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Health disparities, politics, and the maintenance of the status quo: A new theory of inequality

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ABSTRACT

Individuals participate in politics to influence the politicians that prescribe the policies and programs that distribute the public goods and services that shape the social determinants of health. But the opportunity to participate in politics is conditional on survival, and in the U.S., the haves enjoy a significant survival advantage over the have-nots. This process can be detected looking at the relationship between age and participation: It is inflated by the fact that, as time progresses, a higher proportion of low-SES, low-level participation individuals die and are therefore excluded from the available pool of participants faster than high-SES, high-level participation individuals. We analyze this mechanism applying propensity scores matching and multivariate regressions on data from MIDUS I (*Midlife in the United States: A National Study of Health and Well-being*) and its 10-year mortality follow-up. Results show that health differences between 10-year survivors and non-survivors explain 56% of their differences in socio-political participation. Survivors participate at higher levels than non-survivors across all age groups and SES levels; without detrimental differences in health, individuals would participate 28% more as they age. The same disadvantaged individuals whose increased participation would pressure for redistributive policies are those who die off from the available pool of participants at much higher rates than socioeconomically advantaged individuals. The proposed conceptual model helps to explain how, through the early disappearance of the poor, continuing socio-political participation of high-SES survivors helps to perpetuate inequality in the status quo.

1. Introduction

The relationship between age and socio-political participation (e.g., voting, volunteering, attending meetings, or giving money to a campaign) is one of the oldest and best documented in the social sciences literature. Participation increases with age until middle age, after which it declines slightly (Tingsten, 1937). Another powerful and well-established relationship is that of socio-political participation and socioeconomic status (SES), whereby participation is higher among individuals of higher SES and lower among the disadvantaged (Verba, 1987; Verba and Nie, 1972). A third relationship of interest is between SES and mortality, whereby mortality rates are higher among individuals of lower SES who die at younger ages than their high-SES counterparts (Kitagawa and Hauser, 1973; Pappas et al., 1993; Seeman et al., 2010).

One of the main goals of this study is to show that a significant portion of individuals with lower participation rates die younger for reasons related to their low SES, such that the available pool of participants is being "distilled" by the greater loss over time of low-SES/low-participation individuals relative to high-SES/high-participation individuals. This situation contributes to the impression that participation rates increase as individuals grow older – a paradigm in the socio-political sciences.

Another key goal of this study is to illustrate how differences in mortality between low- and high-SES individuals contribute to the higher participation rates found among middle-to older-age individuals. Because participation is conditional on survival, the relationship between age and participation is artificially inflated by the fact that low-participation individuals are excluded in higher proportions than high-participation individuals via their higher rate of mortality. This demographic process generates a favorable accumulation of high-participation participants vis-à-vis low-participation ones in the available pool of participants. This is especially noticeable at midlife (the span when participation is observed at its peak), when SES-driven mortality rate differences are most palpable (Crimmins et al., 2009).

Selective survival constitutes an understudied, yet crucial component of the conceptual model that helps to explain key political processes that organize social systems. SES-driven mortality brings chief

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considerations for the study of socio-political behavior in the United States, especially in a period when socioeconomic inequality, SES disparities in health, and the older adult population are increasing. Given that SES affects survival, that survival is deterministic for participation, and that participation is such one way to promote individuals' socio-political interests, this mechanism helps to explain how political participation is instrumental in maintaining inequality in the status quo. Since the deceased cannot participate and participants and their preferences are at the center of the democratic process, as time progresses high-SES, high-participation individuals increasingly become a higher proportion of the available pool of participants via their selective survival, thus disproportionally influencing decision- and policy-making processes.

This study demonstrates that the same individuals from which we expect to see increased participation to pressure for redistributive policies, are those who die off from the available pool of participants at higher rates than their socioeconomically advantaged counterparts – a process that accentuates during the middle age years when individuals have the tendency to participate the most. Accordingly, SES-driven mortality masquerades the true socio-political disadvantage of deprived individuals, and the true detrimental socio-political effects of social stratification. To the extent that selective survival makes cohorts of individuals become more socioeconomically homogeneous with the advancement of age, the explanatory power of central variables in political research like age and SES weakens, bringing a wide range of repercussions for our understanding of socio-political behavior, political attitudes in the life cycle, and the overall maintenance of inequality in the status quo. We argue that this theoretical framework puts SES disparities in health at the center of differentiation processes in modern democratic systems.

