Published in final edited form as:

Am J Health Behav. 2013 March ; 37(2): 171–180. doi:10.5993/AJHB.37.2.4.

TIME PERSPECTIVE AND SMOKING, OBESITY, AND EXERCISE IN A COMMUNITY SAMPLE

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Abstract

Objective—Time perspective, a psychological construct reflecting guidance by present or future concerns, may motivate engagement in health behaviors. We examined associations between time perspective and smoking, body mass index, and exercise.

Methods—In this community-based survey, adults reported smoking and exercise habits and weight and height, and completed the Zimbardo Time Perspective Inventory.

Results—Subjects (N = 265) who were more future-oriented reported more frequent exercise, but were more likely to smoke. Fatalistic and hedonistic present orientations were not associated with smoking, obesity, or exercise.

Conclusions—Time perspective is not consistently associated with common health behaviors in adults.

Keywords

time perspective; smoking; exercise; obesity; socioeconomic status

Whether a person engages in a particular behavior depends in part on the anticipated consequences of the behavior. Outcome expectancies are a major component of social learning theories of behavior, and are shaped by appraisals of both the likelihood of the outcome and of how rewarding or beneficial the outcome is expected to be^{1,2}. For many health behaviors, such as exercising or eating a healthy diet, some benefits may occur only far in the future, with lower likelihoods of heart disease and cancer. At the same time, these behaviors may involve short-term sacrifices, inconveniences, or disappointments. How a person values future benefits versus present enjoyment (or disengagement from health-promoting behaviors) may influence their outcome expectancies^{3,4}. Some individuals may have a long time horizon and highly value their future health, engaging in whatever behaviors possible to safeguard it. Others may discount the value of future health, believing they are either not susceptible to or can escape any harmful consequences of present behaviors, or that they have time to remediate before consequences develop. Expectancies may differ for near compared to far-off outcomes. Because much of health education

involves motivating people to engage in behaviors that provide future health benefits, understanding peoples' perspectives on time may be important for shaping, delivering, or targeting health promotion interventions.

Psychological time perspective is a construct that represents a person's orientation of the past, present, and future and how it shapes their decision-making^{5,6}. Time perspective is theorized as a subconscious cognitive framework used when making decisions about short-term and long-term goals. In some circumstances, the primary orientation favors consideration of the future, while in other circumstances, the primary orientation may favor the present or the past. Time perspective may be conceived as multidimensional, with different time frames influencing motivations for different decisions and in different domains simultaneously, or as unidimensional, with people having a time perspective that is predominantly future-, present-, or past-oriented⁶. Time perspective affects the perception and resonance of health-promoting messages, suggesting this construct is actively accessed when decisions regarding health are considered⁷.

Psychological time perspective has been associated with the likelihood of engagement in several risky health behaviors, including substance abuse^{8–15}, gambling¹⁶, risky driving^{11,16,17}, and unsafe sexual practices^{11,14,18–20}. However, whether time perspective is associated with more common health behaviors, such as smoking, diet, and recreational exercise, is less clear. Greater future orientation on the Consideration of Future Consequences (CFC) scale was associated with lower body mass indexes (N.B. with obesity considered a result of several different health behaviors), but was not associated with current smoking, in a large community sample in England²¹. Among volunteers who responded to an online survey in the United States, greater future orientation on the CFC scale was associated with lower body mass indexes and a lower likelihood of current smoking, but was not associated with regular exercise²². Among adolescents, future orientation has been associated with more physical activity and eating a healthy diet²³. However, among a small sample of patients undergoing cardiac rehabilitation, scores on the future subscale of the Zimbardo Time Perspective Inventory (ZTPI) were not associated with either exercise or diet, while higher scores on the present-fatalistic subscale were associated with more (rather than less) exercise²⁴. Lastly, in a national sample in Great Britain, associations were found between future orientation and both not smoking and eating more vegetables, but not with recreational activity²⁵.

