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Time perspective and socioeconomic status: A link to socioeconomic disparities in health?☆

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ABSTRACT

Time perspective is a measure of the degree to which one's thinking is motivated by considerations of the future, present, or past. Time perspective has been proposed as a potential mediator of socioeconomic disparities in health because it has been associated with health behaviors and is presumed to vary with socioeconomic status. In this cross-sectional community-based survey of respondents recruited from hair salons and barber shops in a suburb of Washington DC, we examined the association between time perspective and both education level and occupation. We asked participants ($N = 525$) to complete a questionnaire that included three subscales (future, present-fatalistic, and present-hedonistic) of the Zimbardo Time Perspective Inventory. Participants with more formal education and those with professional occupations had higher scores on the future time perspective subscale, and lower scores on the present-fatalistic subscale, than participants with less formal education or a non-professional occupation. Present-fatalistic scores were also higher among participants whose parents had less formal education. Present-hedonistic scores were not associated with either education level or professional occupation. Time perspective scores were not independently associated with the likelihood of obesity, smoking, or exercise. In this community sample, future time perspective was associated with current socioeconomic status, and past-fatalistic time perspective was associated with both current and childhood socioeconomic status.

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Persons of low socioeconomic status (SES) have poorer health and worse health outcomes than persons of higher SES (Pamuk, Makuc, Heck, Reuben, & Lochner, 1998; Sorlie, Backlund, & Keller, 1995; Steenland, Hu, & Walker, 2004). SES may be linked to health by several inter-related mechanisms. Higher educational attainment provides better occupational opportunities and higher earning potential, which allow better nutrition, housing, neighborhoods, and access to health care resources (Adler, Boyce, Chesney, Folkman, & Syme, 1993; Adler & Ostrove, 1999; Evans & Kantrowitz, 2002; Pamuk et al., 1998; Ross & Wu, 1995; Winkleby & Cubbin, 2003). Health behaviors such as smoking, poor diet, and lack of physical activity also vary by SES and contribute to disparities in health (Adler et al., 1993; Pamuk et al., 1998; Ross & Wu, 1995). Chronic stress related to perceived social position may also predispose persons of lower SES to illness (McEwen, 1998).

Time perspective has been proposed as another potential mediator of the relationship between SES and health (Fuchs, 1982; Singh-Manoux & Marmot, 2005). Time perspective is a psychological construct that describes how one's perception or weighing of the past, present, and future influences decision making (Zimbardo & Boyd, 1999). It is thought to represent a subconscious cognitive structure that one accesses when making decisions about short-term and long-term actions and goals. In some circumstances, the foremost influence comes from the events of the past; in others, it is based in the immediate cues of the present environment. In other cases, an individual's motivations may be primarily based on consideration of future consequences (Zimbardo & Boyd, 1999). Although many people adopt and meld different perspectives depending on circumstances, some individuals may preferentially have a past, present, or future orientation (Boyd & Zimbardo, 2005).

It is important to distinguish the psychological construct of time perspective from the construct of time preference used in economics. Time preference in economics describes the notion that holds that there is a natural preference to enjoy goods now and pay for them later (West, McNabb, Thompson, Sheldon, & Grimley Evans, 2003). Because the future is uncertain, goods available now should be valued more highly than goods deferred to some future

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time, and the value of future goods should be discounted. An individual's estimate of the degree to which future goods should be discounted in value has been examined as a measure of how much they value the present relative to the future. This measure includes considerations of risk, alternatives, values, and hypotheticals not present in psychometric measures of time perspective.

Time perspective has been related to differences in health behaviors in a number of studies. A future-oriented time perspective has been associated with a decreased likelihood of engaging in human immunodeficiency virus (HIV) risk behaviors (Rothspan & Read, 1996), smoking, and alcohol and substance abuse (Keough, Zimbardo, & Boyd, 1999; Petry, Bickel & Arnett, 1998; Wills, Sandy, & Yaeger, 2001). A present time perspective was more common among pathological gamblers (Hodgins & Engel, 2002), risky drivers (Zimbardo, Keough, & Boyd, 1997), and homeless persons (Pluck et al., 2008), and has been associated with decreased use of screening mammography (Lukwago Kreuter, Holt, Steger-May, Bucholtz, & Skinner, 2003) and hypertension medications (Brown & Segal, 1996). A future-oriented time perspective has also been associated with improved health outcomes in HIV (Préau, Apostolidis, Francois, Raffi, & Spire, 2007) and systemic lupus erythematosus (Sundaramurthy, Bush, Neuwelt, & Ward, 2003).