2. Theoretical framework

2.1. Age and participation

The bivariate relationship between age and socio-political participation follows a pattern noted across time and space for at least the last century. Tingsten (1937) summarized this pattern from a series of elections carried out between 1911 and 1935: "[political interest in participation is] lowest in the youngest age groups, rising successively, and reaching a maximum in the age groups around fifty; with increasing age the political interest [in participation] once again tends to decrease" (79). Subsequent research found a similar pattern in different nations as well as in various American contexts for both electoral and non-electoral participation (Almond and Verba, 1989; Milbrath, 1965; Nie et al., 1974; Wolfinger and Rosenstone, 1980). After controlling for relevant covariates, multivariate analyses reproduced this age-participation trend, with some uncertainty, however, about the true participation of older adults (Glenn and Grimes, 1968; Hout and Knoke, 1975), and some studies finding that participation continues to increase with age (Campbell et al., 1960; Rosenstone and Hansen, 1993; Verba and Nie, 1972).

There is a variety of arguments as to why participation is a function of age. Group relations, social roles, and social statuses vary with age. Age is a primary force of social organization and performance (Neugarten, 1968; Taylor et al., 1997). Financial and social resources, psychological engagement and inclusion in socio-political mobilization networks, which all increase with age, are often inputs into models of participation (Brady et al., 1995).

2.2. Socioeconomic status and participation

Studies have found an association between measures of socioeconomic status and participation for many decades (Arneson, 1925; Connelly and Field, 1944; Verba and Nie, 1972). Coefficients of socioeconomic indicators are found to be substantial and robust in models of socio-political participation; in fact, much of our knowledge about participation stems from the SES model (Junn, 2010; Leighley, 1995). Contextual and personal factors, as well as aggregate- and individual-level trends related to participation, correlate with both indices of, and independent, socioeconomic indicators (Almond and Verba, 1989; Cho et al., 2006; Kenny, 1992; Milbrath, 1965). The centrality of the SES model to participation research may hinge on the fact that most components of the psychological engagement model, the mobilization model, and the rational choice model of participation (Blais, 2007; Stoker and Jennings, 2008) correlate with SES indicators. Compared to low-SES individuals, high-SES individuals tend to be more psychologically engaged, to be more highly targeted for mobilization by political organizations, and to have more and better quality information to pursue their interests (Leighley, 1995; Lijphart, 1997; Plutzer, 2002). Socioeconomic indicators, therefore, represent numerous complex mechanisms that prompt or inhibit socio-political action.

2.3. Age, socioeconomic status, selective survival, and participation

Research consistently has found that socioeconomic status is a robust predictor of disease, disability, and death, independent from biomedical predictors of health (Adler et al., 1993; Evans and Kim, 2010). Of equal importance is the relationship between age and patterns of physiological decline that converge with disability, comorbidity, and frailty (Fried et al., 2001). Age and SES, then, are key determinants of the physiological decline that influences mortality (Seeman et al., 2010).

This pattern of associations between age, SES, and mortality suggests a connection to participation trends in the lifespan. During the younger years, biological vigor helps individuals endure the physiological stress related to low SES, which leads to a low correlation between SES and mortality. But in midlife, as multi-system physiological dysfunction escalates, vulnerability to environmental factors rises, which leads to a high correlation between SES and mortality. After midlife, the significantly worse health of low-SES individuals accelerates the decline of their fraction in the population relative to high-SES individuals, thus shrinking the correlation between SES and mortality in older age (Crimmins et al., 2009). In sum, the relationship between SES and mortality is weak among younger-age groups, peaks among middle-age groups, and weakens again during the older years.

This pattern is very similar to the trend depicted by the age-participation relationship, suggesting that this relationship may be shaped by SES differences in mortality rates. Considering that participation is manifested among survivors alone, and that age-specific mortality is not random, researchers are studying patterns of participation by comparing different groups of survivors at different stages of the lifespan.

The associations described above imply that the effects of age and SES on participation should vary between survivors and non-survivors. Young individuals exhibit relatively low levels of participation because this subgroup is a mix of high-level participants (high-SES, future survivors) and low-level participants (low-SES, future non-survivors). Middle-age individuals exhibit the highest levels of participation because in this period SES mortality differences reduce the proportion of low-participation individuals in this subgroup. As older-adults constitute a pre-selected high-participation subgroup, SES differences in participation among them attenuate, as well as their aggregate participation level due to an increase in disability, comorbidity, and frailty related to biological aging.