In a previous study, we found no associations between the future and present subscales of the ZTPI and smoking, obesity, or exercise in a community sample²⁶. Although the sample was representative of the local population, participants were highly-educated and had low prevalences of smoking and physical inactivity. Both of these factors may have limited our ability to detect associations between time perspective and health behaviors. More highly-educated individuals tend to be more future-oriented than less well-educated persons and those of lower socioeconomic status^{21,25–28}. Therefore, the association between time perspective and health behaviors may have been affected by the socioeconomic composition of the sample. The purpose of the current study was to examine associations between time perspective and smoking, obesity, and recreational exercise in a diverse community-based sample of lower socioeconomic status than our previous study. We hypothesized that

persons with higher future-orientation would be less likely to be smokers or to be obese, and more likely to exercise. In addition, we hypothesized that those with higher present-orientation would be more likely to be smokers or obese, and less likely to exercise. Also, future time perspective and health share similar socioeconomic gradients. Because time perspective provides a scheme for motivations of investments in future health, time perspective has been theorized to be a mediator of socioeconomic disparities in health^{21,25,26,29–31}. An additional aim of this study was to test if time perspective mediated the association between socioeconomic status and health behaviors.

METHODS

Survey setting and participants

We conducted the survey in two neighboring small cities in a semi-rural area approximately 70 miles from Washington, DC (Hagerstown, MD, population 40,000 and Martinsburg, WV population 17,000). These locations were selected because the socioeconomic status of residents was slightly lower than the national average³², and the area was within commuting distance of Washington. Recent surveys indicated that the prevalence of current smoking was 25.6%, of obesity was 31.7%, and of physical inactivity was 28.7%³³.

To obtain a community-based sample, we surveyed patrons of barber and beauty shops. After first identifying shops using telephone directories, we contacted shop owners, explained the study, and asked permission to come to the shop to distribute surveys to their customers. Eleven shops participated. We included shops in both wealthier and poorer neighborhoods, and serving different ethnic groups. Surveys were completed between October 2008 and July 2010.

The inclusion criteria of survey respondents were age 18 or older, English literacy, and ability to provide informed consent. Researchers met with potential participants, explained the study, obtained verbal consent, and distributed the survey. The study protocol was approved by the X Office of Human Subjects Research.

Measures

Participants completed a six-page anonymous questionnaire that asked about demographic characteristics and health behaviors, and included three subscales of the Zimbardo Time Perspective Inventory (ZTPI)⁶. The demographic characteristics asked were age, gender, ethnicity, marital status, employment, and whether or not they had any children. We used years of formal education as the measure of socioeconomic status. Health behaviors included current and past smoking, and number of days of exercise in the past week. Ever smoking as ascertained by responses to the question “Have you smoked more than 100 cigarettes in your lifetime?” For those who responded affirmatively, current smoking was determined by a follow-up question on whether they smoked now. Days of exercise was ascertained by two questions: “In the past week, did you exercise?” and “If yes, how many times did you exercise?” The questionnaire did not ask about the intensity of smoking nor specify the duration or intensity of exercise. We also asked height and weight, from which

we computed body mass index (weight in kilograms/height in square meters). These items were completed before the ZTPI.

The ZTPI is a 56-item questionnaire that assesses how considerations of the past, present, and future influence one's thinking and guide one's motivations and actions⁶. The items were based on interviews and focus groups related to people's subjective experiences with time, and revised after repeated testing and factor analysis. The ZTPI includes five subscales: future; present-fatalistic; present-hedonistic; past-positive, and past-negative. The ZTPI considers time perspective to be a multi-dimensional construct, rather than a uni-dimensional construct with poles of future and past, or future and present. As a multi-dimensional construct, individuals may emphasize more than one time perspective simultaneously, or use different perspectives in different situations⁶. In this way, an individual could report both a high future orientation and a high present-hedonistic orientation, for example. However, some individuals may preferentially hold a single time perspective. The ZTPI subscales have shown construct validity through their associations with other psychological measures, in cognitive interviews, and with risk-taking behaviors^{6,9–20}

