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The Context of Physical Activity in a Representative Sample of Adults

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Abstract

Purpose—The establishment of formal physical activity (PA) guidelines has led to considerable interest in quantifying participation in moderate-to-vigorous PA (MVPA). However, evidence on the context of MVPA at the population level is scarce. The purpose of this study was to provide types, location and purpose information of MVPA in a representative sample of adults.

Methods—Data from a representative sample of 1,234 Iowa adults were included in this study. Each participant performed a telephone-administered 24-hour PA recall method recalling the previous 24-hour's physical activities. Self-reported data from the recall instrument included time and types of reported activities across 5 distinct location and purpose codes. Reported activities were matched with corresponding metabolic equivalent (MET) scores from a reduced list of PA Compendium. MVPA was defined as any activities with assigned METs ≥ 3.0 .

Results—Of the top 30 most frequently reported MVPAs, 16 were lifestyle activities involving walking in the definition, and only 4 can be regarded as traditional “exercises”. Occupational activities (41% for purpose and 40% for location) and household activities (37% for purpose and 39% for location) accounted for nearly 80% of the total reported MVPA time. Time allocations across the purpose and location codes considerably differed by socio-demographic indicators.

Conclusion—Lifestyle activities were more frequently reported than sports and/or recreational activities. Individuals with varying levels of socio-demographic indicators exhibited different patterns of use-of-time within the given day. A multi-domain approach is needed to better understand and increase MVPA in diverse populations of US adults.

Keywords

context; physical activity; adults; measurement

Introduction

The establishment of formal physical activity (PA) guidelines (29) has led to considerable interest in quantifying participation in moderate-to-vigorous physical activity (MVPA). Unfortunately, studies have reported highly disparate prevalence rates of MVPA when

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Conflicts of Interest

All the authors declare no conflicts of interest.

objective and subjective methods are compared (25, 27). Differences have generally been attributed to overestimation of self-reported activity but this is likely an overly simplistic explanation. Standard accelerometry-based methods are not well suited to capturing the more sporadic activities of daily living activities (20). Therefore, it is likely that accelerometers may underestimate movement and energy expenditure (EE) of lower intensity activities that make up the bulk of our day. Objective methods can also only provide absolute (movement-based) criteria for evaluating PA. It is well known that a “light” activity may actually be of “moderate” or even “vigorous” intensity for low fit individuals (14), but this issue is ignored with standard accelerometer processing techniques. Thus, disparities between objective and subjective estimates of PA may be due, in part, to difference between absolute and relative indicators of MVPA. To advance research on both the assessment and promotion of PA it is important to better understand the primary sources and types of PA as well as the context in which it occurs.

A recent consensus conference sponsored by National Institutes of Health (NIH) highlighted the specific advantages of self-report measures for providing information about the context of PA behavior (4, 26). However, relatively few studies have systematically utilized self-report data to specifically understand adult PA behaviors. The most common design has been to examine time spent in different PA domains (e.g. work, household, transportation) across various socio-demographic variables (8, 9, 17, 21, 24). Prior research (14) has identified the most frequently occurring “types” of lifestyle MVPA, and several other studies (5, 10) have investigated social and environmental contexts of MVPA in adults. The American Time Use Survey has provided perhaps the richest source of information on activity patterns (10, 11, 28), but this data source was not designed specifically for characterizing PA behavior. No study to date has comprehensively characterized the underlying context and nature of MVPA in a representative sample of adults using an established and well-validated self-report measure. Experts in behavioral epidemiology have emphasized the importance of understanding the context of physical activity behavior to plan more effective public health interventions (23).

The present study fills this gap by characterizing the variability in the type, purpose and location of reported MVPA using replicate, single-day recalls collected as part of the Physical Activity Measurement Survey (PAMS). The PAMS project was an NIH-funded study (R01 HL91024-01A1) designed to specifically improve the accuracy and utility of self-report measures of PA (32). A representative sample of adults completed a detailed 24-hour survey that captured both the purpose and location of physical activities reported on a randomly selected day. The present study capitalizes on this database to advance understanding about the context of PA behaviors in healthy adults.

Method

Study design

The data collection for PAMS took place over two years to capture a representative sample of adults from four target counties in the state of Iowa, U.S.A. Participants were recruited through a randomized telephone screening procedure using a sample purchased from Survey Sampling International. The targeted counties (2 urban and 2 rural) were divided into two

co-strata based on higher or lower percentages of minorities in order to balance recruitment while keeping the variation in the weights down to the extent possible. Participants were required to be between 21–70 years of age, be able to walk, and to be able to complete both a telephone and written paper survey in either English or Spanish. Participants in the study were asked to complete two, single day recalls of PA on a randomly selected day.

