Trade-Offs Between Commuting Time and Health-Related Activities

Thomas J. Christian

ABSTRACT *To further understand documented associations between obesity and urban sprawl, this research describes individuals' trade-offs between health-related activities and commuting time. A cross-section of 24,861 working-age individuals employed full-time and residing in urban counties is constructed from the American Time Use Survey (2003–2010). Data are analyzed using seemingly unrelated regressions to quantify health-related activity decreases in response to additional time spent commuting. Outcomes are total daily minutes spent in physical activity at a moderate or greater intensity, preparing food, eating meals with family, and sleeping. Commuting time is measured as all travel time between home and work and vice versa. The mean commuting time is 62 min daily, the median is 55 min, and 10.1% of workers commute 120 min or more. Spending an additional 60 min daily commuting above average is associated with a 6% decrease in aggregate health-related activities and spending an additional 120 min is associated with a 12% decrease. The greatest percentage of commuting time comes from sleeping time reductions (28–35%). Additionally, larger proportions of commuting time are taken from physical activity and food preparation relative to the mean commuting length: of 60 min spent commuting, 16.1% is taken from physical activity and 4.1% is taken from food preparation; of 120 min commuting, 20.3% is taken from physical activity and 5.6% is taken from food preparation. The results indicate that longer commutes are associated with behavioral patterns which over time may contribute to obesity and other poor health outcomes. These findings will assist both urban planners and researchers wishing to understand time constraints' impacts on health.*

KEYWORDS *Health behaviors, Obesity, Commuting, Time allocation, Time scarcity*

BACKGROUND

Each year, obesity-related diseases impose billions of dollars in state and local governmental expenditures^{1,2} and are attributable to large numbers of deaths.³ There is a large interest in understanding contributing factors, and researchers frequently investigate the role of individuals' surrounding environments.⁴ Numerous papers demonstrate spatial patterns in obesity prevalence, including a positive association between obesity and urban sprawl.^{5–11} Subsequent research has identified time spent commuting as a potential pathway between sprawl and both obesity and physical inactivity.¹²

Christian is with the Center for Gerontology and HealthCare Research, Brown University, Providence RI, USA.

Correspondence: Thomas J. Christian, Center for Gerontology and HealthCare Research, Brown University, Providence RI, USA. (E-mail: Thomas_Christian@brown.edu)

Commuting time is an intuitive channel between sprawl and obesity. Time is a major input to health^{13,14} and large amounts of time consumed by long commutes may inhibit healthy behaviors. For example, time scarcity is cited as a barrier to physical activity¹⁵ and maintaining nutritious diets.^{16,17} Less time for meal preparation may prompt the selection of lower time cost meals, which are often processed or non-grocery meals less healthy than meals assembled from base ingredients.¹⁸ Commute time could also be drawn from sleeping time increasing the potential for sleep deprivation, which is associated with obesity.¹⁹

Little is established regarding the manner in which Americans trade-off time among activities. This research focuses on trade-offs between health-related activities and time spent commuting. Because daily time is constrained to 24 h, holding working time constant, increases in commuting time must necessarily be met with decreases in aggregate leisure time. Although every individual leisure activity need not decrease, increasingly limited leisure time progressively constrains time available for health-related activities on the whole. Whether individuals reallocate time from health-related activities—and if so, by how much—are the research questions of this study.

METHODS

Data: the American Time Use Survey

The primary dataset is the American Time Use Survey (ATUS). The ATUS is an annual, nationally representative cross-sectional survey, administered by the Bureau of Labor Statistics since commencing in 2003. A monthly ATUS sample is randomly drawn from respondents recently completing the bureau's Current Population Survey. Respondents chronologically list what they consider to be their primary activities and the activities' durations beginning with 4 am on the previous day through 4 am on the day of the interview, a 24-h period referred to as the respondents' "diary day". A limitation of the data is that only the activity which respondents consider to be their primary engagement at a given time is recorded; other activities performed simultaneously and considered secondary are omitted. This information is categorized on a per-minute time scale into a three-tiered system of approximately 400 activities (e.g., an activity may be classified as "Work & Work-Related Activities" in the first tier, "Working" in the second tier, and "Work, main job" in the third). The ATUS also records where each activity took place, or for travel activities, the transit mode. Additionally, researchers have constructed MET intensity values for each ATUS activity category.²⁰ A "MET" (or "metabolic equivalent") is a unit commonly used to gauge the intensity of a physical activity and is roughly defined as the ratio of energy expenditure in an activity to energy expenditure while at rest. A MET value of 3.0 is considered the threshold for moderate intensity.

