Active Lifestyle, Health, and Perceived Well-being

Prior studies have documented that physical activity leads to improved health and well-being through two main pathways: 1) improved cardiovascular function and improved muscle strength and 2) maintaining or achieving "normal" body weight status (i.e., body mass index of 25 to 30). Physical activity expends calories, which in turn reduces the chance of being overweight or obese. A healthy body weight, in turn, is associated with a reduced risk of heart attack, stroke, and diabetes. We investigate a third plausible pathway: regular physical activity may be associated with a range of short-term positive experiences which may ultimately enhance health and longevity; these more immediate responses include reduced physical pain and psychological stress, feeling better rested, and maintaining a more positive mood. A lifestyle marked by modest to high levels of physical activity can be contrasted with a sedentary lifestyle that includes more time spent watching television and working on the computer, and more time spent in the car. A second set of activities that have been linked to health is social activities, including visiting, volunteering, and interacting with other people. Physically active and social behaviors we suggest comprise an "active life style."

This paper examines the association between "active life style" behaviors and health. Health is measured with the widely-used five-category general self-rated health indicator (excellent, very good, good, fair, or poor). Analyses are based on the 2006-2008 and 2010 waves of the American Time Use Survey (ATUS). For respondents in the 2010 wave of the ATUS, we also examine three specific health outcomes: whether the individual (1) has hypertension, 2) took pain medication on the diary day, and 3) woke up rested on the diary day. Finally, in 2010 we have measures of ATUS respondents' momentary perception of well-being during each of three randomly selected activities. Our study is the first that we know of to examine the association between health behaviors and general and momentary measures of well-being.

The rich ATUS data allow us to examine a broad range of daily activities. The health and lifestyle behaviors examined include time spent in physical activities – e.g., playing sports, walking, biking, working out in a gym - versus sedentary activities such as watching television, relaxing, listening to the radio, using the computer, and time spent traveling in a car (truck, bus, train, plane). Classification of activities as intense, moderate, and sedentary will be guided by the compendium of estimated metabolic equivalent (MET) values (Tudor-Locke et al. 2009). A MET value provides an estimate of the energy expenditure experienced in an activity per unit of time. It is the ratio of the metabolic rate during activity to a standard resting metabolic rate of 1. Our second category of behaviors linked to health encompasses social activities, including visiting, volunteering, and attending and hosting social events. Instead of total time spent, we will examine the proportion of waking time that these activities represent (for general measures of well-being) or the proportion of the total time spent in eligible activities (for momentary assessments). Although sleep is an important contributor to health, the present study simply adjusts for different individual sleep patterns.

Our first question is whether these "active life style" measures are linked to general health and well-being. Our second question is how these activities are experienced: are people happier when they are doing active/social activities than whether they are doing sedentary/nonsocial activities? We examine variation in these patterns in the middle stage of the life course (age 25-64) by gender, age, marital status, employment status, race/ethnicity, education, income, and presence of children.

Description of the American Time Use Survey (ATUS)

The ATUS is a federally funded nationally representative survey on the time use of Americans age 15 and older. The individuals chosen for participation in the ATUS are selected randomly from households that are completing their participation in the Current Population Survey (CPS). ATUS interviews are conducted by telephone in English or Spanish between two and five months after the final CPS interview for the ATUS household. The assigned ATUS diary days are distributed across the days of the week, with 10 percent allocated to each of the weekdays Monday through Friday, 25 percent to Saturdays and 25 percent to Sundays, and they are distributed evenly across the weeks of the year. Weights adjust for the oversample of weekends.

Once telephone contact is established and the ATUS sample member agrees to participate in the survey, the telephone interviewer leads the respondent through his/her activities over the 24-hour period that began at 4 a.m. on the designated day and continues through 3:59 a.m. the following day. The respondent lists his/her activities, describing in his/her own words the primary activity in which he/she is engaged. Information on the activities is collected sequentially and an ending time is recorded for each activity. Data in the present study come from four waves of the American Time Use Survey (ATUS): 2006-2008 and 2010. These waves obtained information on self-rated health for the entire sample. The 2010 wave was the first to include assessments of momentary well-being. The 2010 wave also includes whether a health professional diagnosed the participant as having hypertension, and use of pain medication and restedness on the ATUS diary day.

