Chewing the Fat: the Story Time Diaries Tell About Physical Activity in the United Kingdom

Kimberly Fisher

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Institute for Social and Economic Research
University of Essex
Wivenhoe Park
Colchester
Essex
CO4 3SQ UK
Telephone: +44 (0) 1206 872957
Fax: +44 (0) 1206 873151

ABSTRACT

This paper uses data from the UK Office for National Statistics 2000-2001 national time use study to examine levels of physical activity in the UK. The data cover a random national sample of private households across the UK, and all household members aged 8 and above were asked to keep two 24 hour diaries of their activities, on diary on a week day and the other on a weekend day. This paper assesses both the reported level of participation in sports in the last four weeks and also the reported time undertaking six categories of physical activity: participation in sports and keeping fit, productive exercise, physically active housework, physically active care, walking dogs, self-powered transport. Diary data include some limitations. Diaries only measure when activity occurs, but not the intensity of the activity. Diaries also generally do not collect activities of a very short duration, and diarists are often reluctant to include some activities, such a sexual and violent behaviour. The design of this particular study also did not collect information on what people did during formal education and paid work. In consequence, some physically active time is not included in this analysis. Most people in Britain regularly engage in over two hours of physical activity on a daily basis. Some positive challenges to common stereotypes emerge in the data. Women and older people are much more physically active than popular mythology might suggest. Having a driving license and access to the internet at home increase the likelihood of participating in sports and undertaking regular exercise. The data also reveal worrying trends. Young people are increasingly inactive, and the average teenager undertakes less exercise than the average pensioner. On the average day, 15% of the British population undertake no exercise that lasts in excess of 5 minutes, and this finding is not likely to be explained by artefacts of the study design. This latter finding raises worrying prospects for the future health of the largely inactive.

NON-TECHNICAL SUMMARY

This paper examines data from the National Survey of Time Use conducted by the Office for National Statistics which was released earlier this year. This study is based on a random national sample of around 5,000 households. All people aged 8 and older in these households were asked to keep a diary of their activities over two randomly selected days, one week day and one weekend day.

This study examined time in a range of physical activities: sports and exercise; walking dogs; physically active housework (such as vacuuming, moving furniture and many forms of DIY); physically active care (helping an adult out of bed, bathing young children); productive exercise (such as turning soil in an allotment by hand or picking berries); and travel on foot or bicycle. On the average day, young people aged 8-19 spent just under an hour on a work or school day and nearly 2 hours on a day they did not work or attend school doing any form of physical activity. Britons aged 65+ tended to be active for 2 hours. The gap is large enough to reflect a real difference in lifestyle between younger and older people.

The data also show that on any given day, nearly one-fifth of Britons do no physical activity that lasts longer than 5 consecutive minutes. While only 10% of people aged 65+ are this inactive, 21% of people aged 8-35 did no exercise lasting at least 10 minutes in their day.

Though boys are more physically active than girls, after the age of 20, women tend to be more physically active than men until they reach pension age. At all ages, men spend more time than women playing sports, but women spend more time than men performing physically active housework and care as adults.

Diarists were asked if they had participated in any of 43 sports in the last four weeks. Over half of Britons said they played some sports on at least a monthly basis. Nevertheless, approaching half of the sample - 42% (4229 people) indicated that they had not participated in any sport – not even keep fit exercises - over the last four weeks.

People who say they almost always feel rushed are less likely to participate in sports and keep fit exercise during a month than people who only occasionally feel rushed. Yet people who

seldom or never feel time pressured are even less likely than those who always feel rushed to participate in sports. More curiously, people who have access to the internet at home are more likely to participate in sports than those who do not have internet access at home. The association holds across the age groups, and is particularly large for people in the older working age groups.

The diary data only show the time which people are active, but not the intensity of exercise or the number of calories people burn while doing exercise. Even so, young people naturally have more potential energy to spend than pensioners. People's lifestyle choices in youth can significantly influence their chances of health in older age. Young people who lead a sedentary lifestyle face greater risks of obesity and health problems in later life.

A quick glance through the popular discourse generates an alarming picture of the physical health of people living in the United Kingdom. Data collected by the British Heart Foundation suggest that one-third of British children aged two to seven are not undertaking minimum levels of recommended exercise, and are developing problems including high blood pressure as a result (BBCi April 2002). Not only are expanding waistlines causing clothing designers to amend standard clothing sizes (BBCi 24 July 2002), even household pets are piling on the pounds and losing muscle tone (BBCi 18 July 2002). Devices that send electric shocks to the stomach, pills to control the appetite and stimulate muscle action, and other medications to make people eat less and tone their muscles with minimum effort, and even techniques to enable people improve muscle strength by visualising exercise rather than doing it appear to be the rage. The coach potato stereotype thrives in the popular parlance. This paper tests the stereotype of pervasive sedentary lifestyles in the UK by looking at participation in sports in the last four weeks, and also at physical activities which people undertake on a daily basis. This paper also demonstrates the importance of using time diary data for such investigation.

The Data

This paper uses data from the UK 2000-2001 National Time Use Study, collected by Ipsos-RSL for the UK Office for National Statistics (ONS) from June 2000 through August 2001. The study collected a stratified random national sample of private households from the Postcode Address File (PAF) so that all regions of the country were represented. All members of sampled households aged 8 and above were asked to keep two time diaries, one on a randomly selected weekend day and one on a randomly selected week day. All household members were asked to keep their diaries on the same day, and respondents were paid an incentive if all members returned completed diaries. The overall response rate for individuals was 45%.

The diaries covered 24 hour time periods, starting at 04:00 and ending on 03:59 on the following morning and were divided into ten minute time slots. Diarists were asked to record their main activity in their own words. Diaries included a column where diarists were asked to indicate where they were or, if travelling, their means of travel. People aged 14 and above were also asked to write down anything else they were doing if they did more than one thing

at the same time, and adult diaries also included a series of tick boxes for diarists to note if they were alone, with young children (aged <10) living in the household, with children from the household aged 10-14, with other household members, and with other people that you know. Diarists could tick as many of the time with other people boxes as applied. Diaries for children aged 8 to 13 did not include the secondary activity column, and included fewer time with other people categories – alone, with parents, with others from the household, and with other known persons.

The study collected 20981 diaries from 11667 people. 19348 (92%) of these diaries contained valid information for at least 22 hours and 30 minutes. Unlike some forms of social science data, time diaries offer opportunities for imputing some missing data with relatively high accuracy. The activities on either side of a short missing period of time impose limitations on what activities might have happened in the missing period. If a person is in one location prior to a missing time period, then in a second location at the point when valid information is next recorded, unspecified travel must have transpired in at least ten minutes of the gap. If a person is asleep as part of main sleep at home or at someone else's home, then has a gap, then is doing activity that requires that the person got up first, some form of getting up/washing/dressing can be reasonably assumed to have taken place in the missing period. Missing main night sleep, missing time slots of 10 minutes, and some missing time slots in gaps of 20 to 30 minutes are imputed. After imputation, diaries which continued to have more than 1 hour and 30 minutes missing were excluded.[1] 19684 diaries (94%) are used in the analysis of the diary data. 9027 individuals (77%) completed the section of the individual questionnaire on sports participation in the last four weeks and are analysed separately.

The data are weighted with ungrossed weights calculated by the ONS. Person weights correcting for individual non-response are used to analyse sports participation in the last four weeks. Diary weights used for the diary data analysis correct for non-response for the first diary completed and the second diary completed separately. The diary weights also correct for

[1] The definition of a good diary is less strict than the definition applied in some other research. Diarists do systematically under-report some activities, such as supervising children, as certain diarists do not perceive such activity as an activity of sufficient importance to record (Ironmonger 2002). While there is no reason to suspect that exercise is left out of diaries for a similar reason, as this paper does not model the full day and only focuses on periods of reported physical activity, I decided to include the maximum possible diaries in the analysis.

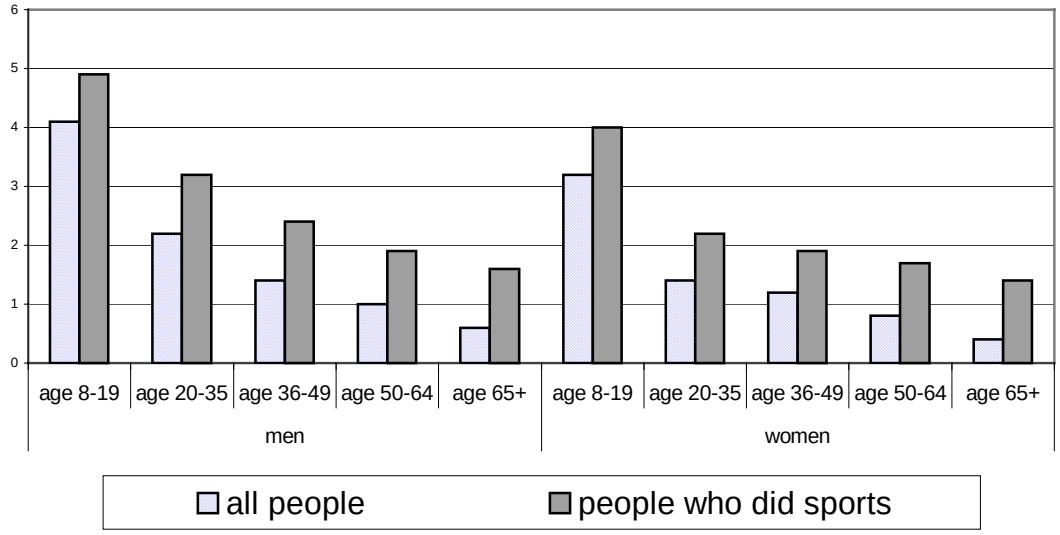
overall individual non-response as well as balancing the representation of diaries completed in each season and on each day of the week.

Participation in Sports in the Last Four Weeks

The individual questionnaires (for both adults and children) asked diarists to indicate if they had participated in any of 43 sports[2] in the last four weeks. Thus, this time diary study allows for the repetition of more conventional social science questionnaire analysis of physical activity.

On the one hand, this data shows a reasonable level of sports participation. Nearly one-fourth of the population (23%, 2248 people) had performed 3 or more sports in the last four weeks. A further 35% of the diarists (3550 people) had performed one or two sports in the last four weeks. Thus, over half of the British population engages in some regular sports participation. This finding is somewhat higher than sports participation observed in the Health Survey for England, 44.5% (Farrell and Shields 2002: 337), though the other study excluded students, while students are included in this analysis.

Figure 1 - Mean Number of Sports Done in the Last 4 Weeks



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

[2] The 43rd category is a catch-all any other sport.

Approaching half of the sample - 42% of the diarists (4229 people) indicated that they had not participated in any sport over the last four weeks. While some sports listed among the 43 items in the questionnaire require considerable training, expensive specialised equipment, and substantial financial resources for participation, the list also includes items which should be possible and accessible for most people, including (a) walking(recreational) or hiking for 2 miles or more, and (b) keep fit, aerobics, yoga, dance exercise. That 42% of Britons do not report engaging even in keeping fit activities is cause for concern for the health of the population.

There are variations in sports participation by age and sex. As Figure 1 and Table 1 show, men tend to participate in more sports than women, and the overall participation for both men and women decreases with age.[3] People reporting that their health is very good, that they have more time during working age on account of being unemployed, and that they have a driving license are more likely have participated in sports than the average diarist. Even more curiously, people who have access to the internet at home are more likely to participate in sports. As Figure 2 shows, the association between access to the internet and sport holds across the age groups.[4] The gap between sports participants who access the internet is particularly large for people in the older working age groups.

People reporting very bad health, not surprisingly, are less likely to participate in sports. Curiously, though, people of employment age who are not working and not seeking a job are less likely to participate in sports that people who are employed, and even less likely to participate in sports than the unemployed. The relationship between time pressure and sports participation is even more curious. People who say they almost always feel rushed are less likely to participate in sports than people who only occasionally feel rushed; yet people who seldom or never feel time pressured are even less likely than those who always feel rushed to participate in sports.

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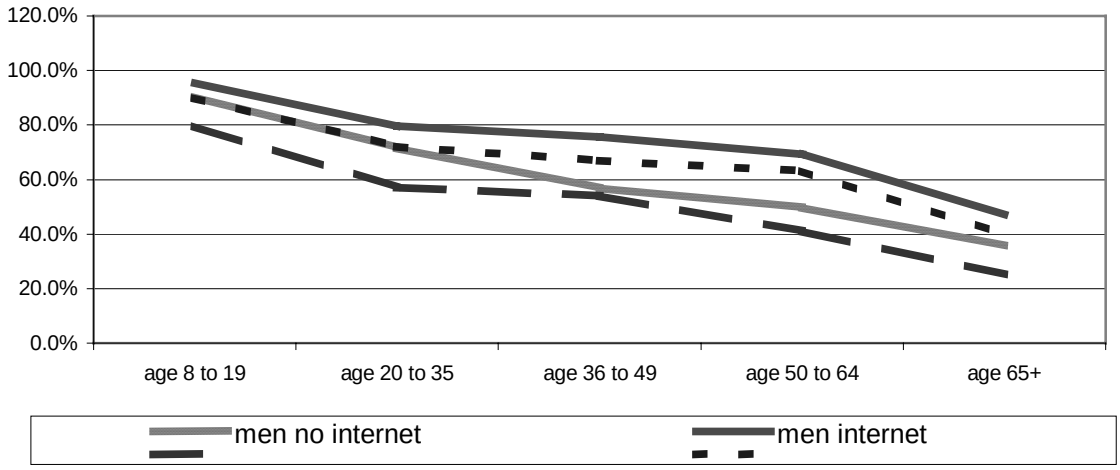
[3] The figures are significant at the level of $p<.000$; for all people one-way Anova $F=330.3$; for people who participated in at least one sport in the last four weeks, one-way Anova $F=243.1$. The F statistic declines when each age groups is considered individually, though the variation by sex remains significant.