A total of 3222 households (out of 5913 valid phone numbers) completed screening, 2143 were deemed eligible, 1648 had an adult conceptually agree to participate and 1501 adults completed data collection (70% of the eligible households). Details on the sampling and weighting procedures are described in a separate methodology report available from the authors. Each participant signed an informed consent form prior to participation and the study protocol was approved by the local Institutional Review Board.

Instrument

Data were collected using a customized, interviewer-administered version of the 24-hour Physical Activity Recall (PAR) developed specifically for the PAMS. The PAR protocol was based on an established, facilitated recall methodology shown in previous studies to be effective for capturing details about the type and intensity of occupational, household and leisure-time PA (6, 19). Participants are asked to provide details about the type and intensity of PA performed in the day and the raw PA data are converted into estimates of EE using established metabolic equivalent (MET) codes from the Compendium of PA (1). The present study necessitated the use of a phone-based methodology so the PAR protocol was modified to work with a Computer Assisted Telephone Interviewing (CATI) system using *Blaise* software. The CATI system incorporated a reduced set of 270 activity codes that were refined using cognitive testing procedures and input from experts in PA recall. A recent study (32) supported the validity and utility of the PAR protocol for capturing PA and EE. Data from the PAR yielded estimates of EE that were equivalent to those observed from the objective monitor. Small mean absolute percent errors (i.e. 11.8%) and high correlations (i.e. 0.83) between the PAR and objective monitor were identified (32).

A unique aspect of the refined PAR protocol was the inclusion of additional contextual codes that captured the location and purpose of each reported activity. Location of PA was coded using five distinct categories ('Work/Volunteer', 'Home - indoor', 'Home - outdoor', 'Transportation', and 'Community'). Purpose was initially coded using six different categories ('Work', 'Home & Family', 'Volunteering', 'Exercise/Sports', 'Education', and 'Leisure'). However, a preliminary analysis indicated that two of the six codes (Volunteering and Education) had minimal time allocations, so these were combined to create a combined purpose code 'Other'. This resulted in a total of 5 purpose codes: 'Work', 'Home & Family', 'Leisure', 'Exercise/Sports', and 'Other'. Emphasis in the present paper was on the reported allocations based on these location and purpose codes in this representative sample of adults.

Data Collection

The data for the PAMS project were collected by an experienced and trained research group over a continuous 2 year period (24 months; 8, 3-month quarters) to capture the inherent

variability in PA due to seasonality and weather patterns. Participants completed two separate 1-day monitoring protocols on a randomly selected day – each trial involved wearing an objective measurement tool for a 24-hour period and then completing a PAR the following day to recall the activities performed.

The PAR interviews were conducted by a team of trained interviewers using a CATI system programmed specifically for the project. Each day was divided into four, 6-hour blocks starting from the midnight, and participants were asked to report only activities performed for 5 minutes or greater. The interviewers selected the named activity from a computerized list of activities (based on the reduced set of activities from the Compendium of PA (1)), and then recorded the location, purpose, and number of minutes for each activity. A series of semi-structured probes was used to prompt recall and to facilitate accurate recall of the day by the participant. Greater detail is described elsewhere (32). Only data from the PAR collected in Trial 1 were used for the analyses of this study.

Data Processing

The self-reported data were processed using standard techniques to determine reported minutes of MVPA in the day. Each PAR activity code in the dataset was first assigned a corresponding MET code based on the Compendium of Physical Activities (1). The minutes were then aggregated by participant and activity code, and the accumulated minutes were checked to confirm that all participants had 1440 minutes of coded data. The present study was focused only on the context of MVPA behaviors so a separate dataset was created that contained only reported activities with MET values greater than 3.0. Sedentary (i.e. MET 1.5) and light PA (i.e. greater than 1.5MET and smaller than 3.0MET) were not included for analysis for the present study. The subsample of reported MVPA included corresponding codes of location and purpose. The data were aggregated by ID (i.e. participants), activity type and 5 categories of purpose and location so that each purpose and location code had its own MVPA minute for each reported activity for each participant. The data were then merged with a data file that included socio-demographic variables for each participant. The six socio-demographic variables of interest in the study were gender (i.e. female and male), age group (i.e. 20–29yrs, 30–39yrs, 40–49yrs, and 50–71yrs), Body Mass Index (BMI)-defined weight status (i.e. normal weight, overweight and obese), ethnicity (i.e. White, Black, and Other), education background (i.e. less than high school, some college/post high school, and college/graduate), and income level (i.e. less than \$25,000, from \$25,000 up to \$75,000, and more than \$75,000).