Whether time perspective is associated with SES has not been well-established. Some, but not all, studies have found that persons of higher SES are more likely to be future-oriented than persons of lower SES (Corral-Verdugo, Fraijo-Sing, & Pinheiro, 2006; D'Alessio, Guarino, DePascalis, & Zimbardo, 2003; Epel, Bandura, & Zimbardo, 1999; Fuchs, 1982; Lamm, Schmidt, & Trommsdorff, 1976). Several of these studies examined either small samples or special groups, such as adolescents or homeless persons. We tested the hypothesis that individuals of lower SES were more likely to have a present-oriented time perspective, while those of higher SES were more likely to have a future time perspective, in a large, ethnically diverse community sample. We also examined the association of time perspective with selected health behaviors and self-rated health.

Methods

Participants

We performed a cross-sectional survey of patrons in 16 hair salons and barber shops in a demographically diverse suburb of Washington DC. We performed the survey in shops to reach a broad sample of the community in places where participants were comfortable and in familiar surroundings. Shops were identified from telephone directories and invited to participate by mail. Study personnel visited the shops that expressed an interest, and explained the study to owners and stylists. Shops were located in both a downtown business district and in neighborhoods, and included those serving black communities and white communities. A convenience sample of patrons was surveyed between July 2006 and November 2007. Surveys were administered by study personnel until 100 participants in each of four gender–ethnicity subgroups had been enrolled. Eligible participants were English-speaking, age 18 or older, and able to give informed verbal consent. The study protocol was approved by the Office of Human Subjects Research at the National Institutes of Health.

Measures

Participants completed an anonymous questionnaire that asked information on demographic characteristics, health behaviors, and the Zimbardo Time Perspective Inventory (ZTPI) (Zimbardo & Boyd, 1999). Demographic information included age, gender, race/ethnicity, years of formal education, employment and marital status, whether they had children, and their parents' educational attainment. We used education level and occupation as our measures of SES because they are more stable measures than income (Galobardes, Shaw, Lawlor, Lynch, & Davey Smith, 2006). Recent or temporary changes in income could have mischaracterized the association between SES and time perspective. We also examined childhood socioeconomic position using parent's educational attainment. Previous research has shown that parent's educational attainment can be accurately reported (Krieger, Okamoto, & Selby, 1998). The health behaviors we studied included smoking history and exercise in the past week. We computed body mass index (weight in kilograms/height in meters squared) from self-reported weight and height. We also asked participants to rate their overall health as excellent, very good, good, fair or poor (U.S. Bureau of the Census, 1985).

The ZTPI is a 56-item self-reported questionnaire that assesses a person's perception of how considerations of the past, present, and future influence their thoughts and motivate their behavior (Zimbardo & Boyd, 1999). The items in the ZTPI were derived from statements about subjective experiences with time collected in interviews and focus groups, modified after initial testing, and subjected to repeated factor analysis. Factor analysis produced five distinct subscales of time perspective (future, present-hedonistic, present-fatalistic, past-negative, and past-positive), which were confirmed in tests of subsequent samples. Cronbach's alpha coefficients for the subscales have been reported to range from 0.74 to 0.82, and test–retest reliability has been reported to be from 0.70 to 0.80 (Zimbardo & Boyd, 1999). The subscales have shown convergent validity with measures of mood, self-esteem, novelty-seeking, and conscientiousness (Zimbardo & Boyd, 1999). In contrast to other psychometric measures that assess only either future or present orientation, or that conceptualize time perspective as a single dimension (i.e. a person is either present-oriented or future-oriented) (Hershey & Mowen, 2000; Strathman, Gleicher, Boninger, & Edwards, 1994; Wallace, 1956; Zaleski, 1996; Zuckerman, 1994), the ZTPI considers time perspective as a multidimensional construct. In this view, although some individuals may dominantly use a single time perspective in most situations, individuals may also be "temporally balanced" and draw on more than one time perspective as situations and demands dictate (Boyd & Zimbardo, 2005).