To reduce respondent burden, we included only the future, present-fatalistic, and present-hedonistic subscales in our questionnaire, as these have been the subscales most often examined for associations with health. The future subscale assesses the importance of planning, consideration of consequences of actions, and delays in gratification, with 13 items including “Before making a decision, I weigh the costs against the benefits,” and “I keep working at difficult uninteresting tasks if they will help me get ahead.” The present-fatalistic subscale measures perceptions of lack of personal control over events in one's life, with 9 items such as “You can't really plan for the future because things change so much,” and “Often luck pays off better than hard work.” The present-hedonistic subscale assesses spontaneity, risk-taking propensity, and pleasure seeking, using 15 items including “I make decisions on the spur of the moment,” and “Taking risks keeps my life from becoming boring.” Responses for each item use a five-category Likert scale ranging from “very untrue” to “very true” and coded 1 to 5. Scores are the mean of responses of items in each subscale, after reverse scoring as appropriate (possible range 1 – 5), with higher scores indicating more of the attribute. Cronbach's alpha coefficients for the scales have ranged from 0.74 to 0.82 in previous studies of college students in California (59% women; 54% white; 25% Asian; 10% Hispanic)⁶. The past-positive subscale, which examines nostalgia for childhood or past events, and the past-negative subscale, which assesses regret and painful past experiences, were not examined as these were not likely to be associated with motivating current health behavior.

Statistical analysis

We sought to enroll 250 participants, which based on our previous study would provide a power of 0.90 to detect a difference of 0.3 on the ZTPI future subscale between current smokers and non-smokers (assuming 20% of participants would be current smokers), and a difference of 0.3 between exercisers and non-exercisers (assuming 30% of participants would be non-exercisers), as statistically significant with a type I error of 0.05 (two-tailed).

There were no missing data for demographic characteristics, and few participants had missing data for single items on the ZTPI subscales. We used mean imputation to compute scores for the future subscale for 8 participants, for the present-fatalistic subscale for 3 participants, and for the present-hedonistic subscale for 8 participants.

To identify correlates of time perspective and potential confounders of its association with health behaviors, we first examined associations between each ZTPI subscale and age, gender, race, marital status, presence of children, and education level, using univariate and multivariate analysis of variance. These demographic factors have previously been associated with differences in the future and present subscales of the ZTPI^{12,17,26,28}. The multivariate models simultaneously included all demographic features as independent variables. In preliminary analyses, we found non-linear associations between age and each of the ZTPI subscales. To represent these non-linear associations, we categorized age into quartiles. We also categorized years of education into four categories representing levels of educational attainment (0 – 11 years; 12 years; 13 – 15 years; and 16 or more years).

We next examined the association between each ZTPI subscale and current smoking, obesity, and exercise, using logistic regression models (for current smoking) or ordinal logistic regression models (for obesity and exercise). The dependent variable in the first set of models was presence or absence of current smoking. The dependent variable in the second set of models was body mass index, categorized into three groups based on the World Health Organization classification: less than 25.0 kg/m², overweight (25.0 kg/m² to 29.9 kg/m²), and obese (30.0 kg/m² or more)³⁴. The dependent variable for the third set of models was number of days of exercise in the past week, categorized into three groups: none, 1 or 2 days, and 3 days or more. We first tested each ZTPI subscale as the only independent variable, and then tested models that included demographic characteristics as the independent variables. To test if time perspective mediated the association between education level and likelihood of smoking, overweight/obesity, and frequency of exercise, we then examined the change in odds ratios for education level when each time perspective subscale was added to the model. The odds ratios across levels of the dependent variable in the ordinal logistic regression models were proportional, based on the score test. We used SAS programs version 9.2 for all analyses (SAS Institute, Inc., Cary, NC).