Primary Measures

(a) Health-Related Activity Outcomes

Four health-related activities are modeled: (1) aggregate physical activity, the summation of time spent in 35 individual exercise and sports activities and time for any other activity for which the MET value is 3.0 or greater; (2) total time spent

preparing food; (3) the total time spent eating as a primary activity; and (4) total time spent sleeping. These time usages are appropriate measures of healthy behaviors. Physical activity includes deliberate exercise as well as other sources daily activity, which may be an important source for many. Given the absence of precise nutritional intake, food preparation and the time spent eating with family proxy for diet quality. More time in these activities suggests that fewer pre-prepared or processed foods consumed. Additionally, to provide benchmark comparisons to the healthy-related behaviors, the time spent (5) socializing or communicating with others and (6) watching television, which together comprise approximately one third of the sample's waking leisure time, are also measured.

(b) Commuting

The principal explanatory factor is the total daily time spent commuting. Classifying a commute is not straight-forward because commuters often run other errands over the course of their journey.²¹ To accommodate commuting trips with multiple destinations, a commute is defined as *all travel time for any purpose from the time the respondent leaves home until arrival at work*, and vice versa. A respondent's total daily commuting time is the summation of all qualifying travel time.

(c) Covariates

Several demographic control variables are included: age, gender, race and Hispanic status, education, marital status, number of children, an indicator for the presence of a child aged 1 year or less, hourly wage, household income, school enrollment status, and employment status by occupation and industry. Covariates also include fixed effects for the respondents' metropolitan area of residence and the diary day date (the year, month, day of the week, and whether it was a holiday). Additionally, two indicators are constructed to identify commuters using active travel modes (walking or bicycling) at least 30 min daily or using public transportation during any portion of their commute. Lastly, commuting is a work-related activity. Because in addition to any trade-off with commuting labor time itself constrains healthy behaviors,²² the total daily time spent working is also included.

Sample Construction

The sample is constructed as follows: when ATUS samples from survey years 2003 through 2010 are pooled, 112,038 observations comprise the full set. Given the focus on commuting, a work-related activity, the sample is limited to working-age (21–65) adults residing within identifiable urban labor markets, specifically the respondent's Core Based Statistical Area. These criteria result in the omission of 23,788 individuals living in rural areas and 20,343 individuals outside of the age range. Next, 3,957 identified as beginning or ending the day away from home or working night shifts were omitted. Commuters falling under loosely defined "traditional" commuting schedules were eligible for inclusion if they arrived at work between 4:30 am and 6 pm, and also arrived at home between 10 am and 11:30 pm. Furthermore, 28,019 respondents who were either not employed or not employed full-time and thus not subject to comparable time constraints were dropped. A further 3,932 employed respondents who did not report wages and 5,877 who did not report household income were not included. Finally, 1,261 individuals with time usages in any health-related activity, socializing, television,

labor, or commuting time exceeding the 99th percentile (measured at the full pooled sample) were excluded as outliers. The final dataset includes 24,861 observations.

Statistical Methods

The empirical objective is to estimate how the participation in several health-related activities varies by the amount of time spent commuting. The analysis uses seemingly unrelated regression (SUR), which acknowledges the interrelatedness among activities within a given day. In particular, the SUR procedure allows for correlation among the error terms within an individual's daily activities. Commuting time is entered into the model in linear, quadratic, and cubic terms, and labor time is entered in linear and quadratic. Additionally, interaction terms are included between commuting time and labor time, and also between commuting time and the indicators for public transportation mode and active commuting. A quadratic term is included for age and respondents' hourly wage and household income are logged.

The SUR results are then available to produce covariate-adjusted means for each health-related activity at each commuting length. The adjusted means are then used to accomplish two primary aims: (1) to calculate how much involvement in a specific activity decreases when commuting time increases, to gauge that activity's responsiveness to commuting increases, and (2) to calculate the percentages of commuting time that are derived from decreases in each health-related activity. These percentages indicate in which activities commuters would otherwise be involved rather than traveling to work. Commuting time increases are calculated using the mean commuting time as the reference comparison.