3. Research design

Who is and who is not available to participate is conditional on survival. Because being part or not of the available pool of participants is pre-determined by many of the same covariates that explain participation, survival is endogenous with respect to participation. Consequently, levels of participation across SES groups are influenced

by non-random mortality. This rationale has been widely studied in research focused on mortality-associated selectivity in aging populations (Diggle et al., 2002; Powers and Bultena, 1972; Siegler and Botwinick, 1979).

A first approximation to track SES-driven mortality would be to use the first wave of a longitudinal study with a mortality follow-up. By identifying future survivors and non-survivors, the mortality follow-up affords the use of observables at baseline. Similar approaches are well established in the literature and implemented to account for selective attrition bias (Weuve et al., 2012), and this is the research strategy implemented in this study. Inferences from this approach will be valid insofar as those individuals with a low probability of survival to the time of the mortality follow-up were already manifesting lower levels of participation at baseline, such that the probability of survival affects the relationship between age and participation extant in the cross-sections of the data before individuals die. This approach, therefore, provides a conservative test of the influence that selective mortality exerts over the relationship between age and participation. This is especially true given we are attempting to capture mortality effects years before individuals die, and the sample has already been influenced by non-random pre-existent mortality at baseline.

4. Hypotheses

This study tests the following hypotheses:

(H1) Health differences between future survivors and non-survivors will explain participation differences between these groups at baseline.

(H2) The effect of the linear component of age over socio-political participation will differ depending on the sub-sample used in the analysis. It will be: (a) positive and substantial for the sub-sample of future survivors (given the exclusion of low-participation, future non-survivors); (b) positive for the complete sample (a mix of high-participation, future survivors and low-participation, future non-survivors), although not as substantial as for the sub-sample of future survivors; and (c) close-to-zero for the sub-sample of future non-survivors.

(H3) The probability of survival will have a positive, independent effect over participation after controlling for age and socioeconomic status.

(H4) Participation will be higher for future survivors than for future non-survivors across all age groups, but more notably between the ages of 40 and 65 years (when SES differences in mortality are most notable). Future survivors will also show higher participation than non-survivors across all SES levels. If future non-survivors participate less at all SES-levels and at all age groups than future survivors, this would confirm that the pool of possible participants is becoming disproportionally composed – most notably in the middle age years – of high-level participants who do not die because of their SES comparative advantage.

Taken together, these hypotheses posit how non-random mortality affects socio-political participation in four different ways: (1) by a heterogeneous distribution of health factors between future survivors and non-survivors, (2) through the selective exclusion of disadvantaged individuals from the pool of possible participants, (3) by individual differences in health related to survivability, and (4) by age-specific mortality rates affecting the composition of the age distribution of future survivors.

5. Data

The data are from the MIDUS I study (*Midlife in the United States: A National Study of Health and Well-being*). MIDUS I integrates a wide range of psychosocial and physical aspects related to social gradients in health status. It is a U.S. national representative sample of non-institutionalized English-speaking individuals, aged 25–75 years, living in households with telephone service. This paper makes use of the main random digit dialing (RDD) sample plus the sibling and twin samples. The data come from participants who completed both the phone and the self-administered questionnaire surveys, for a total of 6325 completed interviews. It also makes use of the MIDUS I 10-year mortality follow-up. Mortality status of the baseline sample was recorded in 2005, 10 years after the survey was fielded in 1995/1996. The status of non-survivors was confirmed via phone, and by matching names and social security numbers to the National Death Index (NDI). In total, 488 participants (7.7% of the baseline sample) were confirmed dead by 2005.

Many pivotal surveys in the socio-political sciences such as the American National Election Studies, the General Social Survey, and the Current Population Survey, among many others, do not include mortality follow-ups as part of their research design. Accordingly, MIDUS I fits nicely the purposes of this study as it uniquely includes measures of socio-political participation, a wide array of health variables related to mortality, and a mortality follow-up.

Of the total sample, 5531 individuals reported their financial data and had enough data to estimate a propensity score (see below), and of these, 5121 are survivors and 410 non-survivors. Of the 410 non-survivors, 407 were successfully matched on propensity score to 5119 survivors (total n = 5526). Our own analyses confirmed that missing data cases in epidemiological surveys are usually participants who refuse to report poor health indicators such as high body weight or smoking; thus, estimations reported here may underestimate the effects of selective mortality on the relationship of interest.

6. Methods

The relationship between age and socio-political participation is delineated by coefficients of linear and quadratic components of age. If the early disappearance of the poor is systematically affecting overall participation, this should be detected in participation differences between survivors and non-survivors across age groups. Accordingly, we first generated a propensity score on survival (i.e., the probability of survival). Second, survivors were matched to non-survivors on their propensity scores in order to reduce the bias related to pre-treatment observables relevant to survival. In theory, participation will be approximately orthogonal on propensity score between survivors and non-survivors. Next, to test for differences in the effect of age over participation, a series of linear regressions were run implementing: (a) the complete sample, (b) the sub-sample of survivors, and (c) the sub-sample of non-survivors.