RESULTS

Participant Characteristics

Of 310 patrons who were approached and eligible, 267 participated in the study (response rate 86.1%). The primary reasons for declining to participate were lack of interest and time constraints. Of the 267 participants, we excluded 2 participants whose questionnaires had invariant responses for all ZTPI items or for the last 80% of ZTPI items. The mean ($\pm$ standard deviation) age of the remaining 265 participants was 44.3 ± 17.6 . Participants were diverse in ethnicity, marital status, and education level (Table 1). Mean scores on the ZTPI future subscale were 3.7 ± 0.6 , on the present-fatalistic subscale were 2.5 ± 0.8 , and on the present-hedonistic subscale were 3.3 ± 0.6 . Cronbach's alpha for the future, present-fatalistic, and present-hedonistic subscales in this sample were 0.78, 0.80, and 0.80, respectively.

Associations of ZTPI subscales with demographic characteristics

Age showed a curvilinear association with scores on the ZTPI future subscale, with both younger and older participants being less future-oriented than those age 30 to 60 (Table 1). Conversely, the youngest and oldest participants had higher scores on the present-fatalistic subscale. Scores on the present-hedonistic subscale were highest among those age 18 to 29. More highly-educated participants had significantly higher scores on the future subscale than less well-educated participants, and were significantly less likely to be fatalistic. Scores on the present-hedonistic subscale did not vary by education level. Gender, ethnicity, and presence of children were not associated with scores on any of the three ZTPI subscales, while married participants had somewhat higher scores on the future subscale than unmarried participants.

Associations of ZTPI subscales with health behaviors

Contrary to expectations, current smokers had higher scores on the ZTPI future subscale than non-smokers (Table 2). Scores on the present-fatalistic and present-hedonistic subscales did not differ by smoking status. None of the ZTPI subscales differed by category of body mass index. Participants who exercised 3 or times in the past week were more future-oriented than those who reported less frequent or no exercise, but scores on the other ZTPI subscales did not differ by exercise frequency.

Mediation of socioeconomic associations with health behaviors

Table 3 presents the likelihood of current smoking, overweight/obesity, and exercise by ZTPI scores. Higher scores on the future subscale were associated with increased odds of current smoking, even after adjustment for age and education level (adjusted odds ratio 2.45 per 1-point increase in future score). Findings were similar when we examined ever-smokers versus never smokers (adjusted odds ratio 1.82, 95% confidence interval 1.17, 2.85). Scores on the future subscale were not associated with the likelihood of overweight/obesity, but were a significant predictor of more frequent exercise, even after adjustment for age and education level. The likelihood of smoking, overweight/obesity, and exercise were not associated with either the ZTPI present-fatalistic or present-hedonistic subscales in adjusted analyses.

To test if time perspective mediated the association between education level and smoking, obesity, and recreational exercise, we examined the association between education level and each outcome with and without adjustment for each time perspective subscale. Education level was inversely associated with the likelihood of current smoking and tended to be inversely associated with the likelihood of overweight/obesity, but was not associated with exercise frequency. The strength of association between education level and smoking and overweight/obesity was similar in models that excluded or included the time perspective subscales, indicating that time perspective did not mediate the association between education level and either current smoking or overweight/obesity.

DISCUSSION

In this community-based sample, we found limited support for the hypothesis that time perspective is associated with selected health behaviors in adults. Individuals who were more future-oriented reported higher frequencies of recreational exercise than those who were less future-oriented. Future orientation was not associated with being overweight or obese, and was higher (rather than lower) among current smokers compared to non-smokers. Neither present-fatalistic nor present-hedonistic orientations were associated with smoking, body mass index, or exercise frequency.