Statistical Analyses

The focus of the analyses was to characterize the context of the top 30 most frequently reported types of MVPA. Thus, the data were first restricted to the sample of participants that reported participating in some form of MVPA during the assessed day. Corresponding minutes for each purpose and location category across all the 30 identified MVPAs were calculated and then presented in proportion using stacked bars. The proportion of MVPA minutes spent in each of the 5 purpose and location categories were calculated across 6 different socio-demographic variables. Differences in proportions of MVPA between different levels of each socio-demographic variable were examined for each purpose and

location category using one-way analysis of variance (ANOVA) with Bonferroni adjustment at an alpha level of 0.05. The analyses incorporated derived sampling weights to account for the complex sampling design of the PAMS project, and to obtain population-level estimates of parameters. Data were managed and analyzed in STATA/SE Version 12 for Windows (StataCorp LP, College Station, TX).

Results

The final data set included 1489 participants with complete PAR records from the first trial but 255 cases did not include any reported MVPAs. Therefore, approximately 17% of the participants (64% men and 36% women) were removed, leaving 1,234 participants in the final data set. The average self-reported MVPA time (for those reporting MVPA) was 175min (standard error: 6.9min). Detailed characteristics of the participants included (n=1,234) are presented in Table 1.

A listing of the top 30 most frequently reported MVPAs along with their corresponding time allocations for purpose and location is presented in Figures 1 and 2, respectively. Of the 30 top reported MVPAs, 24 of them were MPAs (3<MET<5.9) and 6 were VPAs (MET ≥ 6). Various forms of walking dominated the list of predominant MVPAs – with 16 of the 30 codes specifically incorporating walking in the definition. Only four of the activities can be thought of as traditional “exercise” and these were reported by a relatively small percentage of the sample (‘walk briskly for exercise’(3.2%), ‘health club exercise’(3.5%), ‘running or jogging’(3.6%); ‘exercises general vigorous’(3.4%). It is interesting to note that the context of these four activities was not universally reported as ‘Exercise/Sport’ (See Figure 1). Jogging/Running, for example, was attributed as ‘Leisure’ by 44.5% but as ‘Exercise/Sports’ by 27.1%. The activity of ‘weight lifting - light/moderate’ was reported by approximately 4%, but interestingly it was categorized primarily as ‘Work’ by nearly 60% of those that reported it, with smaller percentages reporting it as ‘Leisure’(13.3%) or ‘Exercise/sport’(11.7%). Closer examination of the data revealed that a smaller percentage of people (n=16) reported ‘weight lifting, body building, vigorous’ but this did not make it into the list of top 30 activities.

The diversity in the allocated purpose of the other top 30 activities is readily apparent in Figure 1, with the respective bars (left to right) capturing the allocation from ‘Work’, ‘Home/Family’, ‘Leisure’ and ‘Exercise/Sports’, and ‘Other’, respectively. However, the patterns for some specific activities merit specific mention. Approximately 8% of the sample reported the activity of ‘walk the dog’ but there was considerable variability in the allocated purpose with varying proportions attributing it to ‘Work’(11%), ‘Home/Family’(23%), ‘Leisure’(23%), ‘Exercise/Sports’(32%) and ‘Other’ (11%). This shows that people may view the same activity very differently. The activity of ‘mow lawn, walking’ could be thought of as a chore (i.e. work, 11%) but the majority of people categorized it as either ‘Leisure’ (45%) or ‘Exercise/Sports’ (44%). Gardening is often assumed to be a hobby (i.e. Leisure; 32%), but this was frequently categorized as ‘Exercise/Sports’ (27%). Similar diversity was evident in the location in which activity occurred (see Figure 2).

To quantitatively examine the purpose and location of the reported activities in more detail, the percentage time allocations for both variables were averaged across the 30 activities (see allocations in Figure 3 and 4, respectively). For Purpose, the largest aggregated allocation was for 'Work' (41%), followed by 'Home' (37%), 'Leisure' (14%), 'Exercise/Sport' (7%), and 'Other' (1%). Males had significantly larger proportions of MVPA from 'Work' than females ($p=0.003$), but females showed a significantly larger proportion of MVPA from 'Exercise/Sports' ($p=0.049$). Younger people (20–29yrs) also reported a significantly larger proportion of MVPA from 'Work' ($p=0.080$) compared with older people (40–49yrs). However, they showed a smaller proportion for 'Home/Family' ($p=0.013$) than older people (50–71yrs). Normal weight people had significantly smaller proportions for 'Home/Family' ($p=0.014$) than overweight people, and for the 'Other' category ($p=0.020$) than obese people. The 'Other' ethnicity group showed significantly smaller proportions for 'Leisure' than the White ($p<0.001$) and Black ($p=0.026$) group. Less educated individuals reported a greater proportions for 'Work' ($p<0.001$) and 'Home/Family' ($p=0.009$), but a smaller proportion for 'Leisure' ($p<0.001$) in comparison with more educated individuals. People with lower income had significantly larger proportions for 'Work' ($p=0.002$) than those with the highest amount of income.