The “probability of being treated” (Mattei, 2009; Rosenbaum, 2010; Rosenbaum and Rubin, 1983) corresponds to the probability that a MIDUS participant survives the 10-year period of the mortality follow-up, which was estimated using a logit regression (Austin, 2011) that included an informative set of health-related covariates commonly used to predict mortality – such as self-rated physical, mental or emotional, and general health as well as a sum of 29 chronic conditions the respondent experienced or was treated for, comprising cardiovascular, autoimmune, and neurological disorders among many others (Table 1; also see Table 1S, SM). Subsequently, survivors were matched to non-survivors on propensity score intervals optimized by an Automated Coarsened Exact (ACE) Matching algorithm (Blackwell et al., 2010). For a detailed description of variables, models, and other criteria please refer to the Supplemental Materials [Table 1S, SM].

We ran polynomial models using the complete sample (i.e., survivors and non-survivors), the sub-sample of survivors, and the sub-sample of non-survivors to illustrate how the relationship of age with participation changes depending on the analytic sample (Table 2). The matching output was used to correct for baseline health differences between survivors and non-survivors. The probability of survival was

Table 1
Summary statistics for participation, survival status, demographic, SES, and health variables.

	Analyzed Sample						After Matching	
	Complete Sample		Survivors		Non-survivors		Survivors	Non-survivors
	%	Mean	%	Mean	%	Mean	Mean	Mean
	(n)	(SD)	(n)	(SD)	(n)	(SD)	(SD)	(SD)
Main Analyses Variables								
Participation index (0–4)		1.74		1.76		1.51	1.76	1.65
		(1.24)		(1.24)		(1.30)	(1.24)	(1.28)
Socioeconomic status index (1–3)		1.96		1.97		1.90	1.97	1.98
		(.79)		(.78)		(.79)	(.78)	(.77)
Age (25–75 years)		47		45.9		59.9	45.9	58.4
		(12.9)		(12.5)		(11.0)	(12.5)	(11.1)
Propensity Scores Variables								
Survivor	92.6							
	(5121)							
Black	4.57		4.53		5.12			
	(253)		(232)		(21)			
Female	52.1		52.6		46.1			
	(2881)		(2692)		(189)			
Neighborhood quality (1–4)		3.43		3.43		3.44	3.43	3.46
		(.53)		(.53)		(.55)	(.53)	(.53)
Self-rated physical health (1–5)		3.56		3.61		2.91	3.61	3.51
		(.97)		(.95)		(1.07)	(.95)	(.94)
Mental or emotional health (1–5)		3.81		3.82		3.64	3.82	3.74
		(.93)		(.93)		(.95)	(.93)	(.94)
Self-rated general health (0–10)		7.48		7.54		6.71	7.54	7.48
		(1.59)		(1.54)		(1.96)	(1.54)	(1.55)
Sum of chronic conditions (0–10)		2.36		2.28		3.34	2.28	2.46
		(2.33)		(2.27)		(2.83)	(2.27)	(2.37)
Waist-to-hip ratio (0.46-1.39)		.88		.88		.91	.88	.88
		(.10)		(.10)		(.09)	(.10)	(.09)
Body mass index (14.4-64)		26.7		26.6		27.0	26.6	27.1
		(5.25)		(5.20)		(5.86)	(5.20)	(6.01)
Hospital/physician visit index (0–4)		.51		.49		.79	.49	.49
		(.55)		(.51)		(.86)	(.51)	(.54)
Alcohol consumption (0–5)		.22		.22		.21	.22	.22
		(.67)		(.67)		(.72)	(.67)	(.71)
Smoking cigarettes (0–4)		.56		.53		.95	.53	.68
		(1.19)		(1.16)		(1.46)	(1.16)	(1.29)

Table 2
Participation OLS polynomial models parameter estimates.