These findings differ in part from those of our previous study, in which we found no associations between ZTPI subscales and smoking, body mass index, or exercise, despite using the same measures and study design²⁶. The greatest difference in the two samples was in socioeconomic status. Our prior study included predominantly well-educated individuals, while the current study enrolled participants with a substantially lower level of education. This difference suggests that socioeconomic status may moderate the association between future time perspective and health behaviors. The only other study that assessed the association of validated measures of time perspective with these health behaviors in a community-based sample of adults was that of Adams and White²¹. In their study, future orientation as measured by the CFC scale was associated with lower body mass indexes, but was not associated with current smoking; recreational exercise was not assessed. Our findings also differ from those of Adams and Nettle²², who reported no association between the ZTPI future subscale and exercise frequency, but did find significant associations between the ZTPI future subscale and a lower likelihood of current smoking, adjusting for demographic characteristics. Body mass index was not associated with ZTPI scores in Adams and Nettle's study, which was internet-based and included self-selected subjects, predominantly socioeconomically-advantaged young women.

The poor consistency of results across studies suggests dependencies on either the measures used or the samples examined. More robust associations have been reported with the CFC scale than the ZTPI²². However, several studies have shown associations of the ZTPI with substance use and other risky behaviors^{9–13,15–17}. The readability of the CFC scale is low, with a reading level at 14.5 years of education²⁹. This limits its usability in surveys, particularly those enrolling participants with a high school education or less. Differences in the characteristics of the samples have likely contributed to the variations in associations. In addition to socioeconomic status, our results suggest that the age distribution of the sample is likely important. It is interesting to note that associations between time perspective and health behaviors are both stronger and more consistent in studies of adolescents and college students^{8,9,11,12,14,15,17,20,23,35} than in studies that included middle-aged and older participants^{21,22,24,26}. This difference suggests a window of susceptibility in the course of health behavior decision-making in which time perspective may be most operative. As postulated in stage theories of health behavior, influences on decision-making may operate primarily at particular developmental or situational stages³⁶. Time perspective may be most influential in young people, when decisions regarding behaviors such as smoking and exercise are first engaged. Once decisions are made for a particular behavior, time

perspective may not majorly affect prospects of whether the behavior is continued in the future.

Windowing of susceptibility could explain our counter-intuitive result that future time perspective was higher among current smokers than non-smokers. Once habits such as smoking become established, their outcome expectancies may change, or the behavior may become automatic and unlinked to outcome expectancies^{37,38}. Time perspective may then relate to, and be influenced by, other health considerations or domains other than health, such as finances or interpersonal relations, which may have differed between smokers and non-smokers. These results may also reflect optimistic bias among smokers.

We did not find that time perspective mediated socioeconomic differences in behaviors. Although education level was associated with the likelihood of current smoking and overweight/obesity, none of the ZTPI subscales altered the strength of these associations. Evidence for mediation was also weak in previous studies^{21,26}. Given the complex relationships among socioeconomic status, health behaviors, and health outcomes, and their interactions over a lifetime, it is likely no single measure would mediate these relationships. Mediation may be more apparent for health-care seeking behaviors²⁹.

The strengths of this study included examination of a community-based sample, a high response rate, and testing of associations with both future and present orientations. The health behaviors were also frequent, which would help ensure sufficient power to detect associations with the time perspective measures. Although we had a convenience sample, the prevalences of smoking, obesity, and physical inactivity were closely similar to those of the area's general population, suggesting that the sample was representative. The study is limited in not including several different measures of time perspective, which might have detected associations not seen with the ZTPI, but we were sensitive to respondent burden. We also asked about only three aspects of health, and did not include illegal or risky behaviors, which may have different associations with time perspective. Also, our measures of smoking, exercise, and body mass index were all self-reported and therefore may be of uncertain validity. However, similar approaches and questions have been used in national health surveys^{32,33,39}.