Parallel analyses were conducted to examine the location where MVPA occurred (See allocations in Figure 4). Consistent with the purpose codes, 'Work' accounted for the largest average percentage of MVPA time (40%). However, the combined allocation of 'Home/Indoor' (26%) and 'Home/Outdoor' (13%) accounted for nearly 39% of total MVPA. An additional 21% can be attributed to activity outside the home (Community: 19% and Transportation: 2%). In contrast to the purpose codes, females had a significantly larger allocation of MVPA ($p=0.006$) taking place at work, but larger allocations for 'Home/Indoor' ($p<0.001$) and 'Transportation' ($p=0.044$) (compared with males). People ages 40–49yrs had a significantly larger proportion for 'Work' than people ages 20–29yrs ($p=0.049$) but smaller than people ages 50–71yrs ($p=0.044$). The 'Other' ethnicity group showed significantly smaller proportions for 'Home/Indoor' and 'Home/Outdoor' compared with the White ($p=0.005$ for both categories) and Black ($p=0.044$ for 'Home/Indoor' and 0.022 for 'Home/Outdoor') group, and a significantly larger proportion for 'Community' compared with the Black ($p=0.004$) group. People with college and/or graduate degree showed significantly smaller proportions for 'Work' (p values < 0.001) and 'Transportation' ($p=0.030$), but larger for 'Home/Indoor' ($p=0.026$) than those without college and/or graduate degrees. People with the lowest level of income showed a significantly larger proportion for 'Work' ($p=0.004$) than people with the highest level of income.

Discussion

The present study provides novel information about the context of PA behaviors in a representative sample of adults. There have been strong recommendations for increased efforts to understand the context in PA (13, 26) but it has proven challenging to systematically evaluate the different contextual factors. The PAR used in the PAMS project provides detailed information about both the purpose and location for self-reported PA. Because codes were obtained for each activity it was possible to compare the most commonly reported activities in the population as well as the time allocations for both

purpose and location. The focus of the present analyses was on characterizing the allocations for the most commonly reported activities at the population level so that activity patterns in adults can be better understood.

Consistent with previous studies (24, 28), the most commonly reported activities were mostly household tasks. Tudor-Locke et al. (28) reported that in the American Time Use Survey sample, food and drink preparation was the most commonly reported activity (~26% of the population), followed by lawn and garden tasks (~11%). A code of food preparation was not included in the reduced PAR form but activities linking walking with various cleaning tasks were commonly reported in the present study. Two different lawn and garden tasks were also in the top 30. These clearly indicate the importance of lifestyle tasks as the predominant source of adult's PA.

When aggregated across activities, the results provide a way to examine the relative contribution of different contextual variables (both purpose and location). When examining purpose, the majority of PA was attributed to 'Work' (41%), followed by 'Home' (37%), 'Leisure' (14%), 'Exercise/Sport' (7%), and 'Other' (1%). When stratified by location, the majority of PA was allocated as 'Work' (40%), followed by 'Home/Indoor' (26%), 'Community' (19%), 'Home/Outdoor' (13%) and 'Transportation' (2%). Similar patterns were identified in a related study by Keadle et al. (16) comparing reported vs. directly observed PA patterns. The authors (16) reported time allocations for three location (i.e. Work/School (48%), Home (34%) and Community (18%)) and five purpose (i.e. Office Work (45%), Home Activity (23%), Leisure (21%), Transportation (8%) and Education (4%)) categories. A unique aspect of the present study is that we reported the variability in allocations for specific activities. This allowed us to empirically demonstrate that people report the same activity very differently (e.g. as work or leisure etc.). Another unique contribution of the present study is that aggregated time allocations were further segmented by various socio-demographic indicators. These analyses revealed that the context (purpose and location) of PA varies considerably in the population, both within and between defined demographic strata. The differential time allocations support the importance of targeting multiple domains to promote adults' MVPA at the population level.

The large allocations (in both purpose and location codes) for Work reinforce the importance of 'Work' as a primary source of PA for adults as it accounted for nearly 40% of total PA reported. Several other studies have specifically examined the contribution of work to PA (17, 24, 30). Salmon et al. (24) controlled for various confounders and demonstrated that blue-collar workers were less likely to report any form of leisure time PA. Kirk et al. (17) reached a similar conclusion in a comprehensive review. However, the Kirk study (17) revealed positive correlations between occupational PA and LTPA disputing the notion that individuals with active jobs would have lower LTPA. Blue collar workers accumulated more total PA prompting the authors to conclude that white collar workers are not accumulating sufficient LTPA to offset their predominantly sedentary jobs (17). Work hours and work stress were negatively associated with leisure time PA (17). However, Van Domelen et al. (30) reported that employed individuals had more activity than unemployed individuals – even though they were employed in sedentary professions.