RESULTS

Table 1 presents time use activity and covariate descriptions and sample means and categorical percentages. Summary statistics are presented for the overall sample and additionally within several brackets of daily commuting time in 1-h intervals: 0, 1–59, 60–119, 120–179, and 180 min or more total commuting time on the diary day. Time usages are sample averages and are not conditional on having engaged in the specific activity. The mean time spent daily commuting is 40.0 min overall, whereas conditional on having commuted the mean daily commuting time is 62.2 min and the median is 55 min. The covariates' raw means and rates suggest that respondents with longer commutes are a higher proportion male (54.9% of the 1–59-min commuting bracket group compared to 60.3% of the 120–179-min commuting time bracket group), minority race, and ethnicity (whites are 68.6% of the 1–59 bracket and 61.7% of the 120–179 bracket), have higher household income (\$60.7 thousand in the 1–59 bracket and \$72.7 thousand in the 120–179 bracket), and of higher educational attainment (37.7% have a college degree or higher in the 1–59 bracket, and 46.6% of the 120–179 bracket).

Table 2 provides additional descriptive statistics pertinent to commuting. Within the sample, 4.9% or those working on their diary day spend 0 min commuting, 54.2% spend less than 60 min, 89.9% spend less than 120 min, and 1.6% spend 3 h or more commuting to work. The vast majority of the sample commutes to work solely by automobile: 92.8% of the sample overall. Few commuters walk or bicycle to work (2.2%) or use public transportation (3.4%), but commuters using alternative modes are clustered among respondents reporting longer commuting times, representing almost a third of respondents spending 180 min or more daily commuting.

TABLE 1 Summary statistics with descriptions [n=24,861]

Variable	Description	Total daily commuting minutes					
		Overall	0	1–59	60–119	120–179	180+
Time use variables							
Commuting time	Total minutes spent commuting, defined as all travel time for any purpose between leaving home and arrival at work, and vice versa	40.0	0	33.2	78.5	136.7	196.4
Labor time	Total minutes spent working at main and other jobs, if applicable; (ATUS activities t050101 and t050102)	345.6	45.1	514.7	513.0	504.2	469.6
Physical activity	Total aggregate minutes spent in exercise (t130101 through t39999) and activities in which the MET value exceeds 3.0: t030103, t030105, t040103, t040105, t020101, t020104, t020301, t020302, t020303, t020399, t020401, t020402, t020499, t020501, t020599, t040502, t040503, t040504, t150301, t150302, t150399, and any travel using a bicycle	54.1	99.9	31.3	27.6	21.3	14.6
Food preparation	Total minutes spent in food and drink preparation and presentation (t020101+ t020102).	18.8	25.5	16.0	14.8	12.1	12.5
Family eating	Total minutes eating or drinking as a primary activity (t110101) with family members present	32.2	48.1	23.4	23.7	22.7	22.5
Sleeping	Total minutes sleeping (t010101)	490.3	556.8	461.9	446.8	436.6	423.6
Socializing	Total minutes spent socializing, attending social events, communicating with others, and talking with family and friends on the telephone (t120101, t120199, t120201 t120202, t120299, t160101, and t160102).	37.6	63.1	24.7	22.9	20.4	16.4
Television	Total minutes spent watching television (t120303).	128.5	181.0	106.8	94.0	78.7	97.2
Covariates							
Age	The respondent's age	40.5	40.6	40.4	40.5	40.6	39.3
Male	=1 if the respondent is male	55.6%	54.4%	54.9%	57.0%	60.3%	60.7%
White	=1 if the respondent is Caucasian	68.0%	68.6%	68.6%	67.9%	61.7%	60.1%
Black	=1 if the respondent is African American	10.4%	10.9%	9.8%	10.1%	10.9%	13.2%
Hispanic	=1 if the respondent is Hispanic	15.9%	15.0%	15.9%	16.1%	19.4%	22.5%
Asian	=1 if the respondent is Asian	4.2%	4.0%	3.9%	4.6%	6.2%	4.0%
American Indian or Pacific Islander	=1 if the respondent is American Indian or Pacific Islander	1.6%	1.5%	1.9%	1.3%	1.8%	0.2%

TABLE 1 (continued)