We used three of the five ZTPI subscales (present-fatalistic, present-hedonistic, and future) because these are most likely to be related to health outcomes (Hodgins & Engel, 2002; Keough et al., 1999; Petry et al., 1998; Préau et al., 2007; Rothspan & Read, 1996; Wills et al., 2001; Sundaramurthy et al., 2003; Zimbardo et al., 1997). The present-fatalistic subscale includes nine items that reflect a lack of personal influence and a feeling that other forces are more powerful in determining events. Examples include "Since whatever will be, it does not really matter what I do", "Fate determines much in my life", and "You can't really plan for the future because things change so much." The present-hedonistic subscale includes fifteen items related to pleasure seeking and risk taking. Examples include "I take risks to put excitement in my life" and "I try to live my life as fully as possible, one day at a time." The future subscale includes thirteen items related to planned, delayed gratification in behavior motivated by future goals. Examples include "Before making a decision, I weigh the costs against the benefits", "It upsets me to be late for appointments", and "I believe that a person's day should be planned ahead each morning." Respondents indicated how characteristic a particular statement was of them on a five-point Likert Scale (very untrue, somewhat untrue, neutral, somewhat true, and very true, coded 1–5 such that higher values indicated a stronger endorsement). The subscale score was the mean of the relevant items. The two ZTPI subscales

that were not used were the past-positive subscale, which assesses nostalgia for childhood or past events, and the past-negative subscale, which assesses regret and remembrances of misfortune or painful experiences.

Statistical analysis

We used mean scores to impute missing responses to single items on the future subscale for 21 participants (4.0%), on the past-fatalistic subscale for 10 participants (1.9%), and on the past-hedonistic subscale for 32 participants (6.1%). We tested the association between time perspective subscales and years of formal education using Pearson's correlation coefficients. The study was designed to include at least 100 participants in each of four gender–ethnicity groups, which would provide sufficient statistical power ($\alpha = 0.05$, $\beta = 0.20$, two-tailed) to detect a correlation ≥ 0.20 as statistically significant.

We used linear regression analysis to examine the association of age, sex, race/ethnicity (indicator variables for White, Black, Hispanic, Asian, other), marital status (currently married versus not currently married), years of formal education, parents' educational attainment (categorized as grade school, some high school, high school graduate, some college, college graduate), professional occupation (yes/no), and whether they had children (yes/no) with scores on each time perspective subscale. Because univariate analyses indicated that time perspective scores had a non-linear relationship with age, we also included an age-squared term in the regression models. We also used linear regression models to examine the association of time perspective subscale scores with education level, and logistic regression models to examine the association with professional occupation, adjusting for the covariates noted above.

We used *t* tests to compare time perspective subscale scores between obese (body mass index $\geq 30.0\ kg/m^2$) and non-obese subjects, between current smokers (or ever smokers) and nonsmokers, and between those who exercised or who did not exercise in the past week. We then used hierarchical multivariate logistic regression models to examine the association between time perspective subscales, education level, and the presence of obesity, ever-smoking, current smoking, and exercise, adjusting for age, gender, race/ethnicity, and marital status. Lastly, we used multivariate ordinal logistic regression to examine the association between time perspective subscales and self-reported health. In separate analyses, we used the ratio of future to fatalistic subscale scores and the ratio of future to hedonistic subscale scores as the variables of interest. Results of these analyses did not identify any new associations that were not found when individual subscales were used. Analyses were performed using SAS software (SAS Institute, Cary, NC).

Results

Description of participants

Of 608 patrons invited to participate, 20 did not meet inclusion criteria and 57 declined (response rate 90.3%). Of the 531 who completed the questionnaire, 6 participants were excluded because of missing data on key SES variables or on two or more time perspective items, leaving 525 for analysis (Table 1). The mean educational level was fairly high, and representative of that of residents in the survey area (US Bureau of the Census, 2000). Thirty-one percent of participants completed 12 years of schooling or less. Among participants age 25 years or older, 29% completed 12 years of schooling or less, compared to the 2000 U.S. Census estimate of 31% of residents in this area. Similarly 47.5% were college graduates, compared to a census estimate of 48.5%, and 60.9% had a professional occupation, compared to a census estimate of 51%. Participants' parents had a wide range of educational attainment.