[4] For each age band controlled by sex, the participation in sports across access to the internet at home is significant at the $p<.002$ level for the Fisher's exact 2-tailed test.

Table 1 – Factors Associated With Participation in at Least 1 Sport in the Last 4 Weeks (Logistic Regression Results)			
Independent Variables	B	Standard Error	Significance
aged 8-25	0.732	0.06	p<.000
aged 65+	-0.635	0.06	p<.000
male	0.295	0.04	p<.000
good to very good health	0.440	0.04	p<.000
bad to very bad health	-1.080	0.08	p<.000
unemployed	0.497	0.13	p<.000
not working/not looking for work	-0.197	0.05	p<.000
has a driving license	0.637	0.04	p<.000
almost always feels rushed	-0.177	0.04	p<.000
almost never feels rushed	-0.271	0.04	p<.000
access to the internet at home	0.484	0.04	p<.000
constant	-0.332	0.05	p<.000

Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Figure 2 - % of Men and Women Who Participated in Sports in the Last 4 Weeks by Access to the Internet At Home



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Measuring Overall Physical Activity – the Advantages and Limitations of Using Time Diaries to Assess Levels of Physical Activity

The conventional questionnaire analysis of reported participation in sports entails a significant limitation. The range of physical activities which contribute to overall health and fitness involves more than participation in sports. Indeed, sports merely focus the human capacities to lift, carry, throw, push, pull, run, climb, swim, jump, turn, stretch and reach to achieve specific tasks defined by the rules of each sport. People use these same capacities for a variety of purposes in their daily lives. The study of physical activity covers a much broader scope than the study of sports participation.

Time diaries offer a particular advantage for such study. The human brain does not record the time spent in any given activity automatically. While people do know certain time-related information, such as what time they start work, how long it takes to drive to school, or how long to cook a chicken in the oven, people do not readily know how much time they spend doing most activities. How much time did you, the reader, spend walking for any reason last week? Unless you did very little walking or kept a time diary, you probably have difficulty answering this question. Previous time diary studies have previously noted that people tend to estimate their hours of work and time spent performing housework inaccurately (Robinson and Gershuny 1994, Gershuny 2000). Indeed, a study in the early 1980s asked members of swimming and tennis clubs at State College Pennsylvania to estimate how many times they had used the sporting facilities in the last year (Chase and Godbey 1983: Robinson and Godbey 1997: 58). When researchers compared answers with the sign-in and sign-out records of the clubs, they found that not only were estimates highly inaccurate, but nearly half of respondents even believed that they had used the clubs more than twice as often as they had actually attended. When people keep a time diary of their activities, however, people can provide reasonably reliable estimates of the time they spent performing various activities (Gershuny 2000).

This paper examines the recording of six categories of physical activity: (1) sports participation and exercise; (2) productive exercise[5] (such as turning soil in a garden or picking wild berries and mushrooms); (3) self-powered travel (walking and travel by skis, skates, bicycle, and other unmotorised vehicles); (4) walking dogs; (5) physically active

[5] The categories for voluntary activities lump providing help with berry/mushroom picking, gardening and pet care into a single category. When this code appears, .3 of a time slot is added to productive exercise. The reader should recognise that some active dog walking is miscoded into productive exercise as a result.

housework[6] (from scrubbing floors, to hammering nails, to shifting furniture and boxes), and (6) physically active care[7] (such as lifting and bathing young children or adults needing care). Physically active time is recorded in three places in the diaries: the main activity column, the secondary/simultaneous activity column, and the location/mode of transport column. In testing this data, I found that diarists reported doing multiple physical activities as the same time in fewer than 5% of 10-minute time slots during which some form of physical activity was recorded. As the degree of overlap for any combination of physical activities is too small for meaningful statistical testing, I do not address these occurrences of simultaneous physical activity. Instead, I have recorded the instances of multiple physical activities into the category which the respondent listed as the main activity. As I have a specific interest in total time spent in physical activity (summing time spent in each of the six categories), I have defined the six categories of exercise to be mutually exclusive.[8]

There are three general limitations for using time diaries to measure physical activity. These limitations should be kept in mind when the reader reviews the results. First, diaries measure the occurrence but not the intensity of activity. In part, this is because it is unrealistic to expect diarists to provide such information. Keeping a time diary is a cumbersome activity, and the more detail the researcher demands, the less likely people are to keep the diary. Even if people do record their perception of the intensity of an activity, there are problems with such reporting. The dividing line between vigorous and moderate activity will vary widely from person to person, and arise from a combination of personal perceptions, cultural background, and each person's age and overall level of physical fitness. A speed of swimming 20 laps that is a gentle workout for one person might constitute a tiring and difficult task for another person. Diaries reveal when people are active, how long they are active, and what they do before and after physical activity. Diaries do not reveal the level of

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[6] This activity includes both domestic work done at home and domestic work performed as voluntary assistance for someone else.

[7] This activity includes both care provided at home and care performed as voluntary assistance for someone in another household.

[8] The transformation to compute physically active time first looks at the main activity for each time slot. If the main activity is physically active, then that time slot is recorded in the appropriate category of physical activity. If the main activity time slot is not physically active, but the secondary activity slot is physically active, then the secondary activity is used as the basis for assigning the time slot to the relevant category. Respondents are asked to record all transport simply as travel in the main and secondary activity time slots, then to record the means of travel in the location/mode of transport column. If neither the main activity nor the secondary activity is recorded as physically active, but the where column is recorded as travel by self-powered means, then the time slot is recorded as physically active travel.

energy expenditure, how much effort a person put into performing the activity, or such measures as the distance travelled or weight of goods shifted.

Second, diaries generally do not collect activities lasting less than 5 minutes.[9] It is possible to get large numbers of diarists to record certain short-duration activities by using one-minute time slot diaries and by advising diarists of the researchers' area of interest. Victor Ujimoto (1988, 1991) has adopted such a strategy to identify when older people in Canada take medication, as an example. In the case of the UK 2000-01 study, where diaries covered ten-minute time slots and diarists were encouraged to also record any activity lasting at least 5 minutes which was not the main focus of their attention in the secondary activity time column, the data cover total time in the majority of periods of physical activity which lasted at least 5 minutes. As shorter duration activities are not recorded, the results in this paper do not reflect total physically active time in the day. From the perspective of a person trying to lose weight, increase general fitness, or recover from an illness or injury, a decision to walk up a flight of stairs rather than to use an escalator or lift matters. For the focus of this paper, however, the omission of such short-duration activity is not important. A person whose total physical activity in the day arises from short episodes of, say, 3 minutes walking to the car to drive through McDonalds to buy lunch, 3 minutes walking from the car back to the house, 2 minutes walking from the sofa to the refrigerator for a beer and back, and so forth, is not leading a healthy lifestyle.

Third, there are certain types of activities which people do not tend to record in time diaries, but which instead are cloaked by broader categories of activity. Violent behaviour and sex are two such activities often omitted from diary data (Robinson and Godbey 1997, Gershuny 2000) which generally involve physical exertion. While people have been persuaded to record sexual activity in diaries, studies where this has been successful have had a specific focus on sexual behaviour (Coxon 1988, Coxon and Coxon 1993, Coxon 1993). The reader should note that such activities are not included in the calculations in this paper.

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[9] In cases where diaries collect start-stop time of activities rather than asking people to note main activities in time slots, diarists tend to round up to 5-15 minute units and note activities performed in such time frames. In consequence, start-stop time and short (5-15 minute) fixed time slot diaries do not collect significantly different total numbers of activities (Gershuny 2000, Robinson 1999).

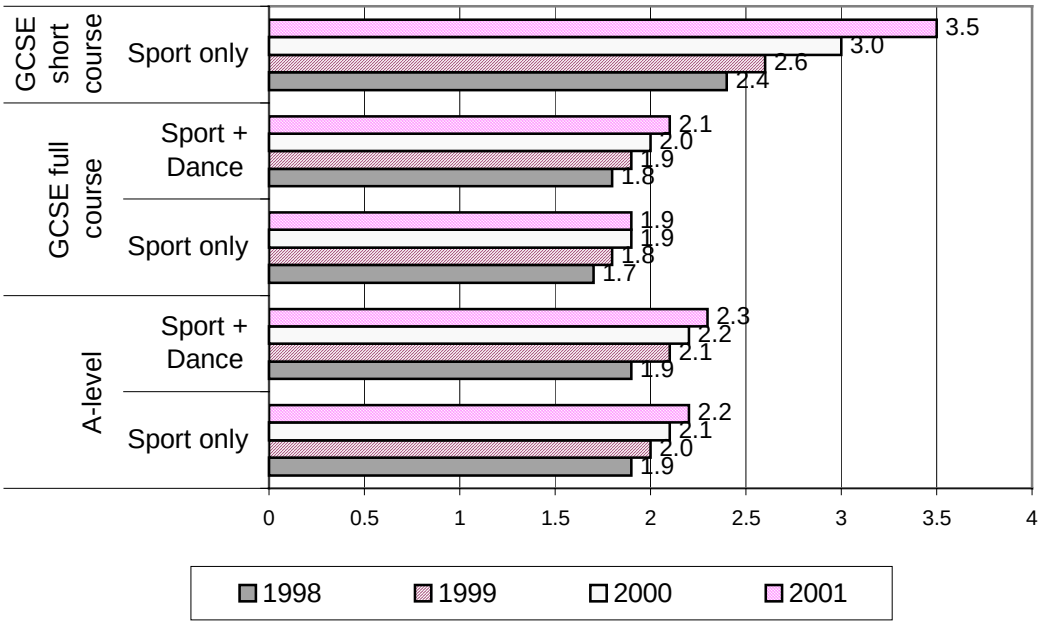
There also are two specific limitations in this data set and other time diary studies which followed the Harmonised European Time Use Surveys (HETUS) recommendations issued by EUROSTAT (2000). First, under the HETUS recommendations, diarists only need record that they are sleeping when asleep, in class when receiving formal education, and at work when performing paid employment activity and job training. Diarists are not asked to record location and who else is present details or to provide more specific details of what they are doing during these three activities. This does not mean that records of all time at school or at work are non-specific. Diarists are instructed to record full details of what they are doing during breaks and recesses at work or at school as well as during times outside of paid time and lessons when they are on workplace or school premises. Similarly, diarists are asked to make a full record of training/study which is not part of formal education, and any activity like paid work done as voluntary assistance for another person or organisation. The missing detail only relates to sleep, formal instruction and paid work.

Limited information during sleep makes no difference to the study of physical activity. Limited information about paid work and study, however, does have implications, as some classes and some types of paid work involve intensive physical activity. Work and class-related exercise also are omitted from the figures in later sections. For this reason, much of the subsequent analysis treats school days, work days, and days where people neither attend courses nor work separately.[10]

As time diaries were collected from people aged 8 and above, there are primary school students in the sample. Primary education in the UK covers sport and exercise. As national government guidelines have placed greater emphasis on reading, writing, numericy and technology skills, and as schools are increasingly judged and ranked by the performance of their students on national exams testing these skills, the level of physical exercise included in the curriculum, especially for older primary school children, has declined in recent years.

[10] Diaries including 3 or more hours of recorded formal education are defined as school days, while diaries with fewer than 3 hours of formal education are coded as non-school days. If the day was not coded as a school day and the person recorded 3 or more hours of paid work time, the day was defined as a work day. Diaries not defined as school days and with fewer than 3 hours of recorded paid work are coded as non-school and work days. School days are only coded for diarists aged 8-35. There are not enough students after the age of 35 to justify coding school days for people after this age.

Figure 3 - Dance and Sport Courses as a Percentage of All GCSE and A-Level Courses



Source: Qualifications and Curriculum Authority, Statistics web page (2002). Figures cover England, Wales and Northern Ireland.