Variable	Description	Total daily commuting minutes					
		Overall	0	1–59	60–119	120–179	180+
Enrolled in school	=1 if the respondent is enrolled in school	5.9%	5.9%	6.0%	6.1%	5.4%	5.7%
Wage (logged)	The respondents' hourly wage	18.6	18.5	17.0	19.8	22.1	21.5
Household income (in thousands)	The midpoint of the reported income bracket. The top bracket was increased from \$150,000+ to \$225,000.	64.7	65.2	60.7	66.9	72.7	75.5
Single	=1 if the respondent was never married	25.4%	24.7%	27.3%	24.2%	23.6%	27.4%
Married, spouse present	=1 if the respondent is married with spouse present	59.8%	60.5%	57.4%	62.0%	61.2%	55.1%
Married, spouse absent	=1 if the respondent is married with absent spouse	1.2%	1.2%	1.3%	1.3%	1.2%	2.1%
Widowed	=1 if the respondent is widowed	1.2%	1.2%	1.1%	1.1%	0.8%	2.0%
Separated/divorced	=1 if the respondent is separated or divorced	12.4%	12.4%	12.9%	11.4%	13.2%	13.4%
Number of children	The number of children in the household	0.8	0.9	0.8	0.9	0.9	1.0
Infant present	=1 if there is a child 0–1 years in the household	8.9%	9.6%	8.0%	8.8%	9.7%	9.9%
No high school diploma	=1 if the respondents' highest education is less than a high school diploma	8.2%	8.3%	8.3%	8.0%	7.7%	12.5%
High school	=1 if the respondents' highest education is high school	25.6%	26.6%	27.4%	23.2%	20.1%	22.2%
Some college	=1 if the respondents' highest education is some college	26.6%	27.1%	26.6%	26.5%	25.2%	18.7%
College	=1 if the respondents' highest education is college	26.0%	25.4%	24.7%	27.4%	29.9%	30.0%
Graduate degree	=1 if the respondents' highest education is a graduate or professional degree	13.6%	12.6%	13.0%	14.9%	17.0%	16.6%

Data from the American Time Use Survey (2003–2010). MET values from Tudor-Locke et al. (2009)²⁰. The sample is restricted to respondents employed full-time residing in urban counties

TABLE 2 Descriptive commuting statistics [$n=24,861$]

Variable	Description	Overall	Total daily commuting minutes				
			0	1–59	60–119	120–179	180+
Sample% by commute time		100.0%	35.7%	33.4%	24.1%	5.8%	1.1%
Sample% by commute time, conditional on having worked		100.0%	4.9%	49.3%	35.7%	8.5%	1.6%
Commuters solely using automobile		92.8%	–	92.5%	88.2%	75.1%	57.9%
Commuters walking or bicycling at least 30 min		2.2%	–	1.2%	3.7%	10.5%	27.7%
Commuters using any public transportation modes		3.4%	–	1.1%	5.8%	18.8%	33.8%

Data from the American Time Use Survey (2003–2010). The sample is restricted to respondents employed full-time residing in urban counties

Table 3 presents adjusted activity means evaluated at half-hour commuting intervals, from 0 to 180 min total daily commuting time. Means are first presented for the four health-related activities individually, and the fifth column displays the aggregate adjusted health-related activity time totals. Means for the time spent socializing are presented in the sixth and seventh columns, respectively. Individually, each health-related activity decreases with increased time spent commuting. Between commutes of 0 and 180 min, mean physical activity decreases 27.3 to 30.1 min (48.4%), food preparation decreases 6.3 to 13.0 min (32.6%), family eating decreases 10.7 to 24.2 min (30.6%), and sleeping decreases 64.5 to 441.0 min (12.8%). Alongside each adjusted mean, within parentheses, ratios of activity times at each commute time relative to activity times at the average commuting time (62.2 min daily) are presented to gauge each activity's responsiveness to commuting time changes. An average commuter whose total commuting time increased 1 h daily to 120 min would experience a 23% reduction in physical activity, a 17% reduction in food preparation, a 8% reduction in time eating with family, and a 3% reduction in sleep time. By comparison, time spent socializing would decrease 3% and time watching television would decrease 14%. In the extreme evaluation of 180 min spent commuting, physical activity time decreases 44% and food preparation time decreases 31% relative to at the mean commuting time, whereas comparatively television time decreases 20%, and an individual spending 3 h commuting daily still views on average 102.0 min of television.