Table 1
Characteristics of the sample ($N = 525$).[a]

Age, years	45.7 ± 19.4
Women, %	53.0
Ethnicity	
White, %	41.7
Black, %	40.2
Hispanic, %	10.9
Asian, %	4.8
Other, %	2.5
Formal education, years	14.8 ± 2.9
Professional occupation, %	60.9
Married, %	51.1
With children, %	63.5
Educational attainment of father	
Grade school, %	11.0
Some high school, %	12.0
High school graduate, %	26.5
Some college, %	15.2
College graduate, %	35.2
Missing, %	0.1
Educational attainment of mother	
Grade school, %	12.1
Some high school, %	9.0
High school graduate, %	32.4
Some college, %	19.7
College graduate, %	26.7
Missing, %	0.1
Smoking	
Ever smoked, %	24.9
Current smoker, %	9.1
Exercised in past week, %	68.0
Obese, %	24.0
Self-rated health	
Excellent, %	14.3
Very good, %	40.6
Good, %	35.0
Fair, %	9.3
Poor, %	0.8
ZTPI subscales	
Future	3.79 ± 0.5
Present-fatalistic	2.43 ± 0.8
Present-hedonistic	3.22 ± 0.6

[a] Plus–minus values are mean ± standard deviation. All other values are proportions. ZTPI = Zimbardo Time Perspective Inventory.

Mean scores were highest for the future time perspective subscale. Scores on the future subscale were inversely correlated with scores on both the present-fatalistic subscale ($r = -0.42$; $p < 0.0001$) and present-hedonistic subscale ($r = -0.18$; $p < 0.0001$), while scores on the two present subscales were positively correlated ($r = 0.44$; $p < 0.0001$).

Association of time perspective subscales with measures of SES

Scores on the future subscale were positively correlated with educational level, indicating that more highly educated people tended to be more future-oriented (Table 2). Scores on the present-fatalistic subscale were inversely correlated with educational level. There was a weaker inverse association between educational level and scores on the present-hedonistic subscale. Associations were similar among White women, White men, Black women and Black men when these subgroups were analyzed separately. The association between education level and scores on the future subscale was somewhat less strong among White men, but there was no

Table 2
Correlations of time perspective subscales and education level.

	Future		Present-fatalistic		Present-hedonistic	
	r	*p*	*r*	*p*	*r*	*p*
All ($n = 525$)	0.27	<0.0001	−0.34	<0.0001	−0.11	0.02
White women ($n = 120$)	0.33	0.0003	−0.47	<0.0001	−0.07	0.45
White men ($n = 99$)	0.18	0.07	−0.32	0.002	−0.16	0.11
Black women ($n = 103$)	0.33	0.0006	−0.37	0.0001	−0.11	0.28
Black men ($n = 108$)	0.33	0.0005	−0.29	0.002	−0.13	0.19

statistical evidence of an interaction between education level and gender–ethnicity subgroup ($p = 0.15$). We also tested the correlation between time perspective subscale scores and educational level using multiple imputation of missing data with the Markov Chain Monte Carlo method. These correlations ($r = 0.27$ for the future subscale; $r = -0.34$ for the present-fatalistic subscale; $r = -0.11$ for the present-hedonistic subscale) were not different from those obtained using mean imputation of missing data, indicating that the method of imputation of missing data did not influence the results.

Participants with a professional occupation had higher scores on the future subscale than non-professionals (3.87 versus 3.68; $p < 0.0001$), and lower scores on the present-fatalistic subscale (2.11 versus 2.51; $p < 0.0001$). There was a smaller difference between these groups on the present-hedonistic subscale (3.15 versus 3.29; $p = 0.03$), similar to the association found with educational level.

Associations with other demographic variables

In univariate analysis, scores on the future subscale had a non-linear relationship with age, with lower scores among younger and older participants and higher scores among those in middle age. Scores on the present-fatalistic subscale also had a non-linear relationship with age, being higher in both the younger and older participants than in the middle age group. Present-hedonistic scores were not related to age.

Scores of the three subscales did not differ by gender. Blacks and "other" ethnic groups had, on average, lower scores on the present-fatalistic subscale than Whites, Hispanics, and Asians. Scores on both the present-hedonistic and present-fatalistic scales were lower in married participants than non-married participants, and present-hedonistic scores were lower among those with children.