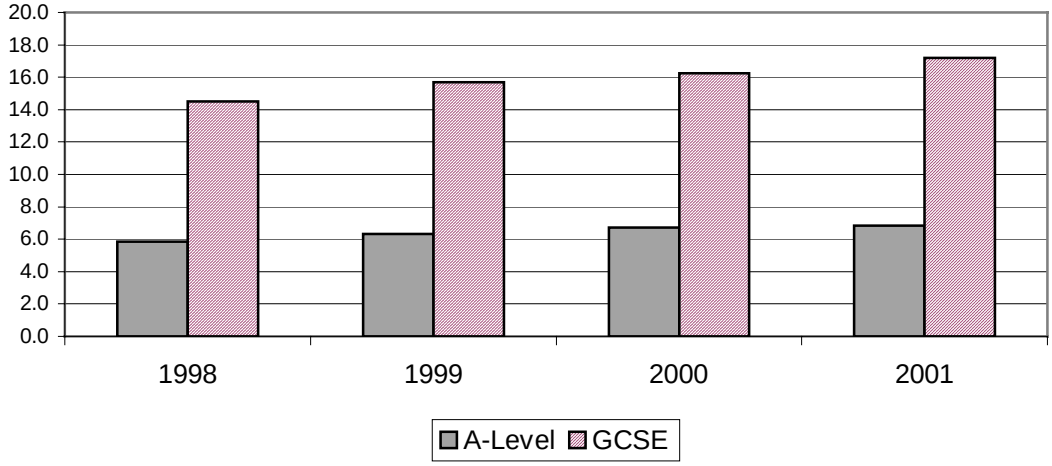
After primary education, there is no general requirement for British students to take courses which involve exercise. Secondary students in England, Wales and Northern Ireland[11] have the option to take dance and also physical education/sport at both GCSE (first stage secondary education) and A-Level (second stage secondary education). PE/sport is also offered as a short course option at GCSE level. Official figures released by Qualifications and Curriculum Authority (QCA 2002) indicate that between 1998 and 2001, dance courses constituted a consistent 0.1% of GCSE and A-Level courses. As Figure 3 shows, the take-up of the PE/sports course steadily increased over these four years, especially at the GCSE short course level, though sport and dance constitute only a small proportion of the total secondary courses offered in the UK.

On average in this time period, A-Level students too 3 courses, and GCSE students took 8 courses (generally a combination of full and short courses) (QCA 2002). Figure 4 shows that the estimated percentage of secondary students who took a course involving physical activity has risen over the last four years, but fewer than 18% of secondary students were taking

[11] Scotland maintains a separate education system in the UK.

physically active courses in 2001. Further, the level of physical activity drops by more than half from GCSE level to A-level. There are also specialised training academies for dancers, actors, soldiers, and some other professions which include physically intensive training. Nevertheless, even when these courses are taken together with the GCSE and A-Level courses, fewer than 20% of British secondary school students take a course that includes physical activity.

Figure 4 - Percentage of Secondary Students Taking a Dance or Sport Course



Source: Estimated from data available from the Qualifications and Curriculum Authority, Statistics web page (2002). Figures cover England, Wales and Northern Ireland.

Around one-fourth of National Vocational Qualifications (NVQs) – work-related qualifications taken by people across the working age spectrum in England, Wales, and Northern Ireland - involve physical activity[12] (QCA 2002). Nearly 1/3 of employed Britons work in an industry where jobs regularly involve some regular physical exercise[13] (Office for National Statistics 2002). The missing physical activity at work principally affects people aged 20-64 in the data. The impact on data for people above retirement age is minimal to

[12] This estimate is derived by dividing the number of NVQ awards made in 1991 in tending plants and animals, natural resource extraction, construction, direct social and personal care, security guarding, fire fighting, sports and coaching, portering, dog grooming, massage, cleaning, repair and maintenance of vehicles and machinery, food service to tables and from trays, merchant and fishing vessel operation, wood working and furniture manufacture by hand, butchery, manual assembly and joining, by the total number of NVQ awards made in 2001.

[13] This is a rough estimate obtained by calculating the percentage that agriculture, hunting, fishing and forestry workers, + construction workers, + 1/2 of manufacturing workers + 1/2 of water and energy workers, + 1/3 of catering workers, + 1/5 of health, education, and public administration workers, + 1/10 of other service workers constitute of the total workforce (seasonally adjusted).

negligible. Even when the limitation of missing exercise at work time is considered, the reader also should note that the majority of British workers are not getting regular exercise while undertaking paid employment.

The second qualification for this data set and other time use data collected following the HETUS guidelines relates to the coding of physically active care. Physical care and supervision are lumped into single codes for care of children and for care of adults. Much care time is also coded with a general, unspecific care code. The data are adjusted with a conservative formula to attempt to capture mostly physical care time. Half of the physical/supervisory child and adult care, and 1/4th of unspecified child and adult care recorded as a main activity are counted as physically active care. When the main activity is not physically active, 1/4th of physical/supervisory child and adult care, and 1/10th of unspecified child and adult care recorded as a secondary activity are counted as physically active care. Time diaries tend to capture only a limited amount of total supervisory time (Ironmonger 2002), and these estimates are more likely to under-estimate than to over-estimate physically active care time.

Physical Activity in the UK

Figure 5 shows the overall level of average physical activity for men and women by age group and type of day in the UK. Figure 5 also compares mean time recorded by all diarists as well as by only those diarists who reported engaging in physical activity in at least one time slot. Figures 6 to 11 break down time spent in each activity for men and women across age groups and type of day.[14] Men and women aged 8-35 do roughly double the level of total exercise on days when they are neither in work nor in school than they perform on school and work days. As Figure 5 shows, younger women and men have similar total exercise profiles. Teenagers spend around twice as much time doing active housework and participating in sports on days they are neither studying nor working, though there is a gender difference, with girls doing nearly double the level of active housework as boys and boys playing sports twice

[14] The following categories are excluded from Figures 6 to 11 as they represent fewer than 20 unweighted cases: women and men aged 20-35 on school days for sport, productive exercise, walking dogs, active housework, and active care time; women and men aged 8-19 on school and work days for productive exercise; women aged 8-19 on school days for walking dogs; women and men aged 8-19 on work days for walking dogs and active care.

as long as girls. Men aged 20 to 35 follow a similar patterns as teenage boys, though the older young men do more active housework, spend less time playing sports, and are generally active for roughly 5 minutes longer per day than teens. Women aged 20 to 35 likewise are more active (mainly from doing more active housework) than teenage girls, but by a greater margin than the age difference for men. Women in early working age play less sport than teenage women.

Time spent in productive exercise and walking dogs increases with age, and for men, active housework also increases with age, while for women, active housework plateaus from working age. Active care time is highest for both men and women during the main child baring years, though women perform more active care than men. Physically active travel time tends to be slightly higher for women and men on non-work days than on working days.

Overall activity levels are higher on days when people are not working or in school. True, there is missing activity during work and study in classes, but the gap between these types of days is substantial. Even high estimates of the degree of missed active time on work and school days for the proportion of workers and students regularly engaged in physical activity in the workplace and the classroom would not be high enough to eliminate this gap for men and women in the age groups (though this is not the case at the level of each individual).

Men's overall physical activity increases across age groups until they retire, when their level of activity declines to the activity level of men aged 20 to 35. Women's physical activity peaks during the mid-working age range (36 to 49), then declines. Overall, women are more physically active than men – which reflects the higher total activity of younger women than younger men. Older men are on average more physically active than older women.

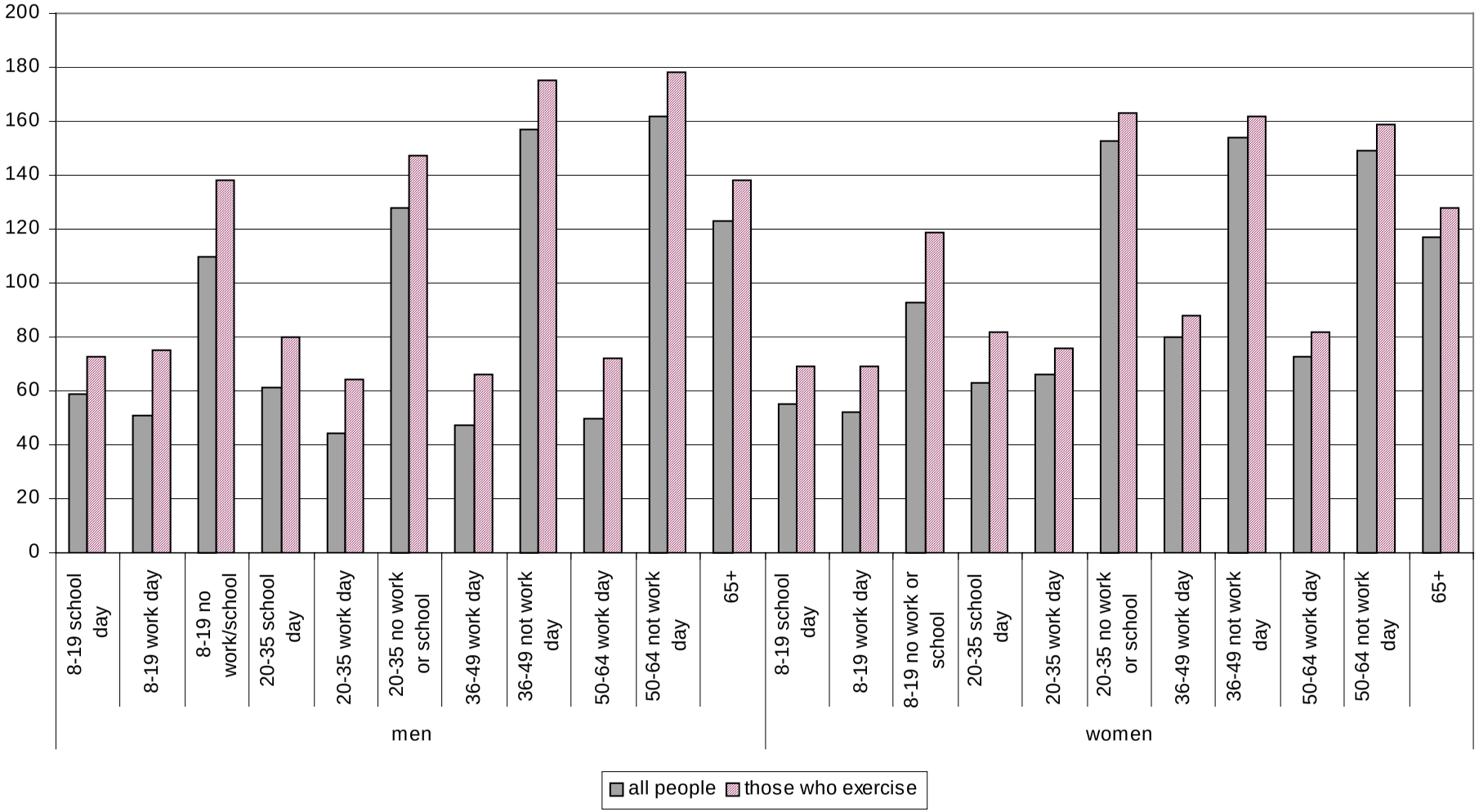
Curiously, the pattern of reported participation in sports in the last four weeks, where there is a steady decline in level of sports participation as people move into older age groups, differs from the pattern for sports participation recorded in the time diaries. True, on average men and women aged less than 20 participate the longest in sport (2 hours and 15 minutes for men and 1 hour and 50 minutes for women on days when they are not in work or in school), and people above retirement age engage in sports for the shortest time (1 hour and 40 minutes for men and 1 hour and 10 minutes for women). The level of sport time for people who report

doing sport in their diaries is relatively consistent in early working age, and rises slightly before dropping again in retirement.

A particularly striking feature of Figure 5 is that pension-aged men and women engage in higher levels of physical activity than teens.[15] The one way ANOVA reveals that this result is unlikely to reflect random variation (f statistic 21.1, $p<.000$). Even when they are not in school or work, teenagers undertake an average of nearly fifteen fewer minutes of physically active time than pensioners. The gap between the overall level of activity of older people and teens grows when young people are working or studying. Biologically, young people should have more energy and be more active than their grandparents. That this is not the case has significant potential future health consequences. Such a finding requires further explanation. One dimension of the observed physical activity patterns of young people arise from changing relations between British parents and their children. In recent decades, two types of stories about young people have featured prominently in both the British media and in popular discourse. One general theme portrays the young as hooligans capable of violent and amoral behaviour. The other theme depicts young people as the victims of careless drivers and secret armies of paedophiles. In the summer of 2002, only stories of the magnitude of tensions between the United States and Iraq bumped coverage of the double murder of two ten-year-old girls and the separate murder of a 13-year-old girl off the main news headlines.