An interesting observation in the present study is that males allocated a higher proportion of their MVPA to be for work (purpose) and at work (location) - Females, in contrast, had a higher proportion of MVPA for family (purpose) and at home (location). This fits the traditional or assumed work/home roles of males and females. This notion is also evidenced by a previous study indicating higher levels of leisure-time PA in males and higher levels of household PA in females (18). However, it is also known that participation in leisure-time PA is confounded by the interaction between gender and occupation (17). Patterns are further complicated by the complex webs that link education, occupation and socio-economic status (SES). Salmon et al. (24) demonstrated that individuals with less than 12 years of education and in the 'less-skilled' category of profession were less likely to engage in leisure-time/vigorous occupational/home PA in comparison with those with university degrees and in the 'professional' category of profession, respectively. Moreover, a systematic review study by Beenackers et al. (2) identified specific patterns of socio-economic inequalities in different domains of PA. They showed that leisure-time PA was higher in people with higher SES compared with those with relatively lower SES but higher SES groups were less likely to be active at work compared with higher SES groups (2). Cerin et al. (7) found out that both individual-level (i.e. education background, income level, household size) and societal-level (i.e. household income and household size of included districts) SES indicators mediated the relationships between social-economic inequalities and participation in leisure-time PA.

Compared to work, recreation (i.e. volitional activity) makes a relatively small contribution to PA. For example, only 7% of the total MVPA time was explained by the purpose category of "Exercise/Sports". A similar finding was observed from a previous American Time Use Survey study (12) which observed that only 2.9% and 12.7% of total use of time on a random day were attributable to sports and exercise, respectively. A novel and particularly interesting observation in the present study is that the same activity can be categorized very differently depending on personal interests and perspectives. These distinctions are important for researchers to consider when characterizing activity patterns in the population. Current public health initiatives focus on promoting leisure-time PA but additional work is needed to better understand what constitutes leisure-time PA as well as domestic, occupational and recreational PA in adults.

It is noteworthy that a relatively large proportion (~19%) of total MVPA was explained by "community" and a relatively small amount (~2%) by "transportation" in the present study. These are two frequently targeted domains in intervention studies. A review study by Wanner et al. (31) found out that active transportation was associated with increased PA (in cross-sectional studies reviewed). Similarly, meta-analyses (3, 15) demonstrated the effectiveness of community-based interventions on increasing PA in adults. The present study adds value to these lines of work by showing how adults' MPVA in these two domains varies by socio-demographic factors. To be specific, transportation MVPA was more commonly reported by males (compared with females) and by individuals with some years of college or high-school graduates (compared with college graduates). Moreover, individuals in the "Black" category of ethnicity reported more community MVPA time compared with the "Other" group. Additional research is needed to clearly understand the

interacting effects of various socio-demographic variables on accumulating MVPA time during transportation and/or in the communities.

The detailed insights about the type and nature of PA reveal the benefits of self-report measures for understanding the context of PA. Considerable research has been done on objective measures and the general consensus is clearly that objectivity is better than subjectivity. However, it is important for researchers to appreciate that objective measures cannot capture this rich contextual information. This is why experts now often recommend multi—method approaches for understanding PA pattern (4, 26). Tucker et al. (27) reported highly disparate levels and patterns of PA when comparing subjective and objective measures of PA from NHANES. The observed prevalence of meeting established PA guidelines was considerably higher for subjective (self-report) measures but an interesting observation was that the patterns varied by ethnicity. With self-report measures, fewer Mexican-Americans were found to achieve the PA guidelines (43.7%) compared with Non-Hispanic Whites (65.0%) and Non-Hispanic Blacks (52.1%). However, with objective accelerometry methods there was little variability among the three ethnicity groups in these percentages (values ranges from 8.0% to 10.1%). The differences can be attributed to a number of factors so additional research is needed to understand how people report and interpret PA behavior and how perceptions may vary by demographic factors as well as by fitness. An advantage of the PAR format used in PAMS is that the short duration (single day) helps to improve the validity of the recall while also enabling detailed information about the context of PA. These advantages have been highlighted in other reviews of self-report measures (20) and the validity of the specific version of the PAR tool used in PAMS has been previously established (32). Additional studies from this PAMS project will provide robust measurement error models and calibration models to further enhance the utility of data from the PAR for public health research. However, combination methods employing both objective and subjective measures are encouraged.