Multivariate-adjusted associations of measures of SES with time perspective subscales

In analyses adjusted for other demographic characteristics, scores on the future subscale were higher among those with more formal education, while scores on the present-fatalistic subscale were lower (Table 3). There was no association between education level and the present-hedonistic subscale. The education level of the subject's mother was independently associated with scores on the present-fatalistic subscale. Results were closely similar in models that used father's educational level in place of mother's educational level (Table 3).

In addition, present-fatalistic scores were higher among Whites, Asians, and Hispanics than among Blacks and persons of other ethnicity. Scores on the present-hedonistic subscale were lower among Blacks and married persons.

The results of analyses of occupation were similar to those found with education level. Adjusted mean scores on the future subscale were higher among professionals than non-professionals (3.84 versus 3.69; $p = 0.008$), and scores on the present-fatalistic subscale were lower among professionals (2.36 versus 2.64; $p = 0.0004$). There was no difference in scores on the present-hedonistic subscale between those with a professional occupation and non-professionals (3.24 versus 3.31; $p = 0.31$).

Multivariate-adjusted associations of time perspective subscales with measures of SES

To examine the reciprocal relationship, we tested the association between time perspective subscales and measures of SES, adjusting for other demographic characteristics. Adjusted mean years of education increased progressively among subjects with higher scores on the future subscale ($p < 0.0001$) and decreased progressively among subjects with higher scores on the present-fatalistic subscale ($p < 0.0001$) (Table 4). Those with high scores on the present-hedonistic subscale did not have adjusted mean education levels that were statistically different from those with low scores on this subscale ($p = 0.08$).

Associations with health behaviors and self-rated health

Subjects who exercised in the past week had marginally higher scores on the present-hedonistic subscale than those who did not exercise, but time perspective scores otherwise did not differ among those with different health behaviors, in multivariate analyses (Table 5).

In multivariate models, the future subscale score, present-hedonistic subscale score, and education level were not associated with the likelihood of obesity (Table 6). In models that did not include education level, subjects with higher scores on the present-fatalistic subscale were more likely to be obese (adjusted odds ratio 1.45), but adding education level to the model attenuated this association slightly (adjusted odds ratio 1.37). In models that did not include education level, subjects with higher scores on the future subscale were less likely to be current smokers (adjusted odds ratio 0.50), while those with higher scores on the present-fatalistic subscale were more likely to be current smokers (adjusted odds ratio 1.51). However, adjusting for education level substantially attenuated these associations. None of the time perspective subscales were associated with ever-smoking in the adjusted analyses. Subjects with higher scores on the present-fatalistic subscale were less likely to report having exercised in the past week (adjusted odds ratio 0.77) in a model that did not include education level, but this association was no longer significant after adjusting for education level. Adding the time perspective subscale to the models did not alter the strength of association between education level and each health behavior, and education level remained significantly associated with the likelihood of current smoking and exercise in the past week.

Future and present-fatalistic scores were associated with self-rated health in the multivariate models (Table 6). Participants with higher scores on the future subscale were less likely to report poorer health than participants with lower scores. Participants with higher scores on the present-fatalistic subscale were more likely to report poorer health, while scores on the present-hedonistic subscale were not associated with self-rated health. Education level was not associated with self-rated health in this sample.

Discussion

Socioeconomic measures were the characteristics most strongly associated with time perspective in this study. As hypothesized, those with more formal education or professional

Table 3
Adjusted mean scores on the time perspective subscales, by subject's education level and mother's education level (A) or father's education level (B).[a]