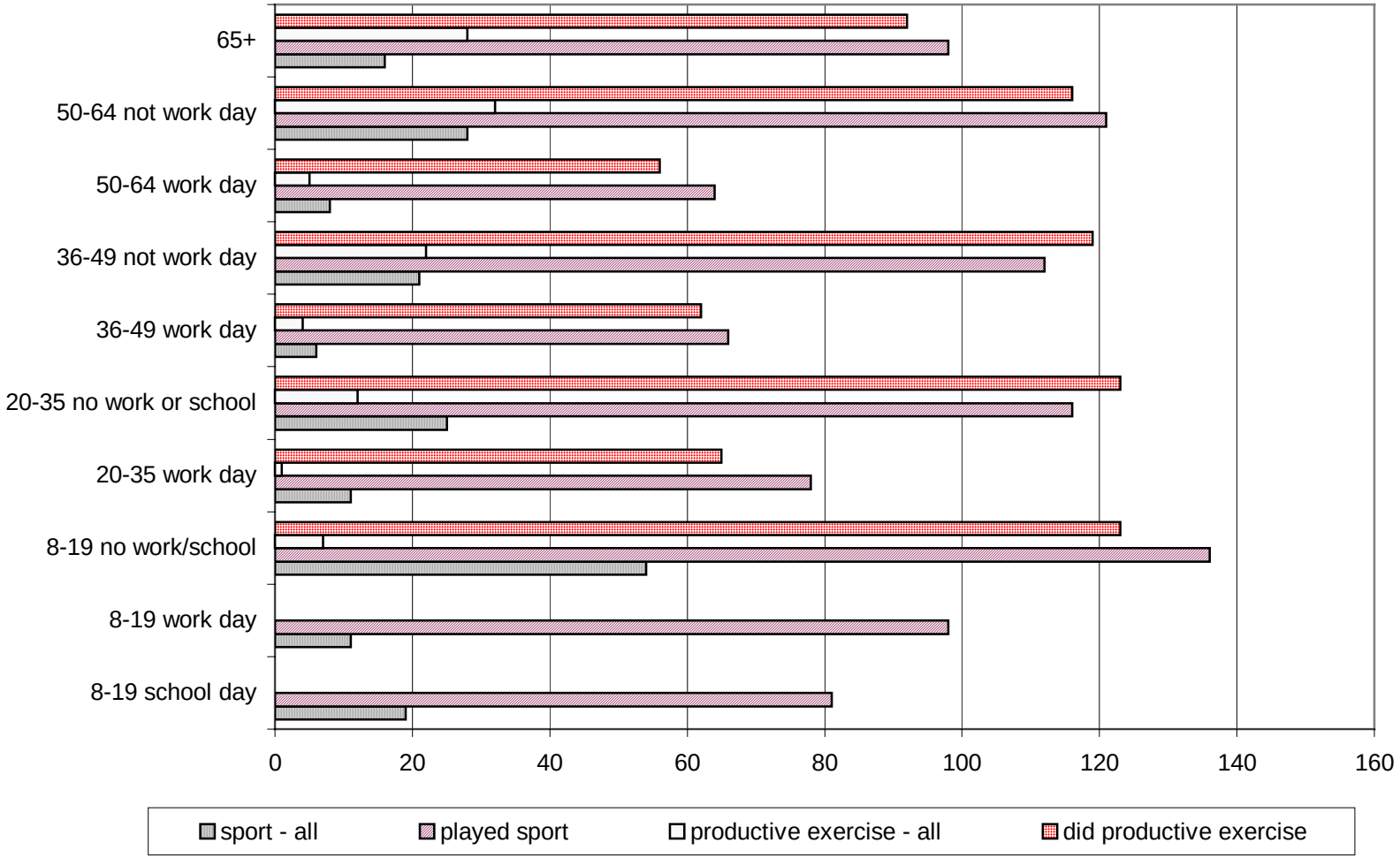
[15] When only people who recorded physical activity are considered, on non-school and non-work days, teenage boys are as active as retirement age men, and teenage girls still perform nearly 10 minutes less exercise than retirement age women.

Figure 5 - Average Exercise Total Time in Minutes



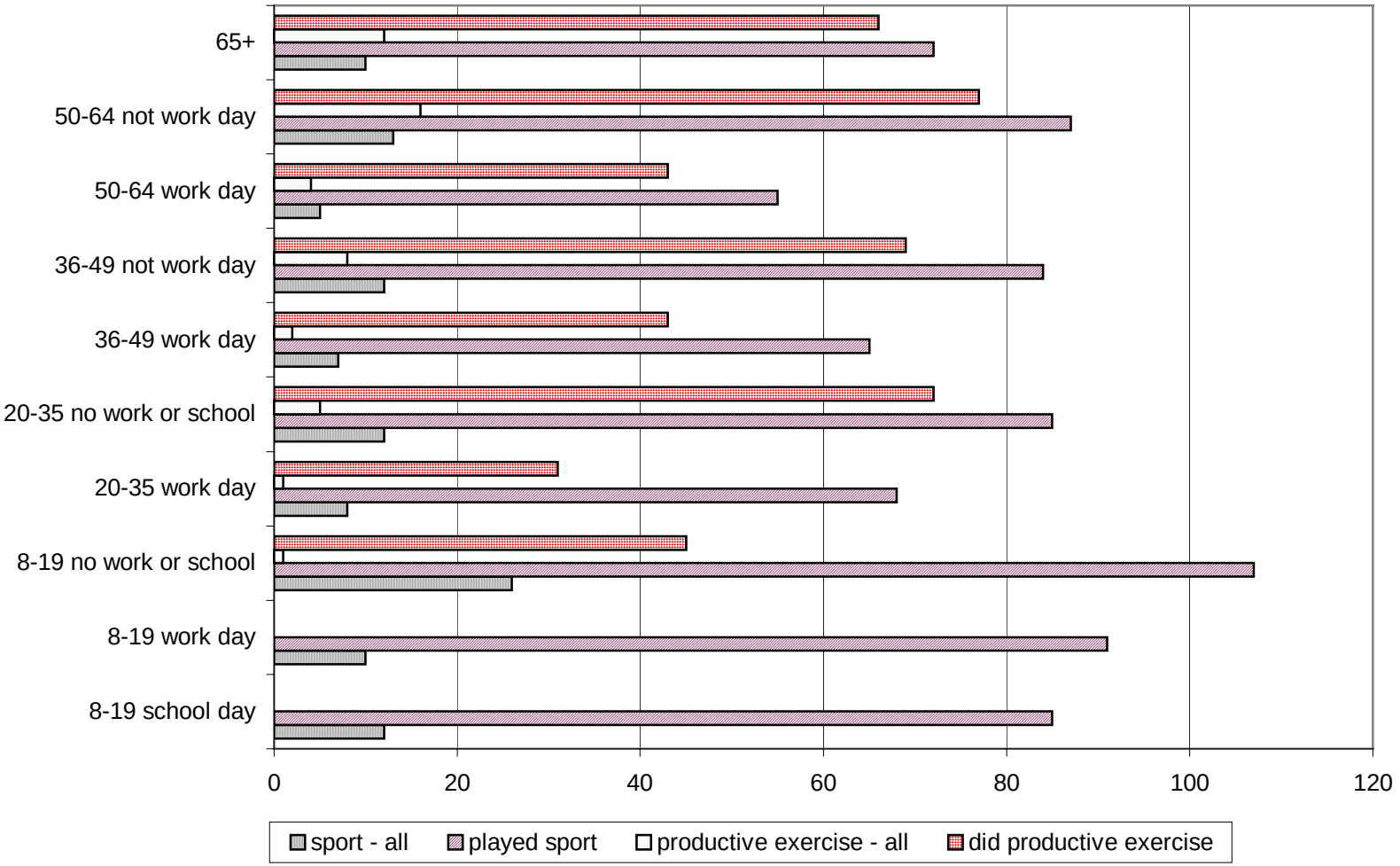
Sources: Office for National Statistics (London), National Time Use Study, 2000-01, BBC (London), The People's Activities, April 1961.

Figure 6 - Men's Time in Minutes in Sport and Productive Exercise - All Men and Those Who Did Sport and Who Did Productive Exercise



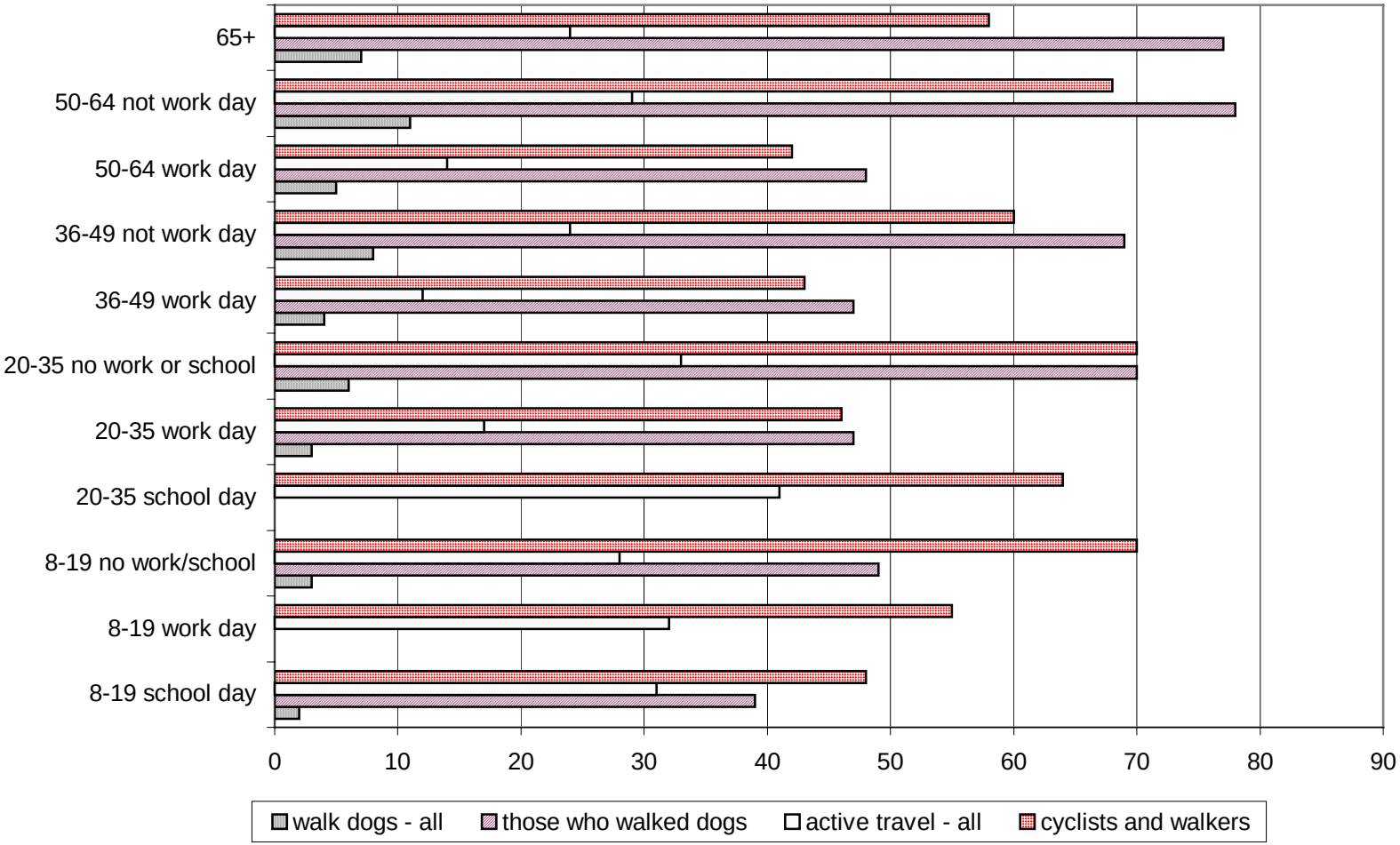
Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Figure 7 - Women's Time in Minutes in Sport and Productive Exercise- All Women and Those Who Did Sport and Who Did Productive Exercise