	(1)	(2)	(3)	(4)
	Complete Sample	Complete Sample	Future Survivors	Future Non-survivors
Age	.05**	.07**	.08**	-.01
	(.02)	(.02)	(.02)	(.07)
Age-squared residuals	-.05**	-.05**	-.06**	.23**
	(.02)	(.02)	(.02)	(.07)
SES	.40**	.38**	.40**	.40**
	(.02)	(.02)	(.02)	(.08)
Probability of Survival		.98**		
		(.23)		
Constant	.84**	-.06	.81**	.78**
	(.05)	(.22)	(.05)	(.24)
Observations	5509	5509	5101	408
R-squared	.070	.074	.073	.075

Note: Dependent variable is socio-political participation. Robust standard errors correcting for non-normality and family membership clusters in parentheses. Statistical significance code: **p < .01, *p < .05.

Table 3
Predicted age-specific and SES-specific participation by survival status (from interactive model).

Interactive terms	Predicted	S.E.	[95% C.I.]
	Participation		
Survival status by age-group			
Deceased 40 to 54 years	1.49	.14	1.22 1.76
Survivor 40 to 54 years	1.90	.03	1.84 1.95
Deceased 55 to 64 years	1.55	.15	1.26 1.84
Survivor 55 to 64 years	1.77	.04	1.68 1.85
Deceased 65 to 75 years	1.83	.14	1.54 2.11
Survivor 65 to 75 years	1.92	.06	1.81 2.03
Survival status by SES level			
Deceased low SES	1.38	.14	1.11 1.66
Survivor low SES	1.44	.04	1.36 1.52
Deceased mid SES	1.37	.13	1.11 1.63
Survivor mid SES	1.82	.03	1.76 1.89
Deceased high SES	1.96	.17	1.62 2.31
Survivor high SES	2.30	.04	2.23 2.38

Note: Standard errors estimated using the Delta-method. All predicted age-specific and SES-specific participation levels are statistically significant ($p < .01$).

included in the models to assess how individual differences in health affect the relationship between age and participation. The four explanatory variables in the models are age, age-squared residuals, SES, and probability of survival. An additional interactive model includes age group and SES level by survival status (Table 3). Since very few adults in MIDUS died before the age of 40, the sample was truncated to individuals 40 years or older (6% of non-survivors (n = 26) in the analyzed sample died before the age of 40). Truncating the sample assured that inferences were supported by the data and not based on model extrapolations. Robust estimation corrected the standard errors

for non-normality; standard errors were also corrected for possible non-independence due to family membership.

The dependent variable of this study is a summary index of participation (range 0–4), constructed from 9 types of non-electoral participation, classified into 3 different subscales: (1) volunteering, (2) attending meetings, and (3) giving money. To simplify the interpretation of results, age is censored into 4 categories (less than 40 years = 1; 40 to 54 = 2; 55 to 64 = 3; and 65 to 75 = 4), including only the 3 latter categories in the interactive model. Age-squared residuals are used to model the curvilinear trend; these residuals represent the quadratic aspect of age that is not correlated with the linear aspect of age. Socioeconomic status is the summation of 5 indicators: Education, family-size adjusted poverty-to-income ratio, current financial situation, enough money to meet needs, and difficulties paying bills. To simplify interpretation, this index (range 1–3) was censored as 0 to 3 = 1 (low SES), 4 to 6 = 2 (middle SES), and 7 to 10 = 3 (high SES). Please see Supplemental Materials for further details.

7. Results

The age distribution differs between survivors and non-survivors: 26% of survivors are 55 years or older compared to 70% of non-survivors; non-survivors are 14 years older than survivors, on average ($T = 21.918$, $p < .001$). There is a difference in participation of about 0.25 participation-units between survivors and non-survivors, meaning that survivors participated 17% more than non-survivors at baseline ($T = 3.838$, $p < .001$). This difference is larger than the 0.21 participation-units difference found between young adults (25–39 years) and older adults (65–75 years).

The mean SES level was 1.97 for survivors and 1.90 for non-survivors (difference = 0.07, $T = 1.674$, $p < .1$). This subtle difference is not representative of other SES differences related to other indicators, however. For instance, high-SES survivors participate 60% more than low-SES survivors and 85% more than low-SES non-survivors. Differences in SES between survivors and non-survivors are higher once other factors are considered.

Levels of participation between survivors and non-survivors differed drastically across health indicators. Survivors with “good” or “better” physical health at baseline reported 23% more participation than survivors with “fair” or “poor” physical health, and 37% more than non-survivors with “fair” or “poor” physical health. For instance, survivors with a body mass index (BMI) < 30 participated 8% more than survivors with a BMI ≥30 and 23% more than non-survivors with a BMI ≥30. Non-smoking survivors participated 25% more than smoking survivors and 37% more than smoking non-survivors.