Collectively, this paper provides new insights about activity patterns in a representative sample of adults. Strengths of the study include the large and representative nature of the sample as well as the refined and well controlled protocol for capturing activity patterns. Limitations of the study include the somewhat overlapping nature of the purpose and location codes. An activity can be categorized as having the purpose of “work” but take place at “work” or at “home”. This distinction was intentionally created as part of the PAR format but it may have proven confusing to participants when reporting their behavior. Another limitation is that the telephone administration necessitated the use of a reduced set of activity codes. This prevents a direct comparison with other studies using the Compendium but it provides a streamlined version that may have more utility since it avoids duplication and redundancy in the coding. The utility of Bonferroni correction method has been questioned (22); however, this method is more conservative than other correction methods (i.e. Sidak).

Future work in this area will help to better characterize activity patterns in adult population. Additional research is also warranted to investigate the underlying context of sedentary behaviors and its variation according to various socio-economic indicators in adults. The Activities Completed Over Time in 24 Hours (ACT24) is a newly developed online tool that

provides considerable advantages. As an online tool, it can be administered less expensively than the present, telephone-administered version of the PAR. As work evolves, this tool will provide researchers with options to improve the utility of a previous-day activity recall method and reach out to more diverse populations.

Conclusion

This study employed a well-established 24-hour activity recall method to systematically characterize the types, location, and purpose of commonly reported MVPAs in a representative sample of adults. A unique aspect of the study is that time allocations of MVPA were characterized according to specific socio-demographic variables across location and purpose categories. In general, lifestyle activities were more prevalent than sports and/or recreational activities, and patterns of time allocations of MVPA considerably varied by various socio-demographic indicators for each location and purpose category. A multi-domain approach is needed to better understand and increase MVPA in US adults.

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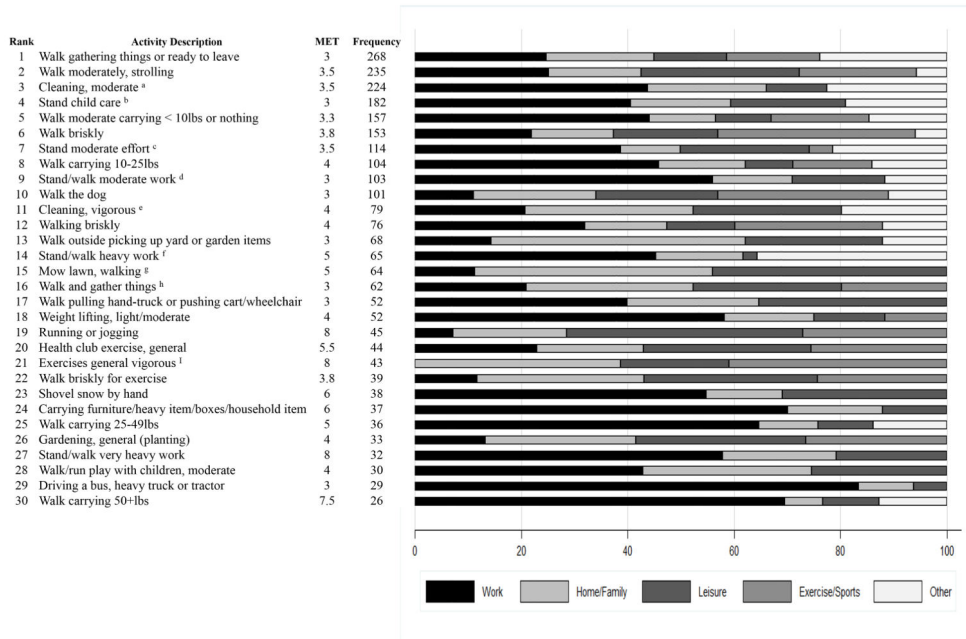


Figure 1. The top 30 most frequently reported moderate-to-vigorous physical activities and corresponding time allocations across the five purpose codes (Work, Home/Family, Leisure, Exercise/Sports and Other). Note: Full activity descriptions are: ^a cleaning, moderate (vacuum, mop, sweep); ^b stand child care (dressing, bathing, grooming, feeding, lifting); ^c stand moderate effort (packing/unpacking boxes, light lifting); ^d stand/walk moderate work (waiter, patient care, stocking shelves, auto repair); ^e cleaning, vigorous (scrub floors, walls, & bathroom, sweep outside, clean garage); ^f stand/walk heavy work (moving furniture and boxes, loading/unloading trucks); ^g mow lawn, walking (push, power, self-propelled mower); ^h walk and gather things (to leave, shut/lock doors, close windows); ⁱ exercises general vigorous (pushups/situps/pullups/jumping jacks)