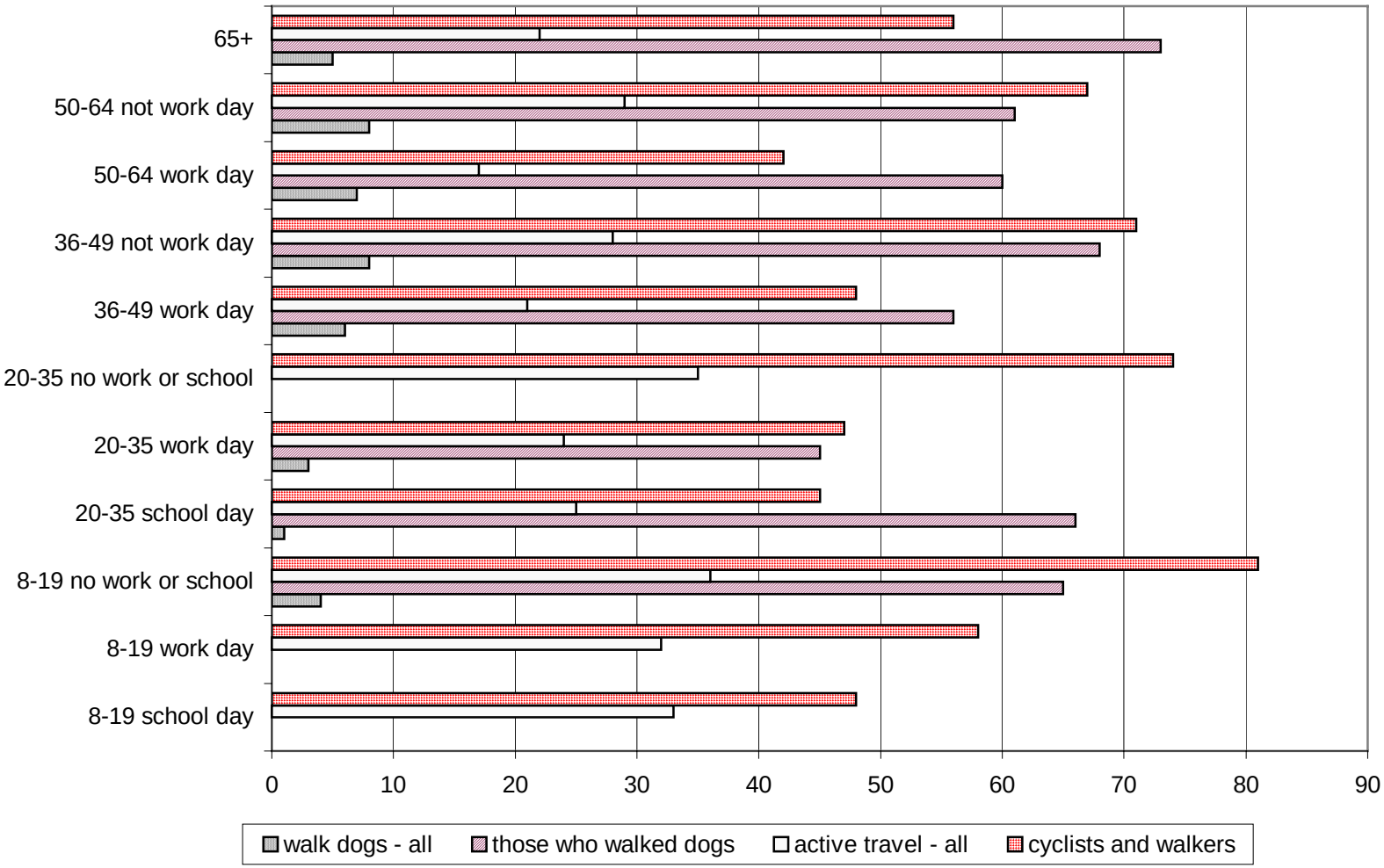
Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Figure 8 - Men's Time in Minutes in Walking Dogs and Active Travel - All Men and Those Who Walked Dogs and Travelled Under Own Power



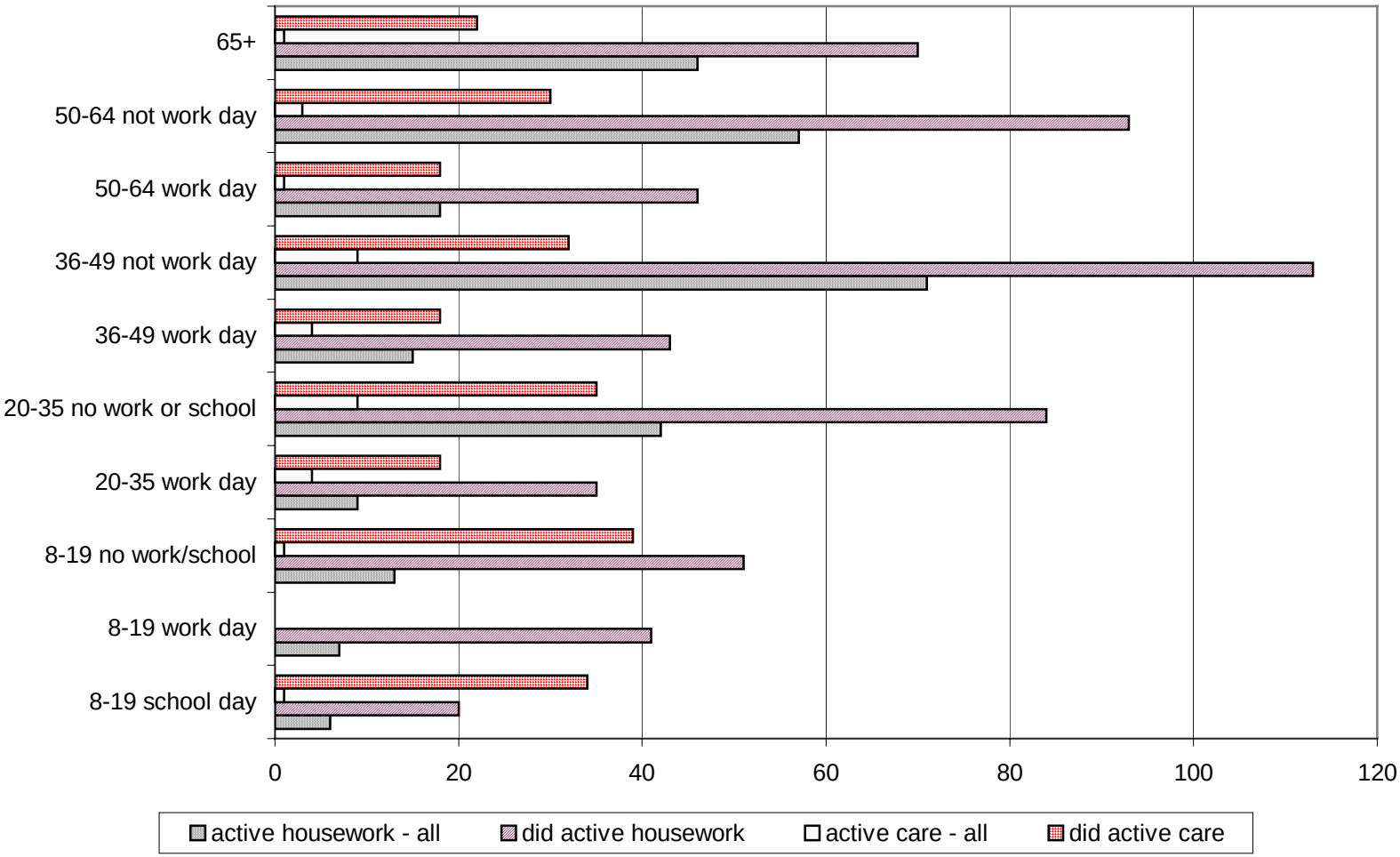
Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Figure 9 - Women's Time in Minutes in Walking Dogs and Active Travel - All Women and Those Who Walked Dogs and Travelled Under Their Own Power



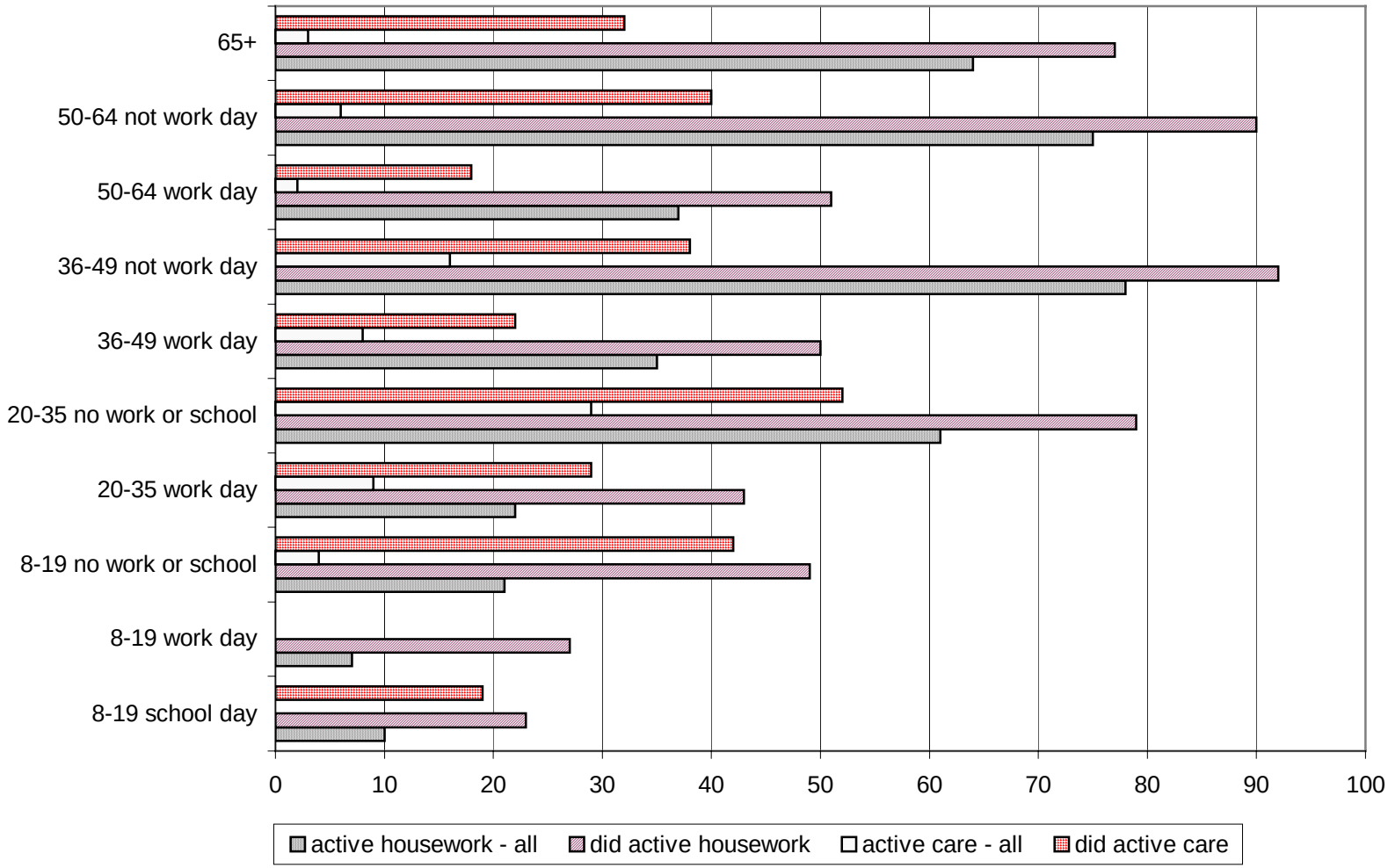
Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Figure 10 - Men's Time in Minutes in Active Housework and Care - All Men and Those Who Did Active Housework and Active Care



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

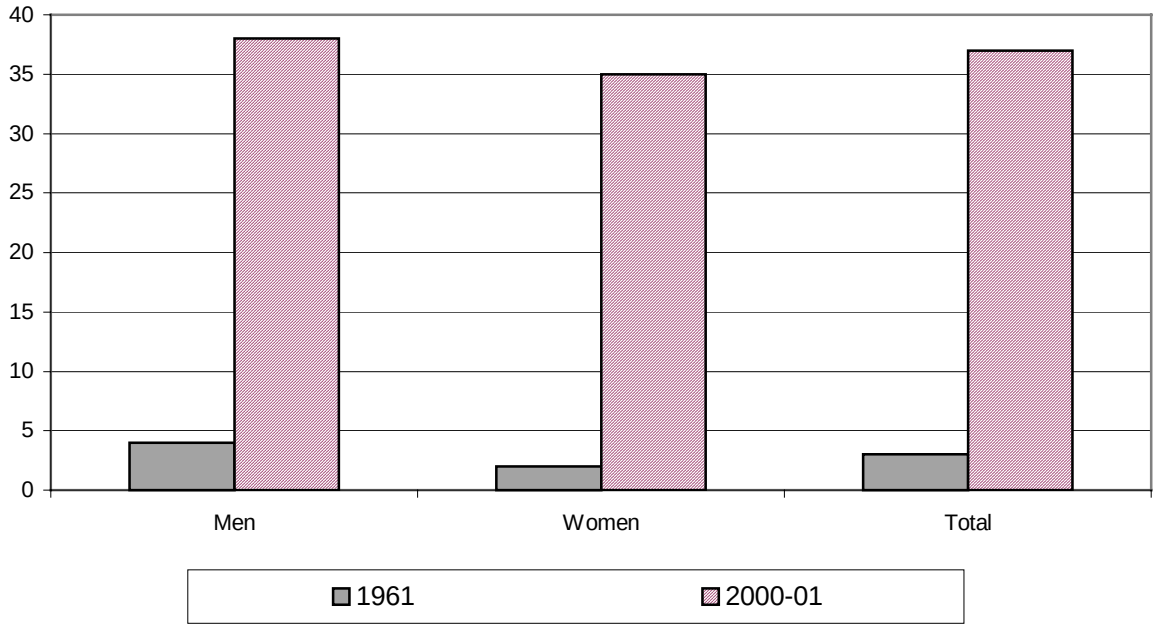
Figure 11 - Women's Time in Minutes in Active Housework and Care - All Women and Those Who Did Active Housework and Care



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

As a result, parents are under dual pressure to spend more time with their children – both to look like responsible parents and to protect their children. Previous research has found that in the 1990s, British parents spent more time with their children than parents had spent in the 1970s, and some of the increase in time arises as parents accompanying children to various locations (Gershuny 2000). It may be the case that as parents travel more with children, children's physically active journey times shorten (as parents are less likely to have the time to wander around, covering longer distances then entailed in a direct route, while young people on their own might be more inclined to such meandering), though it is difficult to test this assumption with presently available data.