	Future		Present-fatalistic		Present-hedonistic	
	Mean ± SE	*p*	Mean ± SE	*p*	Mean ± SE	*p*
A.						
Subject's education level						
Grade school ($n = 4$)	3.70 ± 0.25	<0.0001	2.94 ± 0.35	0.0002	3.48 ± 0.30	0.51
Some high school ($n = 20$)	3.62 ± 0.12		2.81 ± 0.17		3.33 ± 0.14	
High school graduate ($n = 112$)	3.54 ± 0.06		2.69 ± 0.08		3.27 ± 0.07	
Some college ($n = 129$)	3.77 ± 0.06		2.56 ± 0.08		3.30 ± 0.07	
College graduate ($n = 215$)	3.84 ± 0.05		2.33 ± 0.07		3.20 ± 0.06	
Mother's education level						
Grade school ($n = 58$)	3.63 ± 0.08	0.27	2.85 ± 0.11	<0.0001	3.26 ± 0.10	0.33
Some high school ($n = 44$)	3.60 ± 0.10		3.02 ± 0.14		3.41 ± 0.12	
High school graduate ($n = 156$)	3.74 ± 0.08		2.54 ± 0.11		3.34 ± 0.09	
Some college ($n = 92$)	3.73 ± 0.08		2.54 ± 0.12		3.33 ± 0.10	
College graduate ($n = 130$)	3.78 ± 0.08		2.39 ± 0.12		3.23 ± 0.10	
B.						
Subject's education level						
Grade school ($n = 4$)	3.74 ± 0.25	<0.0001	2.92 ± 0.36	<0.0001	3.37 ± 0.30	0.50
Some high school ($n = 19$)	3.68 ± 0.12		2.65 ± 0.17		3.17 ± 0.14	
High school graduate ($n = 99$)	3.57 ± 0.06		2.66 ± 0.08		3.28 ± 0.07	
Some college ($n = 117$)	3.77 ± 0.06		2.58 ± 0.08		3.30 ± 0.07	
College graduate ($n = 207$)	3.88 ± 0.05		2.26 ± 0.07		3.19 ± 0.06	
Father's education level						
Grade school ($n = 49$)	3.64 ± 0.08	0.19	2.81 ± 0.12	<0.0001	3.31 ± 0.10	0.18
Some high school ($n = 54$)	3.67 ± 0.09		2.89 ± 0.13		3.36 ± 0.11	
High school graduate ($n = 119$)	3.79 ± 0.08		2.55 ± 0.11		3.25 ± 0.09	
Some college ($n = 67$)	3.83 ± 0.09		2.36 ± 0.12		3.23 ± 0.11	
College graduate ($n = 157$)	3.73 ± 0.08		2.45 ± 0.11		3.15 ± 0.09	

[a] Based on models adjusted for age, age-squared, gender, ethnicity, marital status, and having had children. Separate models included either mother's education level or father's education level. P for linear trend. SE = standard error.

occupations had responses indicating a more future orientation and a less fatalistic orientation than those with less formal education or nonprofessional occupations. The strongest association, between the present-fatalistic subscale and education level, would be considered as a moderate effect size. Neither socioeconomic measure was associated with scores on the present-hedonistic subscale.

An association between education level and future time orientation might be expected, because extending one's education represents an investment in one's future (Fuchs, 1982). In this sense, obtaining additional education can be viewed as a demonstration of a future time perspective. Our findings support previous reports of direct associations between socioeconomic measures and future time perspective in a small sample of German adolescents, a small sample of homeless adults, and a community sample in Mexico (Corral-Verdugo et al., 2006; Epel et al., 1999; Lamm et al., 1976). Our study extends these findings to a large ethnically diverse American sample. An inverse association between educational level and scores on the present-fatalistic subscale was also reported in another large community sample (D'Alessio et al., 2003).

Participants whose mother or father was less well educated had a more fatalistic time perspective, independent of their own education level. This association indicates that attitudes about fate and opportunity may be shaped in fundamental ways by childhood socioeconomic status, and that these attitudes may not be

Table 4
Adjusted mean education level by quintile of time perspective subscale scores.[a] Higher scores indicate more endorsement of items on each subscale.

		Years of formal education ± SE	*P*
Future	<3.34	11.1 ± 1.2	<0.0001
	3.34–3.67	11.1 ± 1.2	
	3.68–3.92	11.4 ± 1.2	
	3.93–4.16	12.3 ± 1.2	
	>4.16	13.0 ± 1.2	
Present-fatalistic	<1.7	12.8 ± 1.2	<0.0001
	1.7–2.19	12.6 ± 1.2	
	2.20–2.50	11.5 ± 1.2	
	2.51–3.00	11.5 ± 1.2	
	>3.00	10.6 ± 1.2	
Present-hedonistic	<2.75	12.0 ± 1.2	0.08
	2.75–3.10	12.2 ± 1.2	
	3.11–3.36	12.6 ± 1.2	
	3.37–3.65	12.0 ± 1.2	
	>3.65	11.5 ± 1.2	

[a] Based on models adjusted for age, age-squared, gender, ethnicity, marital status, and having had children. P for linear trend. SE = standard error. CI = confidence interval.