Most of the covariates diminished their imbalance after matching [Table 2S, SM]. The imbalance on the propensity score was reduced by 70% after matching. Table 1 above shows that the difference in participation between survivors and non-survivors was reduced from 0.25 to 0.11 participation-units after matching. This 56% contraction indicates that the combination of the health-related factors related to survival included in the propensity score equation explains more than half of participation differences between survivors and non-survivors. This finding favors the expectations of the first hypothesis.

Table 2 shows the models output. Model 1 models the age-participation relationship in the complete sample at baseline and Model 2 additionally controls for the probability of survival. Model 3 uses the sub-sample of only survivors without adjusting for health factors, whereas Model 4 models participation of non-survivors.

Models 1, 3, and 4 show that the coefficients of both age terms vary in size and statistical significance depending on the analytic sample. The effect of age is intermediate for the complete sample (Model 1), high for survivors (Model 3), and close-to-zero and non-statistically significant for non-survivors (Model 4). These findings are in conformity with the second hypothesis. By splitting the complete sample into survivors and non-survivors, it becomes evident that the strong effect of age on participation is, in fact, artificially inflated by selective survival. Comparing Models 1 and 3 shows an overestimation of the effects of age and age-squared residuals on participation of 55% and 13%, respectively, due to the exclusion of non-survivors (Fig. 1).

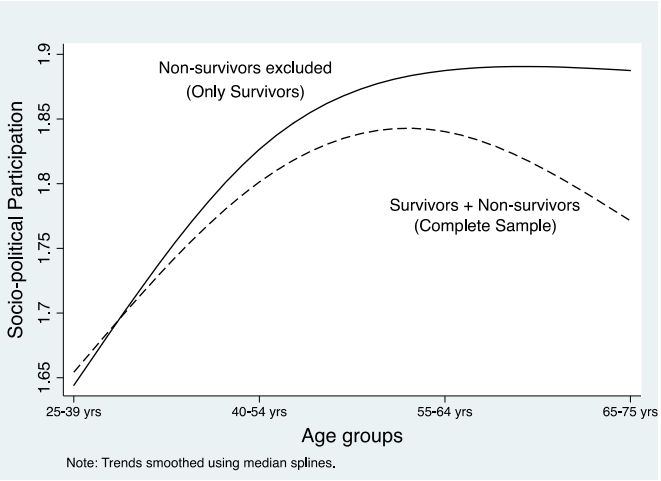

Fig. 1. Participation trends due to the exclusion of non-survivors.

Model 2 (column 2, Table 2) shows that the probability of survival has a positive, independent effect over participation after controlling for age and socioeconomic status. This result corroborates the third hypothesis. Individuals with the highest probability of surviving the 10 years following the baseline participate 25% more than individuals with the lowest probability of survival. Notice that the coefficient of [linear] age is mostly affected whereas for age-squared residuals is not, meaning that differences in participation due to health factors mostly manifest before the older years, when SES differences in survival are most pronounced. Without detrimental differences in health, individuals would participate 28% more as they age.

Models 3 and 4 show that the age-participation patterns are reversed between survivors and non-survivors. Effects of age show that, while survivors increase their participation as they grow older, the linear effect of age for non-survivors is close-to-zero and non-statistically significant. Fig. 2 illustrates the reversed patterns, where non-survivors participate less and less through middle age after which they make a strong “come-back” in their older years. Maximum differences in participation between the groups are detected in their 40s, 50s, and 60s, precisely when maximum SES-differences in mortality manifest (Crimmins et al., 2009).

The dramatic difference between survivors' and non-survivors' age-

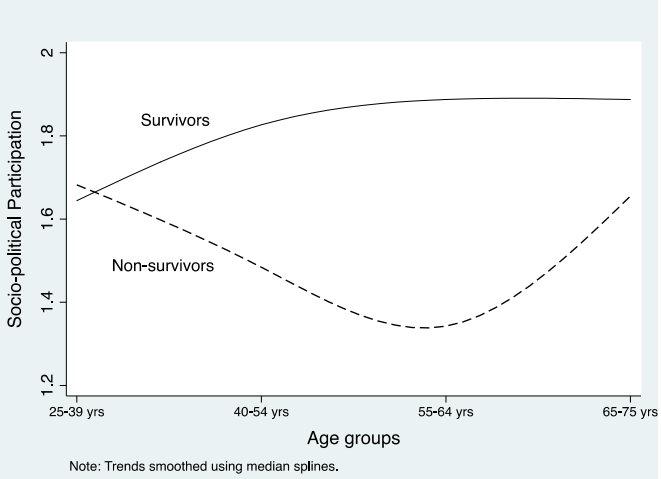

Fig. 2. Participation trends of survivors and non-survivors.

participation patterns has an explanation. Participation levels between survivors and non-survivors are similar among the young because the relationship between mortality, SES, and age during this period is weak. As young-adult non-survivors age, their health vulnerability to SES disadvantages intensify, generating a decline in their average participation. But if non-survivors live to the older years, it is because their characteristics were more similar to those of survivors in the first place. Average participation differences in the older years due to SES attenuate, and non-survivors' participation begins to resemble that of survivors as they reach the older years. These findings reveal that survival is linked to some of the same factors that induce SES-driven participation differences as individuals age.