Figure 12 - Percentage of Travel Time in a Car for People Aged 15-24



Sources: Office for National Statistics (London), National Time Use Study, 2000-01, BBC (London), The People's Activities, April 1961.

The change in the time parents spend with their children has co-occurred with a general increase in car dependence in the UK. The pervasive reliance on car travel has meant a decline in the amount of self-powered transport in which children engage. In 1961, the BBC conducted a random national sample time use study. In that study, diarists aged 15 and above were asked to keep a one week diary. As age data was collected in bands, this analysis now compares people aged 15-24 in 1961 and 2000-01. Diarists were only asked to distinguish travel in private cars from other forms of transport. Figure 12 shows that proportion of young

people's journeys made in private cars rose substantially, from 3% in 1961 to 37% in 2000-01. Though young men continue to make a higher proportion of journeys by car than women, women increased their proportion of journeys by car by a slightly higher rate than men.

The 1961 study allows comparison of two of the other domains of physical activity as well. The results are shown in Table 2. The total average time spent walking dogs has not changed for people aged 15 to 24; however, a smaller proportion of young people walk dogs (7.6% in 1961, compared with 4.6% in 2000-01), but those who do walk dogs now tend to walk them for longer. Among participants, young women's time walking dogs increased by 20 minutes, while young men's time walking dogs increased by only 5 minutes.

As with dog walking, the percentage of young people performing active housework declined from 68.2% in 1961 to 35.2% in 2000-01. Additionally, young people's time in active housework dropped by more than half and hour. This change in average time reflects a sharp drop in young women's time spent in active housework. Among young men who continue to perform active housework, average time increased by 7 minutes from 1961 to 2001.

Table 2 – Average Time in Active Housework and Walking Dogs for People Aged 15-24, Change from 1961 to 2000-01

	Walking Dogs		Active Housework	
	1961	2000-01	1961	2000-01
All men aged 15-24	2 min	2 min	11 min	12 min
All women aged 15-24	2 min	2 min	53 min	22 min
All aged 15-24	2 min	2 min	33 min	17 min
Men who did the activity	40 min	45 min	38 min	45 min
Women who did the activity	32 min	52 min	1 hr 30 min	48 min
All participants	36 min	48 min	1 hr 14 min	47 min

Sources: Office for National Statistics (London), National Time Use Study, 2000-01, BBC (London), The People's Activities, April 1961.

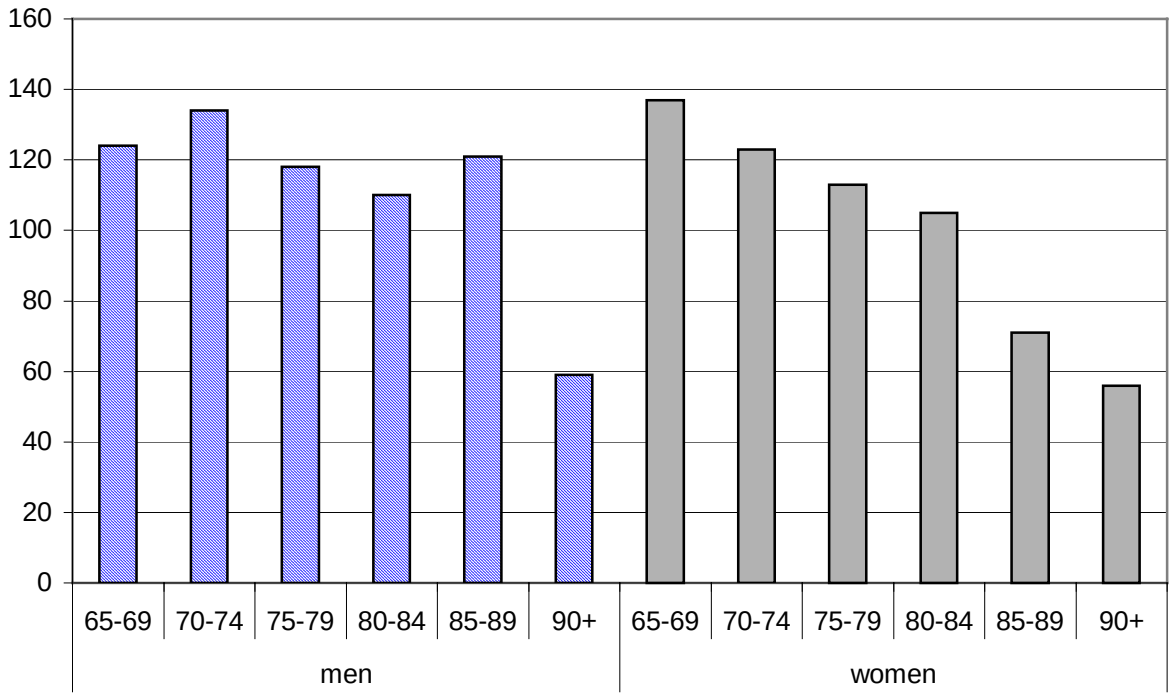
The level of physical activity of young British people in the early part of the present century likely also arises from a co-occurring change in the physical and home landscapes in the UK, particularly in urban areas where the majority of the population live. On the one hand, the

national government has issued policy papers identifying sports facilities as a key element of community regeneration (Department of Culture Media and Sport 2000) and set target for the protection of school playing fields. On the other hand, the government has prioritised increasing the housing stock in urban areas. In July 2002, Deputy Prime Minister John Prescott announced the governments' intention to promote the construction of 200,000 affordable homes as part of a wider home-building strategy in South-East England in the next five to ten years (BBCi 18 July 2002). The home-building policy has increased property values in urban areas, and cash-strapped schools have found themselves under increasing pressure to sell-off playing fields to fund building repairs and other capital projects. An investigation by the newspaper The Daily Mail revealed that 101 or 103 planning applications to build on school playing fields in 1999 and 2000 had been approved by the Department for Education (BBCi 6 January 2000). While the government officially disputed the Daily Mail findings, The National Playing Fields Association criticised government policy for failing to provide adequate replacement exercise facilities for young people when playing fields and other urban open space was converted to housing stock (BBCi 24 May 2000).

The situation has not changed. A BBC investigation of planning office records in 2002 found that planning applications to build on playing fields and urban open space had increased by nearly two-thirds since 2000 (BBCi 24 February 2002). Public Planning Guidance (PPG) 3 issued by the Department for Transport, Local Government and the Regions (DTLR) encourages the development of dense housing with minimal or no garden space. Though the number of gyms and other indoor facilities has increased modestly, these facilities often charge for admittance. In consequence, young people have seen their opportunities for inexpensive outdoor exercise steadily evaporating, and at a time when the range of books, computer games, television programmes on digital, cable and satellite stations, facilities on the internet, DVD films, music on CD, and other options for passive indoor entertainment aimed at young people have blossomed. In such a climate, it is little wonder than young people in the UK exercise less than they might under different circumstances. Media stereotypes portraying young people as increasingly lazy are in part confirmed to the extent that young people are less active – but it would be wrong to place responsibility for this situation solely on young people.

The results from this study counter other popular stereotypes. When the full-range of physical activities are considered, women and men are similarly active. Equally interesting, while exercise declines in older age, this decline is not as pronounced as stereotypes of ageing might suggest. Figure 5 shows that older men and women still perform over two hours of exercise on the average day. Figure 13 displays the total average exercise time of people in retirement age in five year age bands. Men's physical activity from 65 to 89 remains roughly stable, and only declines from the 90s. Women's activity declines steadily but at a shallow slope – amounting to around 7 minutes of daily physical activity decline over each five years from the age of 65 to 84, then declines more steeply from the age of 85. Even after the age of 90, British people on average still are doing more than an hour of exercise daily.

Figure 13 - Average Total Physically Active Time for Men and Women in Older Age



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

The reader should note two qualifications here. The sample sizes are small for the two oldest age groups – 10 diaries from men aged 90+ and 50 diaries from men aged 85 to 89; 25 diaries from women aged 90+ and 68 diaries from women aged 85 to 89. Second, the oldest diarists in the sample are not representative of all people aged 75+ in the UK. The diary study covered the private household population. People in hospitals, hospices and nursing homes

were excluded. Also, people living in a private household who were not capable of keeping a diary on account of illness, such as dementia, also are not represented in the diary sample. Even with these qualifications in mind, however, the diary data do show that older people who continue to live in private households in the UK lead reasonably active lives into advanced age.

Episodes of Physical Activity

The total time spent in exercising is only one dimension of physical activity. Of equal interest is the number of times in which people undertake exercise during the day. Table 3 shows the percentage of people performing none, one, two, or three+ episodes for each of the categories of physical activity. 16% of the diaries contain only 1 episode of physical activity.[16] 17% of diaries contain two episodes, and 49% of diaries contain between three and 10 episodes. At the high end, four diaries include 27 episodes, one diary contains 29 episodes, and one diary includes a marathon 37 episodes.

Table 3 – Percentage of Diarists by Number of Physical Activity Episodes

Exercise category	0 episodes	1 episode	2 episodes	3+ episodes
Sports	83.6%	13.7%	2.2%	0.5%
Productive exercise	88.8%	7.9%	2.3%	1.0%
Walking dogs	91.3%	5.4%	2.3%	1.0%
Active housework	43.0%	25.9%	14.7%	16.4%
Active care	80.1%	7.4%	4.4%	8.1%
Active travel	54.9%	16.1%	14.5%	14.5%
All exercise	15.0%	16.2%	17.0%	51.8%

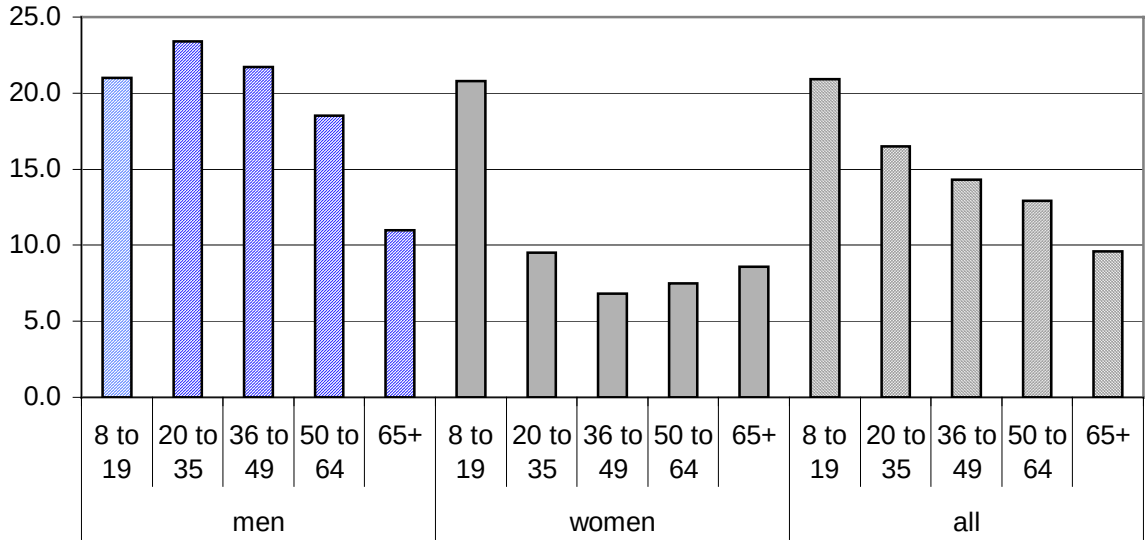
Source: Office for National Statistics (London), National Time Use Study, 2000-01.

High proportions of respondents engaged in physically active housework, care and travel than in other activities on their diary day, and people generally performed more episodes of these

[16] In this paper, an episode is defined as ending when one time slot is physically active, and the following time slot is not physically active. Someone exercising for 40 minutes in an hour time slot who takes two 10 minute breaks in that hour before returning to exercise would be coded as having engaged in three episodes of physical activity.

activities than of the other three activities. It is important to bare in mind a significant qualification here – most people who undertake physically active housework, travel, and care – as well as dog walking - are likely to perform these activities on most days, and hence their participation in these activities is highly likely to be reflected in one or both of their diaries. People in the UK are more likely to participate in sports and productive exercise on a weekly or monthly basis rather than on a most days basis, and thus the level of participation in sports and productive exercise is lower than participation rates recorded in some other surveys.