Table 4 presents the percentage of time reallocated in each activity as a percentage of the total daily commuting time's difference from the mean commuting time. This is equivalent to the percentage of commuting time attributable to the decrease in participation time of that particular activity. The fifth column displays the summation of the previous four percentages and indicates the total percentage of the daily commuting time which is drawn from the four health-related activities. The total-health-related column illustrates that the majority of commuting time—consistently above 56%—is attributable to decreases in these four health-related activity categories. The health-related trade-off with commuting is largely comprised of the trade-off with sleep, which is 35.3% of 30 min spent commuting, 30.6% of 60 min spent commuting, and 32.6% of 180 min spent commuting. The trade-off with sleep is fairly constant over the range of commuting time, whereas an increasing proportion of time is drawn from physical activities and food

TABLE 3   Adjusted means of health-related activities by daily time spent commuting (Ratio of activity time to activity time at mean commuting time) [*n* = 24,861]

Commuting	Physical activity	Food preparation	Family eating	Sleeping	Total health related	Socializing	Television
0	56.4 (1.08)	19.3 (1.02)	35.0 (1.21)	505.4 (1.05)	616.1 (1.06)	35.7 (0.85)	132.2 (1.04)
30	56.0 (1.07)	19.8 (1.04)	31.3 (1.08)	490.7 (1.02)	597.7 (1.03)	40.2 (0.96)	133.1 (1.05)
60	52.4 (1.01)	19.0 (1.00)	29.0 (1.00)	480.0 (1.00)	580.4 (1.00)	42.1 (1.00)	127.3 (1.00)
90	46.9 (0.90)	17.5 (0.92)	27.6 (0.96)	471.5 (0.98)	563.5 (0.97)	42.1 (1.00)	118.0 (0.93)
120	40.4 (0.77)	15.7 (0.83)	26.6 (0.92)	463.4 (0.97)	546.1 (0.94)	41.1 (0.97)	108.5 (0.86)
150	34.1 (0.65)	14.0 (0.74)	25.7 (0.89)	453.9 (0.95)	527.7 (0.91)	39.8 (0.95)	102.1 (0.81)
180	29.1 (0.56)	13.0 (0.69)	24.2 (0.84)	441.0 (0.92)	507.3 (0.88)	39.2 (0.93)	102.0 (0.80)

Cells display adjusted mean activity time. Parentheses contain the ratio of time in the activity to the amount of time in that activity at mean commuting time. Primary data from the American Time Use Survey (2003–2010). MET values from Tudor-Locke et al. (2009)²⁰. The sample is restricted to respondents employed full-time residing in urban counties. All times are in minutes. Ratios are relative to means at the average commuting time (62.2 min). Means are adjusted by total time spent working, wage, age and age-squared, gender, race and Hispanic status, education, marital status, number of children, the presence of a young child, household income, school enrollment status, employment status by occupation and industry, metropolitan area, and diary day date

TABLE 4 From Where does commuting time come? Percentages of commute time attributable to health-related activity reductions [n=24,861]

Commuting	Physical activity	Food preparation	Family eating	Sleeping	Total health related	Socializing	Television
30	12.1%	2.6%	7.6%	35.3%	57.6%	-5.9%	19.9%
60	16.1%	4.1%	5.8%	30.6%	56.6%	-2.4%	27.4%
90	18.8%	5.1%	4.5%	28.0%	56.5%	0.1%	31.2%
120	20.3%	5.6%	3.8%	27.5%	57.2%	1.8%	31.5%
150	20.5%	5.6%	3.6%	29.0%	58.7%	2.6%	28.1%
180	19.5%	5.0%	3.9%	32.6%	61.0%	2.5%	21.0%

Primary data from the American Time Use Survey (2003–2010). MET values from Tudor-Locke et al. (2009)²⁰. The sample is restricted to respondents employed full-time residing in urban counties. Commutes are in minutes. Reductions are established from adjusted means evaluated at the average commuting time (62.2 min). Estimates are adjusted by total time spent working, wage, age and age-squared, gender, race and Hispanic status, education, marital status, number of children, the presence of a young child, household income, school enrollment status, employment status by occupation and industry, metropolitan area, and diary day date

preparation, peaking just prior to the extreme: the decreases in physical activities {food preparation} comprise 12.1% {2.6%} of 30 min spent commuting, 16.1% {4.1%} of 60 min, 20.5% {5.6%} of 150 min, decreasing to 19.5% {5.0%} of a 180-min commute. For comparison, the percentages of commuting time attributable to socializing and television time decreases are again presented in the sixth and seventh columns. The percentage estimates of the trade-off between commuting and television are comparable to the trade-off with sleep. Overall, time reallocations in the four health-related categories and two comparison activities explain fairly sizeable portions of commuting time: 81.5% of a 60-min commute and 90.4% of a 120-min commute.