In conclusion, we found future time perspective to be associated with the frequency of recreational exercise, and with a higher likelihood of current smoking, but found no associations between present time perspectives and health behaviors, in this study of adults. Studies that examine exercise intensity in more detail and, conversely, sedentary activities such as time spent watching television, may help define the extent of associations with future time perspective. Future research of time perspective in health may benefit from consideration of a life course perspective, incorporating the concept of windows of susceptibility in decision-making. Our results also suggest that the outcomes of health promotion interventions for certain behaviors, such as recreational exercise, may be influenced by the time perspective of the recipients. Tailoring interventions based on time perspective could be tested as a way to enhance their efficacy.

Acknowledgments

This work was supported by XX.

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Table 1

Associations of the Zimbardo Future, Present-Fatalistic, and Present-Hedonistic Time Perspective scales with demographic characteristics of subjects. Values are mean (standard error). Adjusted means are derived from models that included all demographic characteristics.

	N (%)	Future		Present-Fatalistic		Present-Hedonistic	
		Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Age (years)							
18 – 29	72 (27.2%)	3.60 (.07)	3.61 (.08)	2.64 (.09)	2.64 (.10)	3.56 (.07)	3.58 (.08)
30 – 44	66 (24.9%)	3.79 (.07)	3.75 (.08)	2.33 (.10)	2.36 (.10)	3.05 (.07)	3.03 (.08)
45 – 60	67 (25.3%)	3.83 (.07)	3.78 (.08)	2.46 (.09)	2.49 (.10)	3.15 (.07)	3.11 (.08)
61 and older	60 (22.6%)	3.52 (.08) *	3.50 (.09) *	2.79 (.10) *	2.75 (.11) *	3.28 (.08) ***	3.23 (.09) ***
Women	126 (47.6%)	3.69 (.05)	3.66 (.06)	2.56 (.07)	2.56 (.08)	3.26 (.05)	3.24 (.06)
Men	139 (52.4%)	3.68 (.05)	3.66 (.06)	2.54 (.07)	2.57 (.08)	3.27 (.05)	3.24 (.06)
White	118 (44.5%)	3.70 (.06)	3.63 (.06)	2.52 (.07)	2.58 (.08)	3.33 (.06)	3.32 (.06)
Black	98 (37.0%)	3.69 (.06)	3.70 (.06)	2.55 (.08)	2.50 (.08)	3.23 (.06)	3.20 (.06)
Other	49 (18.5%)	3.66 (.09)	3.65 (.09)	2.64 (.11)	2.60 (.11)	3.22 (.09)	3.20 (.09)
Not married	120 (45.3%)	3.60 (.05)	3.61 (.06)	2.67 (.07)	2.65 (.08)	3.33 (.06)	3.25 (.06)
Married	145 (54.7%)	3.76 (.05) *	3.71 (.06) *	2.46 (.07)	2.47 (.08)	3.22 (.05)	3.23 (.06)
No children	86 (32.6%)	3.64 (.07)	3.65 (.07)	2.53 (.09)	2.50 (.10)	3.34 (.07)	3.18 (.08)
With children	179 (67.4%)	3.71 (.05)	3.67 (.05)	2.56 (.06)	2.62 (.06)	3.24 (.05)	3.30 (.05)
Education (years)							
0 – 11	41 (15.5%)	3.36 (.09)	3.38 (.10)	2.95 (.12)	2.88 (.13)	3.37 (.10)	3.34 (.10)
12	86 (32.5%)	3.65 (.06)	3.66 (.07)	2.68 (.08)	2.64 (.09)	3.27 (.06)	3.22 (.07)
13 – 15	79 (29.8%)	3.74 (.07)	3.71 (.07)	2.48 (.09)	2.52 (.09)	3.26 (.07)	3.23 (.07)
16 or more	59 (22.2%)	3.90 (.07) ***	3.89 (.08) **	2.18 (.10) ***	2.20 (.10) **	3.20 (.08)	3.17 (.08)

* P < .05;

** P < .001;

*** P < .0001 for differences among groups.

Table 2

Scores on the Zimbaro Future, Present-Fatalistic, and Present-Hedonistic Time Perspective scales, by current smoking, overweight/obesity, and exercise days per week. Values are mean (standard error).