Figure 14 - Percentage of Diaries With No Reported Exercise by Age and Sex



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

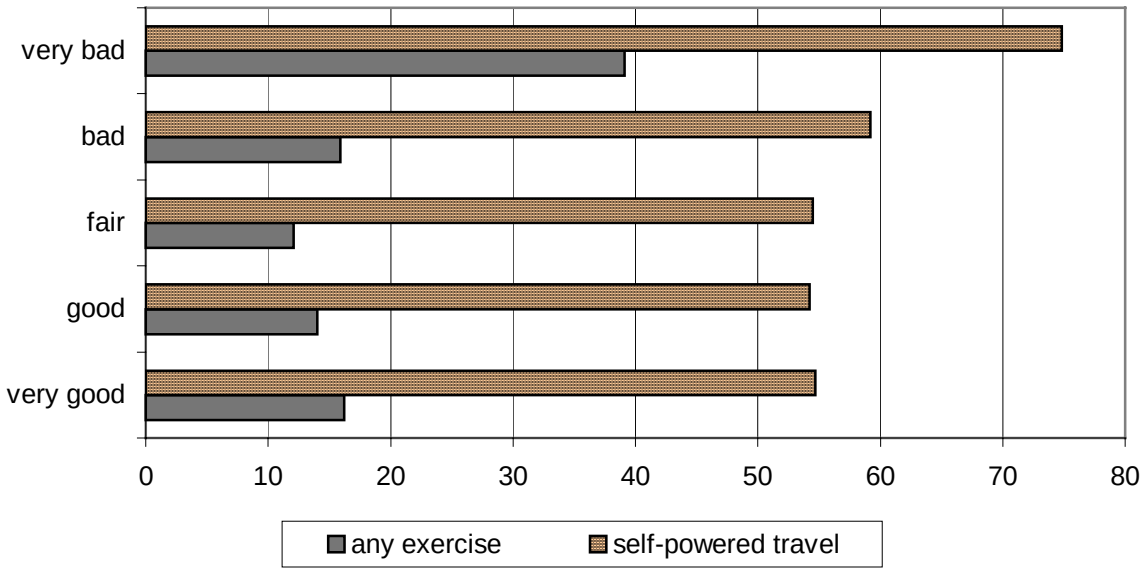
Figure 14 displays the percentage of people who report no episodes of physical activity by age and sex. Among all diarists, the young record the highest percentage of absence of exercise, with a steady decline across age, and the lowest percentage of no activity among people aged 65+. The Pearson Chi Squared value for whether any exercise is reported across the whole sample by age group is 183.1, sufficiently high for the results to be significant at the $p<.000$ level. Figure 14 shows that there is some variation by sex. The youngest women are least likely to engage in exercise. Women aged 36 to 49 are most likely to report some exercise, with the percentage reporting no exercise rising slightly from age 50 to 64, and again at age 65+. In all age groups, men are more likely than women to report no episodes of exercise, with the non-participation rate holding relatively steady in youth and working life, and dropping near retirement. Men above retirement age are much more likely to report at least

one episode of exercise than younger men. Again, the results by sex are statistically significant at the p<.000 level.[17] The gamma value for women by age group and participation in exercise is 0.254, compared to a value of 0.192 for the whole sample and 0.135 for men, indicating that the association of reporting no exercise by age for women is stronger than for men and the whole sample.

A Closer Look at Physical Inactivity

The 0 episode scores do not mean that people do not move, but these scores do mean that movement is confined to very short episodes. All diaries including no reported exercise were produced by people who reported doing no sports in the last four weeks. At this level, the data are internally consistent. That such large numbers of people (2824 diaries – 15% of diaries) lead such inactive lives raises serious worries for future health needs of this section of the population.[18] This paper now considers explanations which might account for this finding.

Figure 15 - Percentage of Diaries Including No Reported Exercise by Self-Assessed Health Status



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

[17] Pearson Chi Squared value for women by age group 242.1; and for men by age group 91.6.

[18] As the diaries cover two randomly selected days, it is not possible to say from this data whether these individuals are inactive on most days, or whether they simply have a higher risk of having the occasional day with no exercise.

One possible explanation for the level of diaries where no physical activity is recorded could be that large numbers of people kept diaries on days when they were feeling ill. Living with a chronic or long-term acute illness may significantly impact a person's life, but does not in most cases mean that a person is incapable of exercise on most days. Likewise, having a need to go to hospital or to see a doctor also does not mean that a person is too ill to exercise. Consequently, most health items in the individual questionnaire do not assist examination of this question.

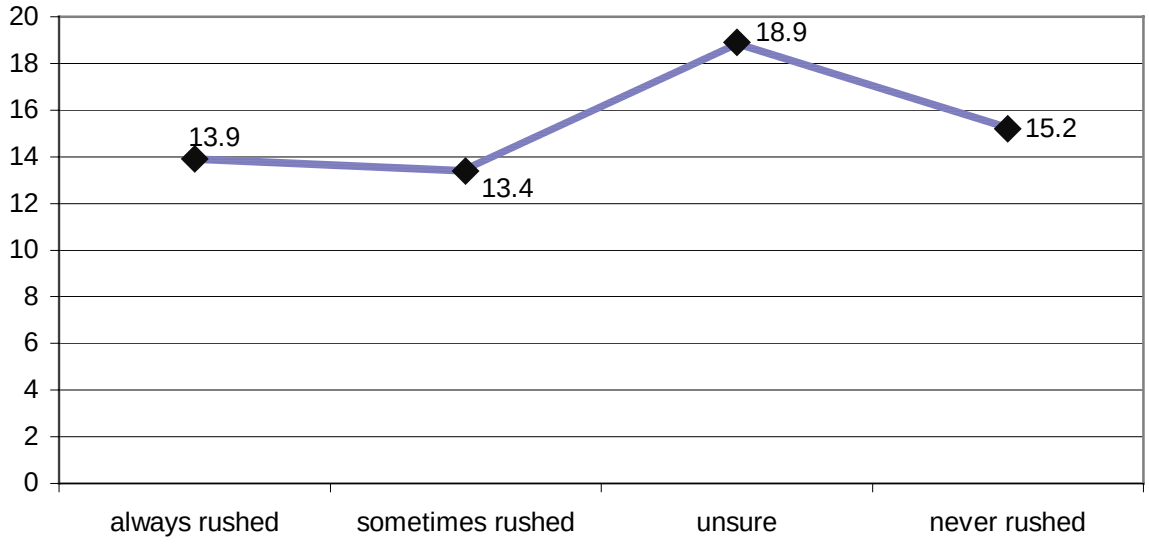
In the diary instructions, however, people were asked to distinguish between 1) taking a nap, 2) main sleep, 3) resting, and 4) sitting and lying down on account of illness. At a conceptual level, it seems reasonable that if a person has to lie down on account of illness during the day, that they may be feeling sufficiently poorly to be unable to exercise. Statistically significant relationships emerge running a one-way Anova without control variables for the mean time spent ill in bed across three dummy variables, people who did any and no exercise, people who did any and no active travel, and people who did any and no active housework – with all results suggesting that people who did not exercise have higher mean times ill in bed. No diary with recorded exercise time includes any recorded time ill in bed. These results are not consequential in relation to the overall observations about physical inactivity, however, as only 17 diaries include any time ill in bed (though these 17 diaries have relatively high levels of reported resting on account of illness time).

One item on the individual questionnaire also is useful in the consideration of the potential impact of poor health on the absence of physical activity in the diary. Diarists were asked to assess their own health on a five point scale, from very good to very bad. Figure 15 shows the level of reporting no exercise and no self-powered travel across the self-assessed health categories.[19] There is no substantial difference between the decision to exercise or remain inactive across four categories: very good to bad; however, there is a considerable increase in the degree of inactivity among people reporting that their health is very bad. Of the 238

[19] For the table of any exercise across health, the Pearson Chi Squared value is 145.2, p<.000, Cramer's V .088, Gamma .044. For the table of self-powered travel across health, the Pearson Chi Squared value is 46.1, p<.000, Cramer's V .049, Gamma -.022. Thus the relation is strong enough to not be likely to have resulted by chance, but the association remains weak – mainly because the only category with a different profile – very poor health, has a relatively small number of cases.

diaries produced by people indicating that their health is very bad, 93 (39%) reported no physical activity, and 178 (75%) did no physically active travel. Thus, it is worth noting that while feeling very poorly has an association with an aversion to self-powered travel, even those reporting very bad health are still likely to exercise. The health issue can explain the lack of exercise in 103 cases[20] - 3.6% of people who report no exercise.[21]

Figure 16 - Percentage of Diaries With No Reported Exercise By How Rushed the Diarist Feels



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

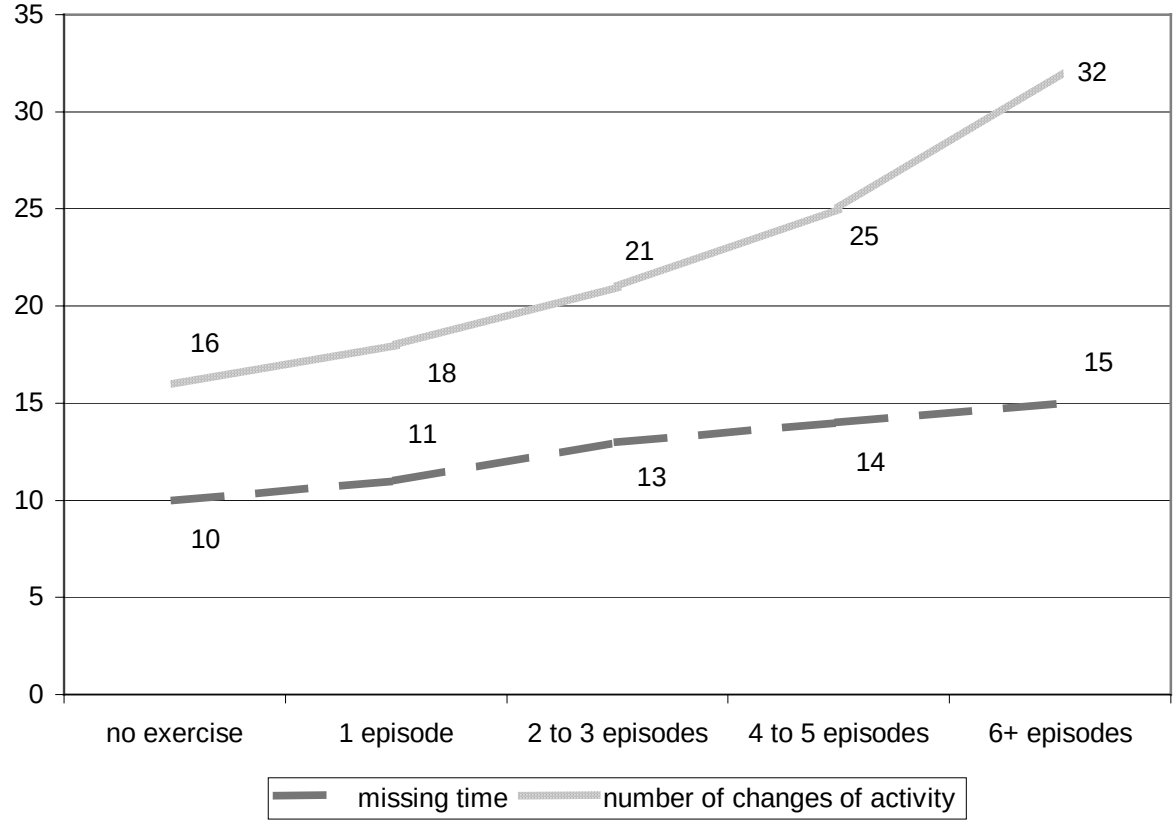
A second possible explanation might be that people who do not exercise feel time pressured and lack sufficient time to exercise. This concept of time pressure is measured in a question on the individual questionnaire asking diarists if they normally feel rushed always, sometimes, unsure, or never. Figure 16 shows that over 81% of diarists in each of these four categories of time pressure reported some exercise. Figure 16 is statistically significant ($p<.018$), but the Cramer's V measure of the strength of the association (0.024) is weak. The curious feature here is that diaries of people who reported feeling unsure about whether they were rushed have the highest levels of inactivity, followed by people who feel never rushed.

[20] People reporting that their health is very bad completed seven of the diaries including time being ill. People reporting that their health is generally fair completed a further 7 of the diaries with time being ill. One of these diaries was completed by a person reporting good health, and the other two diaries with time ill were completed by people recording that their health is very good.

[21] Feeling badly can be a disincentive to exercise, but poor health is not an excuse for not exercising. Regardless of their state of health, all people have a need for regular movement.

Diaries of people who always or sometimes feel rushed are more likely to include exercise. Time pressure thus is not an explanation for absence of exercise.

Figure 17 - Missing Time in Diaries (in Minutes) and Number if Total Episodes in Diaries by the Number of Episodes of Exercise



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

A third explanation might be that people who recorded no physical activity did not keep diaries of the same quality as people who did report exercise. Two aspects of diary quality are examined. The first measure is the level of missing information in the diary. As noted in the data section of this paper, a limited imputation program was developed to fill in short gaps of missing time, and a generous definition of a bad diary included all diaries with no more than one hour and 30 minutes missing time after imputation. Figure 17 shows the average missing time prior to the imputation program in the diaries included in the analysis. Diaries with no recorded physical activity have an average of 10 minutes (one time slot) missing information. In contrast, diaries with six or more episodes of physical activity have an average of 15 minutes (one to two time slots) missing. The one-way Anova ($f=24.4$) is statistically significant at the $p<.000$ level. This suggests that the diaries of people with higher levels of

reported physical activity are of a lower overall quality on this measure than the diaries including no physical activity.[22] On this measure, diary quality does not explain the 15% of diaries with no reported exercise.