Table 5
Association of time perspective subscale scores and obesity, smoking status, and exercise. Values are adjusted mean ± standard error of scores on each subscale, based on models adjusted for age, age-squared, gender, ethnicity, marital status, and having had children.

	Future	*p*	Present-fatalistic	*p*	Present-hedonistic	*p*
Obese	3.65 ± 0.22	0.34	2.30 ± 0.30	0.12	2.97 ± 0.26	0.16
Not obese	3.71 ± 0.21		2.19 ± 0.30		2.87 ± 0.26	
Current smoker	3.55 ± 0.23	0.11	2.39 ± 0.32	0.23	3.02 ± 0.27	0.22
Not current smoker	3.68 ± 0.21		2.25 ± 0.30		2.91 ± 0.25	
Ever smoker	3.69 ± 0.22	0.93	2.21 ± 0.30	0.56	2.88 ± 0.26	0.67
Never smoker	3.69 ± 0.21		2.25 ± 0.30		2.91 ± 0.26	
Exercise in the past week	3.72 ± 0.21	0.29	2.21 ± 0.30	0.24	2.95 ± 0.26	0.09
No exercise in the past week	3.66 ± 0.22		2.29 ± 0.30		2.85 ± 0.26	

Table 6
Association of time perspective subscales and education level with health behaviors and self-rated health. Values are odds ratio (95% confidence interval) based on hierarchical regression models.[a]

	Obesity	Current smoking	Ever smoked	Exercise	Self-rated health
Models including future time perspective					
Future	0.68 (0.43–1.09)	0.50 (0.27–0.91)	0.94 (0.64–1.39)	1.28 (0.87–1.88)	0.70 (0.50–0.98)
Education level	0.93 (0.85–1.01)	0.81 (0.72–0.91)	0.91 (0.85–0.98)	1.10 (1.02–1.19)	0.97 (0.92–1.04)
Future	0.74 (0.46–1.20)	0.64 (0.33–1.21)	1.06 (071–1.59)	1.14 (0.77–1.70)	0.71 (0.50–0.99)
Education level	0.94 (0.86–1.03)	0.82 (0.73–0.93)	0.91 (0.84–0.98)	1.10 (1.02–1.19)	0.99 (0.93–1.05)
Models including present-fatalistic time perspective					
Present-fatalistic	1.45 (1.06–1.99)	1.51 (1.00–2.28)	0.97 (0.75–1.26)	0.77 (0.59–1.00)	1.41 (1.13–1.78)
Education level	0.93 (0.85–1.01)	0.81 (0.72–0.91)	0.91 (0.84–0.96)	1.10 (1.02–1.19)	0.97 (0.92–1.04)
Present-fatalistic	1.37 (0.99–1.91)	1.20 (0.78–1.85)	0.86 (0.65–1.14)	0.84 (0.64–1.11)	1.42 (1.12–1.80)
Education level	0.95 (0.87–1.04)	0.82 (0.72–0.93)	0.90 (0.83–0.97)	1.09 (1.01–1.18)	1.00 (0.94–1.07)
Models including present-hedonistic time perspective					
Present-hedonistic	1.33 (0.89–2.00)	1.57 (0.91–2.71)	0.95 (0.68–1.33)	1.26 (0.91–1.76)	1.08 (0.82–1.44)
Education level	0.93 (0.85–1.01)	0.81 (0.72–0.91)	0.91 (0.84–0.96)	1.10 (1.02–1.19)	0.97 (0.92–1.04)
Present-hedonistic	1.29 (0.86–1.93)	1.36 (0.79–2.34)	0.91 (0.65–1.27)	1.32 (0.95–1.85)	1.07 (0.81–1.42)
Education level	0.93 (0.86–1.02)	0.82 (0.72–0.92)	0.91 (0.84–0.98)	1.11 (1.03–1.19)	0.98 (0.92–1.04)

[a] Based on separate multivariate logistic regression models for each time perspective subscale that included either the time perspective subscale, education level, or both, adjusted for age, age-squared, gender, ethnicity, and marital status. Analysis of self-rated health used an ordinal logistic regression model, with the dependent variables categorized as 1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor.

easily altered by adult experiences (Bosma, van de Mheen, & Mackenbach, 1999; Heinonen Räikkönen, Matthews, Scheier, Raitakari, & Pulkki, et al., 2006). This association may also be a mechanism by which childhood SES influences future health (Schooling & Kuh, 2002; Turrell, Lynch, Leite, Raghunathan, & Kaplan, 2007).

