (23). Elucidating which of these factors is most responsible for the increases in health stratification by childhood socioeconomic position are important next steps. Various areas of research—including studies examining economic downturns such as the Great Recession (63–65) or socioeconomic inequalities in cardiovascular disease risk (66, 67)—could provide insight into mechanisms driving changes in the association between childhood circumstances and adult health. Studies examining the impact of specific policy changes are also sorely needed to illuminate potential solutions.

The pattern of associations across the 2 samples was similar by sex and race. However, the associations tended to be stronger among women than men in the 2012 sample, a difference especially apparent for BMI, waist circumference, functional limitations, and self-rated health. These results parallel prior research showing that gradients in life expectancy and adult health outcomes by adult SED have increased more among women than men (6, 68–70). Our results suggest the same might be true for childhood SED; specifically, that between the 1990s and the 2010s the strength of the association between childhood disadvantage and adult health might have grown more quickly among women than men.

Race-related findings are preliminary due to a relatively small Black sample. However, smaller effect sizes among Black Americans underscore the importance of examining SED gradients separately across racial/ethnic groups and are largely consistent with prior work showing a flatter SED gradient among Black Americans (71). Unfortunately this seems to stem from poorer health among more-advantaged segments of the population rather than better health among the less advantaged (72). The reasons for this are not well understood but are likely due to stressors disproportionately experienced by Black Americans across the socioeconomic hierarchy (73, 74). It should also be noted that childhood SED was disproportionately experienced by Black Americans in both samples. This is particularly troubling given ongoing racial tensions in the United States and the urgent need to mitigate enduring racial disparities in health.

Several limitations should be considered. First, because our study focused on differences across 2 samples, the detailed historical timing of secular trends could not be elucidated. Such questions will be important for future research to provide insight into possible mechanisms and potential policy solutions for troubling secular changes. Furthermore, because our analyses are cross-sectional, we were not able to fully rule out confounding factors such as those relating to sample composition or measurement invariance. However, our analyses showed that the findings were robust to inclusion of demographic covariates at each time point (i.e., to adjustment for demographic differences in sample composition). Furthermore, the pattern of associations over time was similar across the exposure and outcome variables considered, making it unlikely that idiosyncrasies in measurement over time were a major factor in the overarching results. Nonetheless, future analyses to confirm the findings using additional data and alternative study designs will be important.

A second limitation was that childhood SED measures were based on retrospective self-report measures. Retrospective measures of childhood SED are widely used in population studies and have been well validated (75, 76). Furthermore, consistent findings across the 3 measures we considered bolster confidence in the reported findings. Nonetheless, examination of objective or parent-reported measures of childhood SED, and measures that capture the specific age of exposure, are important considerations to help confirm and build on the reported results (77).

A final caveat relates to the fact that, aside from BMI and waist circumference, health measures did not include objective health assessments, such as biomarkers. Although all of the self-reported health measures have been well validated and are robustly linked to objective health outcomes, they do not illuminate biological pathways that might be salient in the secular trends. Elucidation of such pathways will help to bring into focus mechanisms of physiological dysregulation that link childhood SED to morbidity and mortality. Given increases in substance abuse and mental health problems in recent decades (78, 79), the role of these variables in the reported trends will also be an important topic of research.

Within the limitations noted, our findings suggest that the circumstances of a child's birth are emerging as a stronger predictor of adult health in recent decades. Possible policy solutions span domains from economic and tax matters to communities and schools, but empirical studies are essential for bringing such policy solutions into focus in hopes of alleviating declining long-term health prospects of children born into socioeconomically disadvantaged families. Within- and between-country analyses will be important in optimizing useful insights for potential policy solutions.

Finally, times of upheaval and change tied to the coronavirus pandemic and accompanying economic downturn are having a disproportionate impact on disadvantaged groups and thus likely exacerbating inequities across the life span (80). These changes, although deeply concerning and challenging, nonetheless provide new opportunities for policy changes that contribute to a more widely shared economic recovery. Offering optimism, a growing number of studies suggest that specific policy changes can improve population health and reduce health disparities (81, 82). In a society that embraces the idea of opportunity for all, generating and using scientific evidence to advance solutions to problems of inequity is a major priority.

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