	N (%)	Future	Present-Fatalistic	Present-Hedonistic
Current smokers	59 (22.3%)	3.84 (.07)	2.53 (.10)	3.23 (.08)
Non-smokers	206 (77.7%)	3.64 (.04) *	2.55 (.06)	3.28 (.04)
Body mass index < 25.0 kg/m ²	74 (28.5%)	3.67 (.07)	2.48 (.09)	3.40 (.07)
Body mass index 25.0 – 29.9 kg/m ²	107 (41.1%)	3.76 (.06)	2.57 (.08)	3.22 (.06)
Body mass index ≥ 30 kg/m ²	79 (30.4%)	3.64 (.07)	2.54 (.09)	3.22 (.07)
Exercise 0 days per week	77 (29.0%)	3.56 (.07)	2.65 (.09)	3.19 (.07)
Exercise 1 – 2 days per week	68 (25.7%)	3.67 (.08)	2.61 (.10)	3.30 (.08)
Exercise 3 or more days per week	120 (45.3%)	3.78 (.06) *	2.45 (.07)	3.30 (.06)

* P < .05 between groups, by analysis of variance.

Associations between the Zimbaro Future (A), Present-Fatalistic (B), and Present-Hedonistic (C) Time Perspective scales and the likelihood of current smoking, overweight/obesity, and exercise frequency. Values are odds ratios (95% confidence intervals).

Table 3

	Current smoking			Overweight/obesity			Exercise		
	Time perspective	Demographics alone	Full model	Time perspective	Demographics alone	Full model	Time perspective	Demographics alone	Full model
A.									
	Future	1.73 (1.04, 2.89)	2.45 (1.37, 4.37)	0.94 (0.64, 1.36)	--	1.54 (1.03, 2.29)	1.59 (1.10, 2.32)	--	1.54 (1.03, 2.29)
	Age (years)								
	18 – 29		1.00		1.00	1.00		1.00	1.00
	30 – 44		1.10 (0.48, 2.51)		3.99 (2.08, 7.65)	4.06 (2.10, 7.82)		0.92 (0.48, 1.72)	0.85 (0.45, 1.63)
	45 – 59		1.37 (0.61, 3.08)		3.70 (1.94, 7.05)	3.78 (1.97, 7.27)		0.90 (0.48, 1.70)	0.83 (0.43, 1.57)
	60 and older		0.58 (0.23, 1.45)		2.92 (1.49, 5.74)	2.92 (1.48, 5.73)		0.48 (0.25, 0.94)	0.48 (0.24, 0.94)
	Education (years)								
	0 – 11		1.00		1.00	1.00		1.00	1.00
	12		0.75 (0.33, 1.69)		0.48 (0.23, 0.97)	0.49 (0.23, 1.01)		0.84 (0.41, 1.70)	0.73 (0.35, 1.49)
	13 – 15		0.46 (0.19, 1.10)		0.44 (0.21, 0.93)	0.46 (0.21, 0.97)		0.95 (0.46, 1.96)	0.81 (0.38, 1.70)
	16 or more		0.13 (0.03, 0.43)		0.51 (0.23, 1.11)	0.53 (0.24, 1.19)		1.36 (0.63, 2.92)	1.09 (0.49, 2.42)