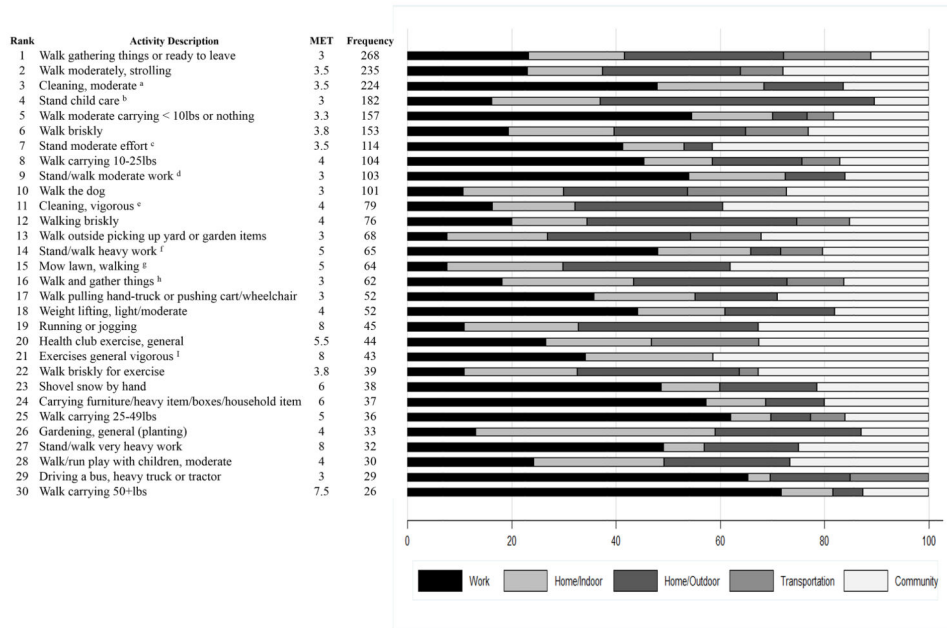


Figure 2. The top 30 most frequently reported moderate-to-vigorous physical activities and corresponding time allocations across the five location codes. (Work, Home/Indoor, Home/Outdoor, Transportation, and Community) Note: Full activity descriptions are: ^a cleaning, moderate (vacuum, mop, sweep); ^b stand child care (dressing, bathing, grooming, feeding, lifting); ^c stand moderate effort (packing/unpacking boxes, light lifting); ^d stand/walk moderate work (waiter, patient care, stocking shelves, auto repair); ^e cleaning, vigorous (scrub floors, walls, & bathroom, sweep outside, clean garage); ^f stand/walk heavy work (moving furniture and boxes, loading/unloading trucks); ^g mow lawn, walking (push, power, self-propelled mower); ^h walk and gather things (to leave, shut/lock doors, close windows); ⁱ exercises general vigorous (pushups/situps/pullups/jumping jacks)

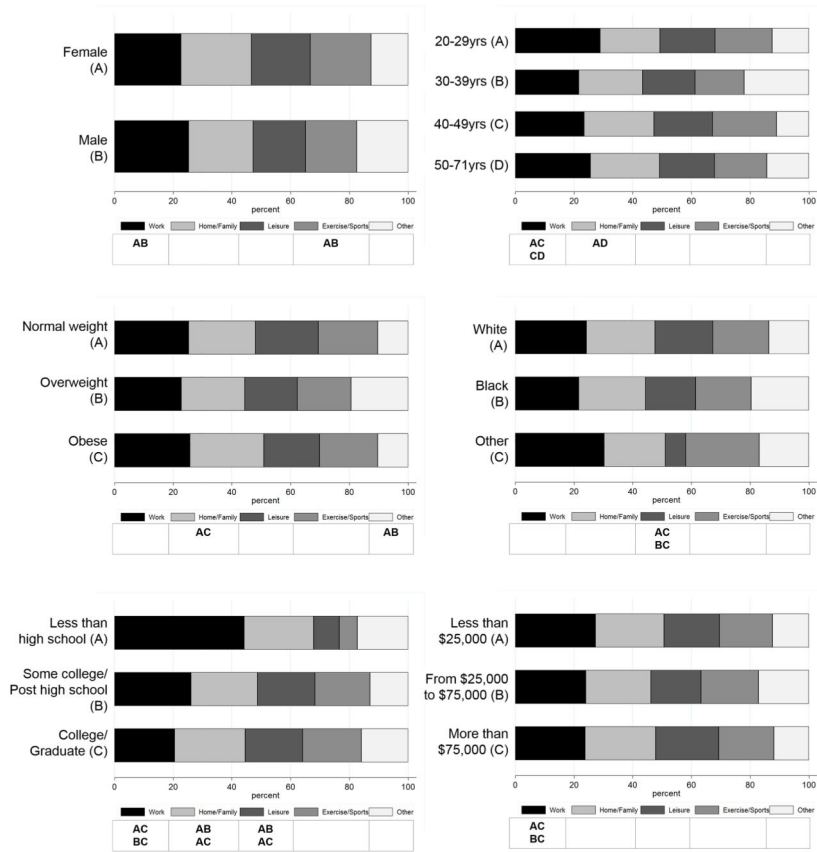


Figure 3. Time allocations of five purpose codes (Work, Home/Family, Leisure, Exercise/Sports and Other) across six socio-demographic variables. Note: Significant differences are indicated by combinations of ‘A’, ‘B’, and ‘C’.