Table 3 shows the predicted average participation of survivors and non-survivors by age group and SES level retrieved from the interactive model (Table 3S, SM). Results show that, on average, survivors participate at higher levels than non-survivors across all age groups and SES levels. These findings support expectations from the fourth hypothesis, demonstrating that, if non-survivors participate less than survivors at all age groups and SES levels, then the pool of available participants is becoming increasingly disproportionally composed – most notably in the middle age years – of high-level participants who do not die because of their SES comparative advantage. Considering that the poor have very different interests from the privileged, their premature mortality generates an increasingly socioeconomically homogeneous composition of the living population that, given their higher SES, promotes the maintenance of the status quo by setting aside the interests of the disadvantaged via mortality.

Table 3 shows that differences in participation between survivors and non-survivors decrease as age progresses and that this difference is higher for middle- and high-SES individuals. Selective mortality effects are proportional to participation differences between survivors and non-survivors, and an important portion of such differences come from middle-to high-SES, 40-to-64 year-old individuals. But because the size of these effects is also proportional to the ratio of non-survivors to survivors in each age group, another important portion of participation differences comes from low-to middle-SES individuals who comprise a bigger share of non-survivors than do high-SES individuals across age groups [Table 4S, SM].

Taken together, our findings suggest the relationship between age and participation as depicted by survivors alone incurs in biased representations of the true age-participation relationship because we are attributing properties to proportions of survivors across all age groups that arise due to the exclusion of non-survivors – who represent a critical fraction of the variation in participation across age groups. As time progresses and low-SES, low-level participants die off, variation in survivors' participation contracts and concentrates in the middle-to high-SES strata. SES-driven mortality eliminates part of the variation extant in society and so fabricates relationships that appear genuine to us because we study relationships using only survivors. As such, we also underestimate the poor's true level of disadvantage because they die prematurely, taking away with them the factual dimension of their hardship. And, accordingly, survivors continue to operate socio-politically within the framework of their socioeconomic standing, which, combined with the early disappearance of the poor and their pressure to influence government through participation, brings stability to the status quo. SES disparities in health are at the core of differentiation processes in democratic systems.

8. Conclusions

This paper proposes a conceptual model that uses SES disparities in health to expand theories that explain how democratic societies organize in hierarchies. Individuals participate in politics (electorally and non-electorally) to influence the politicians that prescribe and implement the policies and programs that distribute the public goods and services that shape the social determinants of health. But who is available to participate in politics is conditional on survival and, in the U.S., the haves enjoy a significant survival and participatory advantage over the have-nots. The early disappearance of the poor – who have been shown to have very different interests from the privileged – helps to explain how political participation becomes instrumental for the maintenance and perpetuation of inequality in the status quo. SES disparities in health are at the core of differentiation processes in democratic systems.

In the United States, there are about 2.6 million deaths in a year of which the great majority are related to health, and research has consistently signaled that factors associated with socioeconomic status explain a critical fraction of the variation in mortality. Insofar as selective survival is a primary characteristic of the aging process that alters the composition of the available pool of participants, and to the extent that the dead do not have a voice in the political system, the premature death of the socioeconomically disadvantaged masks the true full effects of social stratification, and the true socio-political disadvantage of deprived individuals (c.f. Markides and Machalek, 1984; Ferraro and Farmer, 1996; Shuey and Willson, 2008).

Even though the SES-gradient in health varies across racial or ethnic groups, it is consistently observed within each racial or ethnic group (Braveman et al., 2010). Recent research has indicated stagnation and even deterioration in life expectancy among low-education groups (Bound et al., 2015; Case and Deaton, 2015; Kindig and Cheng, 2013; Montez et al., 2011; Montez and Zajacova, 2013; Olshansky et al., 2012; Waldron, 2007). SES differentials in life expectancy have also increased in recent decades (Bound et al., 2015; Preston and Elo, 1995). Inequalities in health and mortality between the races and social classes have been shown to have strong effects on political behavior, including the weight to influence electoral outcomes (Bor, 2017; Cottrell et al., 2018 (forthcoming); Monnat and Brown, 2017; Navarro, 2017; Pacheco and Fletcher, 2015; Rodriguez, 2012; Rodriguez et al., 2015), and key population health variables like infant mortality have been shown to oscillate according to the political party in power (Rodriguez et al., 2013, 2014). Our findings further indicate that the health improvement of vulnerable populations is inherently connected to the improvement of our representative and participatory democracy.