	Current smoking			Overweight/obesity			Exercise		
	Time perspective	Demographics alone	Full model	Time perspective	Demographics alone	Full model	Time perspective	Demographics alone	Full model
B.									
	Fatalistic	0.96 (0.66, 1.38)	0.77 (0.51, 1.15)	1.06 (0.80, 1.42)	--	1.07 (0.78, 1.47)	0.78 (0.58, 1.03)	--	0.84 (0.61, 1.13)
	Age (years)								
	18 – 29		1.00		1.00	1.00		1.00	1.00
	30 – 44		1.10 (0.48, 2.51)		3.99 (2.08, 7.65)	4.06 (2.10, 7.84)		0.92 (0.48, 1.72)	0.87 (0.46, 1.66)
	45 – 59		1.37 (0.61, 3.08)		3.70 (1.94, 7.05)	3.72 (1.95, 7.13)		0.90 (0.48, 1.70)	0.89 (0.47, 1.69)
	60 and older		0.58 (0.23, 1.45)		2.92 (1.49, 5.74)	2.90 (1.48, 5.71)		0.48 (0.25, 0.94)	0.49 (0.25, 0.96)
	Education (years)								
	0 – 11		1.00		1.00	1.00		1.00	1.00

		Current smoking			Overweight/obesity			Exercise		
		Time perspective	Demographics alone	Full model	Time perspective	Demographics alone	Full model	Time perspective	Demographics alone	Full model
B.										
	12		0.75 (0.33, 1.69)	0.63 (0.28, 1.42)		0.48 (0.23, 0.97)	0.49 (0.23, 1.00)		0.84 (0.41, 1.70)	0.80 (0.39, 1.62)
	13 – 15		0.46 (0.19, 1.10)	0.38 (0.15, 0.92)		0.44 (0.21, 0.93)	0.46 (0.21, 0.96)		0.95 (0.46, 1.96)	0.88 (0.42, 1.84)
	16 or more		0.13 (0.03, 0.43)	0.10 (0.02, 0.33)		0.51 (0.23, 1.11)	0.54 (0.24, 1.21)		1.36 (0.63, 2.92)	1.20 (0.54, 2.67)

		Current smoking			Overweight/obesity			Exercise		
		Time perspective	Demographics alone	Full model	Time perspective	Demographics alone	Full model	Time perspective	Demographics alone	Full model
C.										
	Hedonistic	0.88 (0.54, 1.40)	--	0.83 (0.50, 1.38)	0.71 (0.49, 1.38)	--	0.91 (0.60, 1.35)	1.24 (0.86, 1.80)	--	1.28 (0.86, 1.90)
	Age (years)									
	18 – 29		1.00	1.00		1.00	1.00		1.00	1.00
	30 – 44		1.10 (0.48, 2.51)	1.01 (0.42, 2.39)		3.99 (2.08, 7.65)	3.81 (1.93, 7.51)		0.92 (0.48, 1.72)	1.03 (0.53, 2.03)
	45 – 59		1.37 (0.61, 3.08)	1.28 (0.55, 2.93)		3.70 (1.94, 7.05)	3.54 (1.82, 6.88)		0.90 (0.48, 1.70)	0.99 (0.51, 1.90)
	60 and older		0.58 (0.23, 1.45)	0.62 (0.25, 1.54)		2.92 (1.49, 5.74)	2.83 (1.42, 5.62)		0.48 (0.25, 0.94)	0.52 (0.26, 1.02)
	Education (years)									
	0 – 11		1.00	1.00		1.00	1.00		1.00	1.00
	12		0.75 (0.33, 1.69)	0.66 (0.29, 1.49)		0.48 (0.23, 0.97)	0.47 (0.23, 0.97)		0.84 (0.41, 1.70)	0.87 (0.43, 1.77)
	13 – 15		0.46 (0.19, 1.10)	0.42 (0.17, 1.98)		0.44 (0.21, 0.93)	0.44 (0.21, 0.92)		0.95 (0.46, 1.96)	0.99 (0.47, 2.04)
	16 or more		0.13 (0.03, 0.43)	0.11 (0.03, 0.38)		0.51 (0.23, 1.11)	0.51 (0.23, 1.10)		1.36 (0.63, 2.92)	1.44 (0.66, 3.12)