Beyond the data from the ATUS interview, information collected as part of any ATUS modules and data from the final CPS interview for the ATUS households are also available. Additional information about the ATUS respondents and members of their households may be obtained by linking ATUS data files to earlier waves of participation in the CPS. The present analysis uses information from the core ATUS interview and module data (ATUS-X; Abraham et al. 2012), and draws on data linked to the March supplement of the CPS (IPUMS-CPS; King et al. 2012) from which we obtain previous self-rated health reports.

Analysis Plan

The first two analyses present a descriptive and then a multivariate analysis of the association between behaviors that comprise a physically active or social life style and the five-category measure of general health. Health will be analyzed as an ordered dependent variable. Time spent in physically active, sedentary, and social activities are the key independent variables. Controls for individual and family demographic variables will be included. For the 2010 subsample only, we will also examine the association between these behaviors and diagnosis of hypertension, use of pain medication, and restedness, additional indicators of health. Of course, people who are healthy are better able to engage in healthy behaviors. We, therefore, use data drawn from the March CPS, which was collected three to six months earlier than the ATUS, to control for initial health conditions influencing behavior, thus approximating a fixed effects model for health. Behaviors are measured at only one time point (ATUS).

The third analysis will use multivariate techniques to examine associations between activities indicating "active life styles" (physical/sedentary or social/nonsocial) and momentary well-being outcomes (happy, sad, tired, stressed, or in pain). All models will control for the full set of individual and family demographic variables and night sleep time. This analysis will be conducted only on the 2010 file.

Preliminary Results

Descriptive statistics on the sample characteristics and the dependent variable, health, are shown in Table 1. Because of the large differences in life style between married and unmarried participants, we show them by marital status, with t-tests for differences in means for continuous variables and differences in proportions for categorical variables. Married participants are older, better educated, have higher incomes and have slightly better health (NB: a lower value means better health) than unmarried participants. Married participants also are more likely to be white, and to have children under age 18 living with them.

Table 2 shows the proportion engaged in each type of activity and the amount of time spent for those who spent time. Almost everyone spent time traveling in a car, truck or public transportation and spent time watching television or doing other passive leisure. Four out of ten engaged in social activities on the diary day. However, only a small fraction engaged in physical activity or in walking/biking as a mode of transportation.

Table 3 shows the results of a preliminary ordinal regression in which the dependent variable is the five-category health measure (1=excellent; 5=poor) regressed on the independent variables of minutes of time in the five activities, controlling for the sociodemographic variables. Because the ordered logistic regression cumulates probabilities over the lower categories, the results can be interpreted as the association between each variable and the probability of the participant's health being excellent or very good compared to the less healthy categories.

The results show that each additional 10 minutes spent in physical activity is associated with a 2% increase in the chance (odds) of being in better compared with worse health. An additional 10 minutes spent walking or in biking as travel is associated with a 4% greater chance of being in better compared with worse health. More time spent in social, volunteer or hosting activities is associated with a .2% greater chance of being in better compared with worse health. In contrast, more time spent in sedentary activity is associated with a 1% lower chance of being in excellent health. In contrast to expectations, passive travel is associated with a .3% greater chance of being in excellent health.

The sociodemographic variables are associated in the expected directions with health. Having higher income, higher education, no children, being female, being white, being married, and being younger are associated with a greater chance of being in excellent health. These findings are consistent with expectations.

Conclusions and Plans for the Full Paper

These results provide some initial support for the linkage between healthy activity patterns and health. However, it would not be surprising to find that those in poorer health may be unable to engage in physical activity and active travel. Besides some refinement of the activity categories and the addition of time spent sleeping, we will also link to health data from the CPS data from previous months to control for health prior to the diary report of activities. We will re-weight the data accordingly, since only a subsample of ATUS respondents will have participated in the March CPS. This will be done in the next few months, far in advance of the 2013 PAA annual meetings.