Time perspective demonstrated few associations with demographic features other than measures of SES. Age, gender, race/ethnicity, marital status and childbearing were not associated with future time perspective scale scores in multivariate analyses. Scores on the present-fatalistic and present-hedonistic scales varied weakly among ethnic groups.

Although future and present-fatalistic time perspectives were related to socioeconomic measures, they were not independently associated with obesity, smoking, or exercise behavior. This contrasts with evidence from other studies indicating that more future-oriented persons were less likely to report engaging in harmful behaviors such as high-risk sexual activity and substance use (Hodgins & Engel, 2002; Keough et al., 1999; Petry et al., 1998; Pluck et al., 2008; Rothspan & Read, 1996; Wills et al., 2001; Zimbardo et al., 1997). Time perspective may play a greater role in motivating or inhibiting risky behaviors than more commonplace behaviors. It may also be that time perspective is most relevant when a person first encounters situations in which a behavioral decision is required (for example, teens and smoking, or at the time of diagnosis of a new disease), and less relevant after such decisions have been made and behaviors established (Schooling & Kuh, 2002). Different measures of time perspective might have undercovered different associations. For example, Adams and Nettle recently reported associations between scores on the Consideration of Future Consequences scale, but not the ZTPI future subscale, and both current smoking and BMI (but not exercise) in an internet survey (Adams & Nettle, 2008). Whether a pairing exists between specific measures of time perspective and specific health behaviors or health outcomes is not known. Alternatively, the association between time perspective and these health behaviors may have been influenced by the relatively high education level of our sample. Despite the absence of an association with health behaviors, future and present-fatalistic time perspective were strongly associated with self-rated health, indicating that time perspective has an important role in health outcomes.

In our hierarchical models, education level attenuated the association between future time perspective and current smoking, and between present-fatalistic time perspective and obesity, current smoking, and recent exercise. These findings suggest that associations between time perspective and health may be confounded by measures of SES, and studies that seek to examine associations between measures of time perspective and either health behaviors or health outcomes should take care to adjust for SES. In addition, the time perspective measures did not alter the association between education level and the likelihood of both current smoking and exercise. These results do not support the proposition that time perspective serves as a mediator of SES-associated differences in these health behaviors. However, these relationships should be tested in other samples and with different measures of time perspective.

The strengths of this study include a high response rate, a diverse sample which allowed testing of the consistency of associations across gender–ethnicity subgroups, and study of two different measures of personal SES, as well as parents' educational level. Although the study was community-based, we examined a convenience sample, and results might be different in a population-based study. We cannot exclude the possibility that the relationship between SES and time perspective might have been different among patrons of other shops in the community. Diverse types of shops serving different communities and neighborhoods were sampled, and the socioeconomic characteristics of the sample closely resembled that described by census data for this community. Although direct comparisons across studies are not possible, mean scores on the three subscales were comparable to those obtained in surveys of college students and in a community-based convenience sample in Britain, suggesting the responses among our participants were not atypical (Pluck et al, 2008; Zimbardo & Boyd, 1999). The study is also limited by the relative high education level of the sample, and associations may be different in a sample with lower SES. We did not ask about income because non-response to these questions tends to be high (Turrell, 2000). We do not know if associations between income and time perspective would differ from those of education level or

occupation. We also did not ask about risky health behaviors and therefore could not examine their associations with time perspective.

Future and present-fatalistic time perspectives were strongly associated with measures of SES and self-reported health, but they were not independently associated with selected health behaviors in this sample. Examining the relationship of time perspective with both health behaviors and health outcomes of specific diseases would provide the most direct assessment of the contribution of time perspective to socioeconomic health disparities.

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