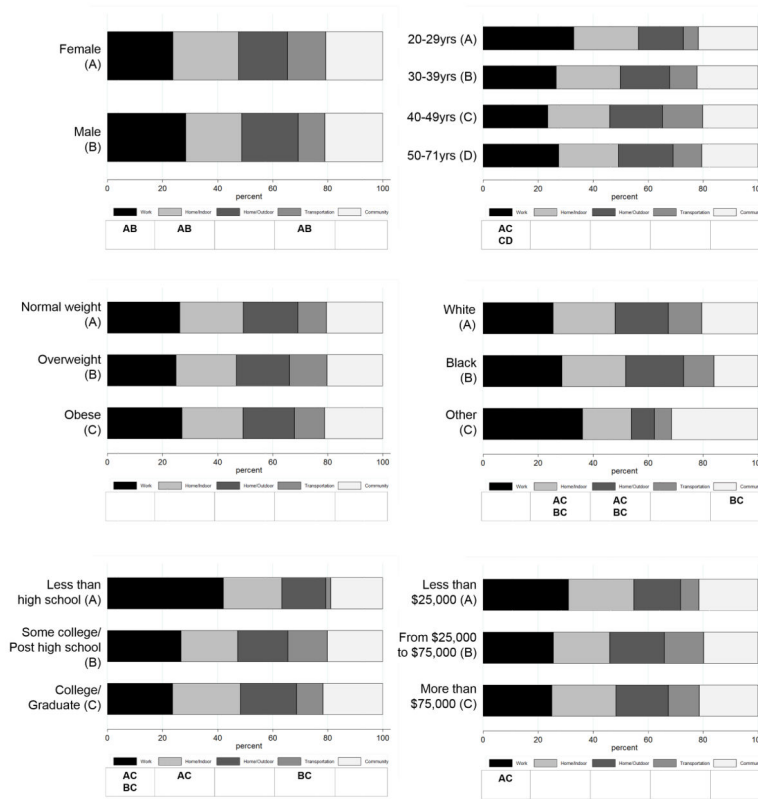


Figure 4. Time allocations of five location codes (Work, Home/Indoor, Home/Outdoor, Transportation, and Community) across six socio-demographic variables. Note: Significant differences are indicated by combinations of ‘A’, ‘B’, and ‘C’.

Table 1

Socio-demographic characteristics of the participants included.

Variables	All (n=1,234)	Female (49.7%)	Male (50.3%)
Age (yrs)	46.1 (0.4)	46.7 (0.6)	45.6 (0.6)
20–29 yrs, %	7.8 (1.1)	6.6 (1.4)	8.9 (1.6)
30–39 yrs, %	23.3 (1.8)	21.0 (2.5)	25.5 (2.7)
40–49 yrs, %	34.8 (2.0)	38.1 (2.7)	31.5 (2.7)
50–71 yrs, %	34.2 (1.6)	34.2 (2.2)	34.1 (2.4)
Body Mass Index (BMI)	29.8 (0.3)	29.2 (0.4)	30.4 (0.4)
Normal Weight, %	25.3 (1.7)	32.1 (2.6)	18.7 (2.1)
Overweight, %	33.4 (1.8)	31.4 (2.5)	35.4 (2.7)
Obese, %	41.3 (1.9)	36.6 (2.6)	46.0 (2.8)
Ethnicity			
White, %	89.5 (1.4)	89.7 (1.8)	89.3 (2.0)
Black, %	6.3 (1.0)	7.1 (1.4)	5.6 (1.3)
Other, %	4.2 (1.0)	3.2 (1.2)	5.1 (1.6)
Education Background			
Less than high school, %	3.1 (0.7)	3.9 (1.2)	2.3 (0.7)
High school diploma/some college, %	50.3 (2.0)	49.5 (2.7)	51.2 (2.8)
College/graduate school, %	46.6 (2.0)	46.7 (2.7)	46.5 (2.8)
Income Level			
Less than \$25,000, %	12.2 (1.2)	13.9 (1.6)	10.6 (1.7)
From \$25,000 up to \$75,000, %	45.0 (2.0)	49.3 (2.8)	40.8 (2.7)
More than \$75,000, %	42.8 (2.0)	36.9 (2.8)	48.6 (2.9)

Note: All values were weighted to account for the complex sampling design. Values in parenthesis represent standard errors unless otherwise indicated. Hispanics were the predominant ethnicity in this 'Other' category (2.7% of overall sample) but there was insufficient data to produce generalizable results.