DISCUSSION

The results indicate that longer commutes are increasingly associated with behavioral patterns which over time may contribute to poor health outcomes. Average commuting times are associated with modest reductions in health-related activities. Decreases in the four health-related activities—physical activity, food preparation, time eating with family, and sleeping—constitute the majority of time from which is commuting reallocated from. The greatest percentage of these four categories is taken from sleeping time. Above the mean commuting time, a greater proportion of commuting time is derived from decreases in food preparation and physical activities of moderate or greater intensity than at the mean. Lastly, even among respondents that report spending 2 or 3 h each day commuting, the average time spent watching television exceeds 100 min the same day. This estimate suggests that sizeable discretionary time still remains that Americans could utilize to improve their health and other aspects of their lives.

The presented calculations are for a single average day, only. There are also likely cumulative effects, the calculation of which unfortunately requires extrapolation from the data. Assuming 260 working days per year and linear cumulative trade-offs, a 90-min-per-day commuter will trade-off 24.2 h of physical activity annually at a moderate or greater intensity relative to a worker with the average 60-min-per-day commute time. Even at moderate intensities 24.2 h is the equivalent to thousands of unexpended calories. Slight behavioral changes cumulate to dramatic results: the growth in median body weight since the 1980s is equivalent to only 100–150 additional calories per day—“three Oreo cookies or one can of Pepsi”.¹⁸ The modest trade-off estimates support trade-offs with commuting as a small but meaningful factor among an array of complex causes of obesity.

These physical activity trade-offs are in addition to any further dietary or sleep impacts. However, because the functional relationships of time inputs of these activities into health are not well understood, health consequences are more difficult to assess. For example, individuals with longer commutes spend less time preparing food and are likely consuming more processed and prepared foods. Yet, the lack of any detailed nutritional intake prohibits further estimating any health implications. Similarly, no research exists to guide quantifying the precise health impacts of 15-min lost sleep each working day.

Commuting is an activity with diverse practices. Certainly, active modes such as walking or bicycling provide some physical activity via transit and thus may influence health-related behaviors differently than commuting by automobile. Similarly, public transportation enables some commuters to multitask, such as working en route, potentially freeing up additional leisure time for healthy

behaviors. However, these practices are predominantly clustered in major cities with the infrastructure to support non-car commuting modes. Active travel in sprawled communities is often inconvenient or infeasible. The vast majority of sample respondents (93%) commuted solely using automobiles, and a large number likely did not have short-term alternative options. Future researchers should evaluate coping strategies long car-dependent commuters could implement immediately, such as parking further from their worksite and walking the remaining distance.

Anecdotally, workers in foreign cities experience commutes comparable to or exceeding Americans' travel, yet abroad, obesity and related diseases rates' are often lower. This suggests that beyond the direct time loss to commuting, a crucial element is also the context in which that time loss occurs. Responses to time constraints may differ by culture, attitudes towards health, or the environment. In the USA, leisure time lost to commuting occurs within a context of increasingly low-cost, energy dense foods, which are linked to obesity.²³ Workers with long commutes living in a different food environment may not respond the same. An extension to this study could investigate cross-cultural differences in commuting trade-offs.

Lastly, this study's estimates likely only establish an upper-bound on commuting trade-offs. Commuting time is not randomly assigned and self-selection may yield biased estimates. Already, it is noted that the failure to acknowledge unobserved preferences for health or location might lead to misguided interpretation in the association between sprawl and obesity.^{24,25} In the commuting context, individuals caring less about their health might purposefully select long commutes to enjoy cheaper housing costs. It is difficult to disentangle such factors from long-run conditions such as commuting time and these results are only intended as an initial attempt to quantify trade-offs.

CONCLUSIONS

This paper describes Americans' trade-offs between commuting time and health-related activities. Individuals with longer commutes are increasingly less engaged in health-related activities. These results provide a first look at trade-offs between health-related activities and commuting. Continuing research in this area will inform understanding of work-life balance and how environmental context interacts with lifestyle choices that are risk factors for obesity.

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