References

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Table 1: Background characteristics of ATUS respondents aged 25-64 in the surveyed years (2006-2008, 2010) by marital status

		Married respondents (N=21,803)	Unmarried respondents (N=14,484)	N
Age (M)		44.87***	41.94	36,287
Education in years (M)		13.86***	13.43	36,287
Family income (M)		75,886.52***	47,468.50	32,756
Lowest quintile		6.79	23.67***	4,805
Second quintile		16.92	29.56***	7,173
Third quintile		18.53	19.30	6,053
Fourth quintile		30.88***	18.10	8,194
Highest quintile		26.89***	9.37	6,531
General health (M)		2.37	2.56***	35,654
Excellent (1)		20.88***	18.16	7,194
Very good (2)		36.92***	31.46	12,675
Good (3)		29.06	30.84**	10,368
Fair (4)		10.18	14.43***	4,056
Poor (5)		2.96	5.10***	1,361
Employment Status	Working	77.92***	76.15	27,851
	Non-working	22.08	23.85***	8,436
Race	Non-Hispanic White	72.57***	61.39	24,424
	Non-Hispanic Black	7.54	19.91***	4,836
	Non-Hispanic American Indian	1.17	1.42*	448
	Non-Hispanic Asian/Asian or pacific islander	4.78***	2.90	1,385
	Hispanic	13.85	14.12	5,131
	Other	0.09	0.25**	63
Sex	Male	49.40	48.80	16,091
	Female	50.60	51.20	20,196
Children<18 in household	Yes	54.23***	27.14	20,093
	No	45.77	72.86***	16,194

Note. * p<.05; ** p<.001; *** p<.0001

Table 2: Percentage of ATUS respondents reporting each activity and average time spent in activity by those who engaged in it, by marital status

	Married respondents (N=21,803)		Unmarried respondents (N=14,484)		N
	%	Hours:Min	%	Hours:Min	
All sports activities	16.76	1:30	15.41	1:35	5,816
All travel: walking or biking	10.23	0:20	15.81	0:27	4,375
All travel: car, truck, and motorcycle, bus, subway, boat, taxi, airplane	87.70	1:24	82.57	1:20	30,908
TV, computer, relaxing, radio	84.94	3:07	86.30	3:49	30,846
All volunteer activities and social activities	42.78	1:57	36.23	2:09	15,470
Sleep at night (8pm-4am)	98.13	5:21	96.66	5:06	35,449

Table 3: Ordered logistic regression of general health status on activity time (including nonparticipants) and sociodemographic controls

	β	OR (95% CI)
Background Information		
Age	-0.019	0.980 (0.978, 0.982)***
Education in years	0.113	1.120 (1.112, 1.129)***
Family income (ref.: Lowest quintile)		
Second quintile	0.322	1.380 (1.283, 1.485)***
Third quintile	0.561	1.752 (1.621, 1.894)***
Fourth quintile	0.661	1.938 (1.793, 2.094)***
Highest quintile	0.946	2.576 (2.366, 2.805)***
Employment status (ref.: Non-working)		
Working	0.599	1.822 (1.727, 1.921)***
Race (ref.: Non-Hispanic White/Other: omitted)		
Non-Hispanic Black	-0.203	0.816 (0.764, 0.872)***
Non-Hispanic American Indian	-0.148	0.862 (0.720, 1,032)
Non-Hispanic Asian/Asian or pacific islander	-0.398	0.672 (0.606, 0.745)***
Hispanic	-0.325	0.723 (0.678, 0.770)***
Sex (ref.: Female)		
Male	-0.074	0.928 (0.890, 0.967)**
Children < age 18 in household (ref.: No)		
Yes	-0.066	0.935 (0.893, 0.979)*

Marital Status (ref.: Unmarried)		
Married	0.098	1.103 (1.051, 1.158)***
Activity Time (divided by 10)		
All sports activities	0.022	1.023 (1.019, 1.027)***
All travel: walking or biking	0.044	1.045 (1.030, 1.061)***
All travel: car, truck, and motorcycle, bus, subway, boat, taxi, airplane	0.003	1.003 (1.000, 1.006)*
TV, computer, relaxing, radio	-0.012	0.988 (0.986, 0.989)***
All volunteer activities and social activities	0.001	1.002 (1.000, 1.004)
Control variable		
Sleep at night (8pm-4am)	0.000	1.004 (1.002, 1.006)**
T_1	-3.203***	
T_2	-1.424***	
T_3	0.310**	
T_4	2.028***	
N	32,189	

Note. CI = Confidence Interval; * p<.05; ** p<.001; *** p<.0001;
-2 Log L: Intercept only: 91,152; With Intercept and covariates: 85,171;
Log likelihood test for the model: Chi square = 5,981, df = 20, p<.001