Health inequality has been identified as the 'worst inequality of all' (Dobson, 1997) and, in the U.S., reducing it has been a central health policy aim for decades (US Department of Health and Human Services, 1990, 2000, 2011). The social conditions in which people live in a society are a reflection of how that society is organized into hierarchies, including how and when people die (Mitchell et al., 2000). Given that 'who gets what, when, how' is the fabric of politics (Laswell, 1936) and, in democratic systems, this happens through policy making and the implementation of programs that distribute the public goods and services that affect the social determinants of health, who gets represented becomes instrumental for health inequality. But this need not to be true.

A great amount of knowledge has accumulated on how to reverse SES disparities in health and in socio-political participation. The promotion of education and a culture of health, improving neighborhood and working conditions, diminishing racism and racial segregation, focus on child health and development, emphasis on exercise and good nutrition, local efforts on drugs, alcohol and smoking cessation, managing the effects of stress, and public-private partnerships that go beyond health care are some of the many goals to be pushed through the policy-making apparatus (Braveman et al., 2011; Williams et al., 2010). Likewise, research in the U.S. and other countries show that increasing incentives while diminishing the costs of participation activate the disadvantaged. Strengthening the welfare system, protecting organized labor, quota mechanisms for descriptive representation, compulsory voting, eliminating gerrymandering and felony disenfranchisement laws, flexible voter ID requirements, increase community-oriented institutional engagement, limit the influence of corporate money in political campaigning, and improving education are just a few of the identified factors that enhance the participation and political

representation of the poor (Barreto et al., 2009; Bedolla and Michelson, 2012; Cottrell et al., 2018 (forthcoming); De Paola et al., 2014; Fowler, 2013; Gallego, 2010; Gerber et al., 2015; Hacker and Pierson, 2010; Lawrence, 2016; Newman and Kane, 2017; Rocha et al., 2010).

Yet, inequality is entrenched; governmental efforts to decrease both health disparities and wealth inequality have shown to be slow or ineffective. In the U.S., many healthy Americans may come to the realization that their political system primarily represents the interests of the super-rich. Today the three and 400 richest individuals in the U.S. have more wealth than the poorest 160 million and 204 million people in the U.S., respectively (Collins and Hoxie, 2017). That the U.S. political system is characterized as an oligarchy (Winters and Page, 2009) or a plutocracy – with the top 0.01% of campaign contributors accounting for at least 40% of federal campaigns in 2012, and the President now a billionaire himself who appointed other multi-millionaires and billionaires to key official positions (Bonica et al., 2013; Pierson, 2017) – suggests that increasing inequality is more a product of power relations than of market forces (Bartels, 2016). As the old adage says, 'personnel is policy'; policy prescription and implementation spring from elected politicians and the appointments they make. And as far as SES-disparities in health continue, the poor will die prematurely without the same opportunity to participate and influence elected politicians and the power relations among them.

Accounting for only 10 years of mortality data, the results of this study show a critical difference in socio-political participation between future survivors and non-survivors, and that this difference (56%) are related to health differences between these groups. The results of this study also show that, without detrimental differences in health, individuals would participate 28% more as they age. Indeed, future survivors participate significantly more than future non-survivors across all age groups and SES levels, demonstrating that the pool of available participants is becoming increasingly disproportionally composed of high-level participants who do not die because of their SES comparative advantage.

The analyses in this study were carried out under conservative circumstances. First, estimations ignore all pre-existent selective mortality already present in the sample. Second, the health-related variation affecting the age-participation relationship in the models is years away from actual mortality. Third, findings are subjected to a short 10-year mortality follow-up, which is a period much shorter than the actual range of time in which mortality influences the age-participation association. And finally, the analyzed sample was mostly composed of white individuals, had a higher SES than the average population, and was not representative of disadvantaged communities – like African Americans – where mortality rates are much higher. Taking these factors into consideration, we can gain confidence in that the depictions of the influence of selective mortality and health over the age-participation relationship are in the right direction.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.socscimed.2018.01.010.

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