A second measure of diary quality is the average number of reported episodes. This measure requires qualification, as it is not as straight-forward a measure as missing time. Own words recording in diaries can produce higher average numbers of recorded activities than pre-coded diaries – in the past between 18 and 20 activities on average per own-words diary (Harvey and Pentland 1999, Robinson 1999, Gershuny 2000). A low number of recorded changes in activity can indicate that an individual diarist did not devote as much attention to completing a diary as a person who recorded more changes of activity, but this is not always the case. A person who is ill, who is observing a religious rite, who is intensively focussed on an activity, or who is under pressure to complete a task (such as writing a report to meet an imminent deadline or painting a room before the carpet is laid the next day), as some examples, might legitimately perform few activities on the diary day. In general, the average number of episodes at the level of all men and all women is used to compare the quality of different time use studies rather than to compare the quality of the diaries of individuals.

Figure 17 also shows the average number of changes of activity in diaries by the number of episodes of physical activity recorded (one-way Anova f=2981.2, p<.000). The number of activities recorded by people who report no exercise is lowest, but not so low that these diaries can be dismissed as low quality diaries. An alternative compelling explanation of this finding might be that people who exercise have more energy to do more activities than people who do not exercise are able to undertake. Indeed, the relationship between the total number of changes in any activity and the total number of episodes of physical activity is linear (adjusted R^2 .435, standard error of the estimate 6.609, standardised ß = 0.660, t=123.4, p<.000). Once again, there is no clear evidence that diaries with no activity are of lower quality than diaries with physical activity.

[22] As Figure 17 also shows that people performing more episodes of physical activity also perform higher total numbers of activities, it may be that people who exercise more have such busier days that when they fill in the diary, they do not remember for certain everything they did over a few hour period, and leave some blank cells as a result.

The finding that on any given day around 15% of British population undertake no exercise is likely to reflect a real social behavioural pattern. Moderate exercise improves the psychological well-being, stress-induced blood pressure, and coping capacity of carers (King et. al. 2002). A lack of exercise has been found to be associated with sleeping problems and work stress in Sweden (Akerstedt et. al. 2002). The popular British media have published numerous stories on research finding a relation between regular exercise and improved health – from helping dyslexic school children deal with school work (BBCi February 2001), reducing the risk of heart failure (BBCi January 2002), reducing cancer risks (BBCi November 2001), improving stroke recovery and survival (BBCi October 2001), and improving mood (BBCi September 2001). Conversely, more people choosing to not exercise raises serious concerns for future health policy in the UK. The absence of reported exercise cannot be explained away by artefacts of the diary study design.

Table 4 – Factors Associated With Participation in Any Exercise in the Daily Diary (Logistic Regression Results)

Independent Variables	B	Standard Error	Significance
aged 65+	0.129	0.07	p<.060
male	0.273	0.05	p<.000
single never married	0.248	0.05	p<.000
bad to very bad health	-0.580	0.25	p<.019
unemployed	0.479	0.14	p<.000
employed full time	-0.300	0.06	p<.000
has a driving license	0.256	0.06	p<.000
not sure if rushed	1.218	0.46	p<.008
access to the internet at home	0.292	0.05	p<.000
constant	-2.172	0.05	p<.000

Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Table 4 displays results from using logistic regression to model participation in exercise. As with participation in sport, being male,[23] having access to the internet at home, having a driving license, and being unemployed is associated with a higher likelihood of undertaking

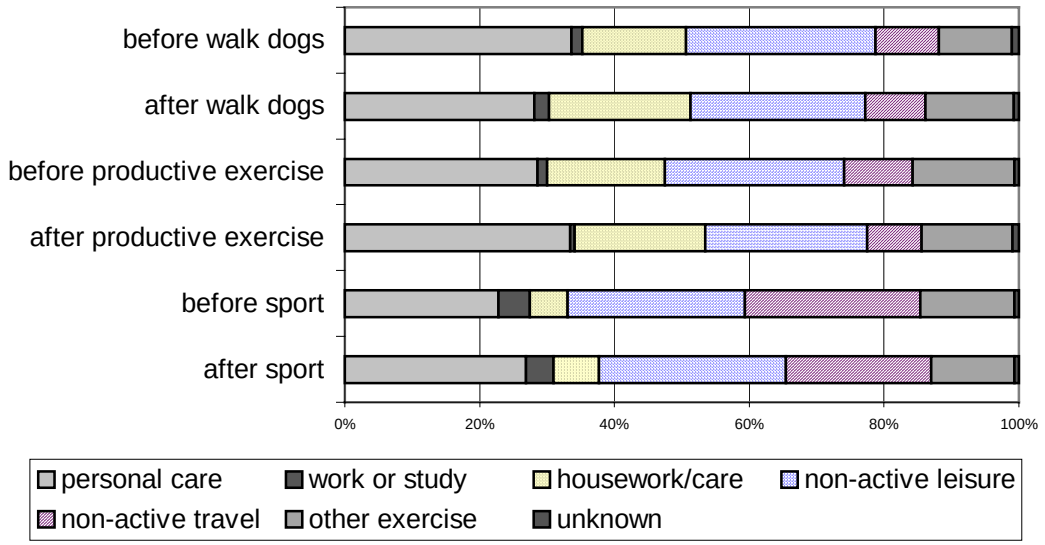
[23] While men are more likely to do any exercise in this model, women generally still perform exercise for longer and perform more episodes of exercise than men.

exercise. Being single/never married and unsure if you feel time pressure are also associated with a higher likelihood of undertaking exercise. Having very bad health and working full-time are associated with lower chances of performing exercise. In contrast with the model for participation in sports, people aged 65+ are more likely to perform exercise, but the result is marginally not significant.

Activities Before and After Exercise

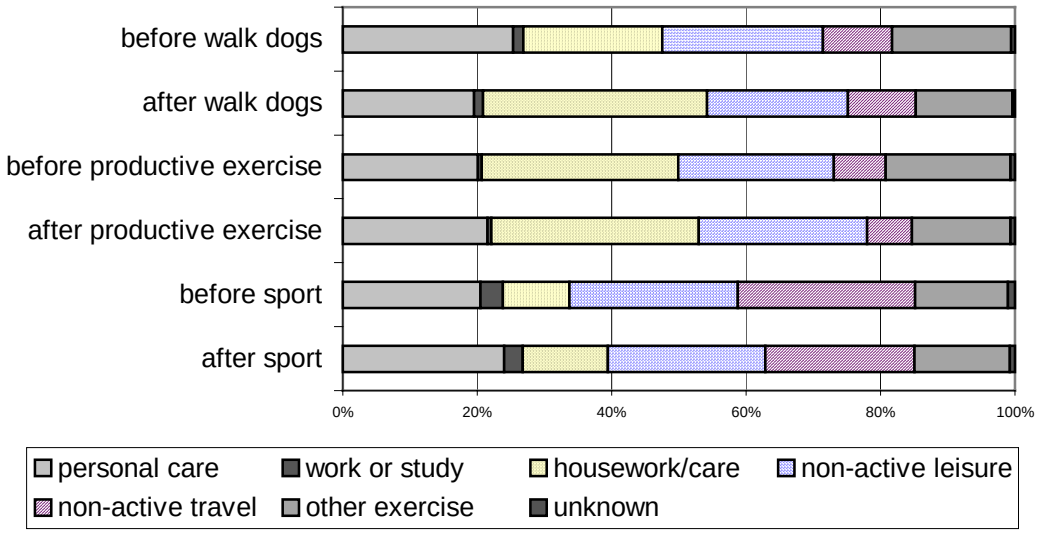
Understanding the exercise patterns of the majority of Britons who do exercise requires comment on the activities in which people engage before and after physical activity. Figures 18 to 21 reveal the range of activities in which people engaged before and after physical exercise. Overall, another form of exercise follows each episode in around 15-20% of cases, except when the form of exercise is self-powered travel, before and after which diarists were much more likely to be inactive. Personal care, housework, and non-active leisure are generally more likely to occur before and after exercise; though, again, self-powered travel is an exception. Prior to and following active travel, diarists had a greater likelihood of paid work and study and also of a form of non-active travel than they did before or after other forms of exercise.

Figure 18 - Men's Activities Before and After Walking Dogs, Productive Exercise, and Sport



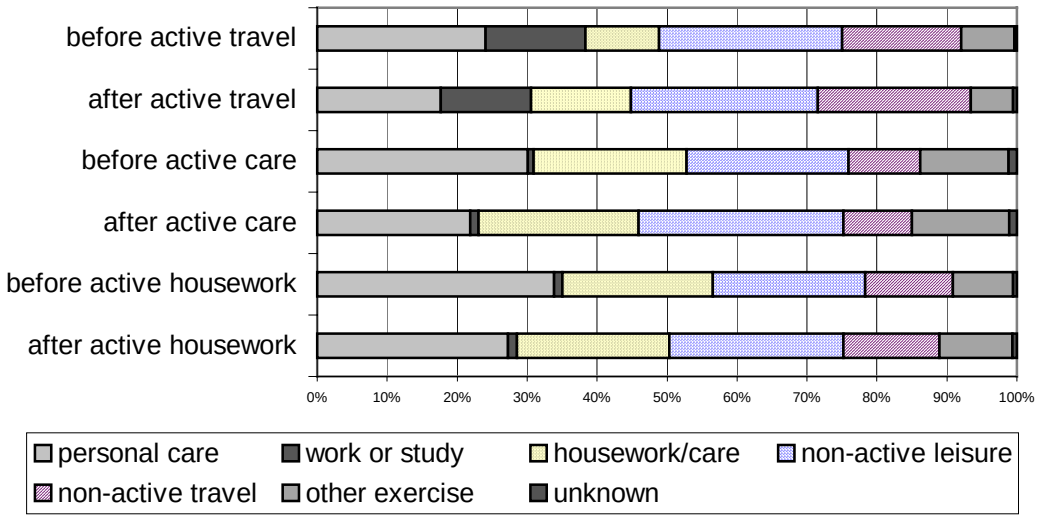
Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Figure 19 - Women's Activities Before and After Walking Dogs, Productive Exercise, and Sport



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Figure 20 - Men's Activities Before and After Active Travel Care and Housework



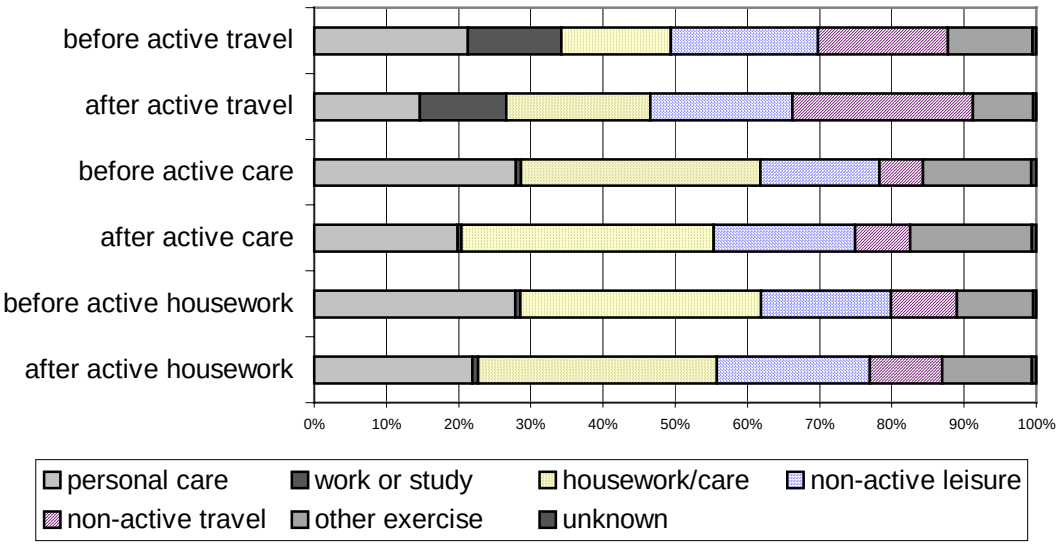
Source: Office for National Statistics (London), National Time Use Study, 2000-01.

There are some notable sex and age differences. In the case of women and men aged 8-19 and aged 65+, the modal activity before and after walking dogs is non-active leisure. Men of working age most often engage in personal care before walking dogs, and though they are still likely to be performing personal care after the walk, they are also more likely to perform housework or other exercise than before walking the dog. Women of working age have a wide range of activities before walking the dog, but are most likely to do housework

afterward. Men follow a similar activity patterns before and after productive exercise as they follow in relation to walking the dog. Women are very much more likely to engage in non-active housework, followed by non-active leisure before and after productive exercise.

Women and men follow similar patterns before and after sport, though women are more likely to perform housework than men, and men are more likely to perform personal care than women. Age differences emerge for both sexes. For people aged 8-19, the pre- and post-sport modal activity is non-active leisure. People aged 20-49 are most likely to travel before sport, and those aged 20-35 are most likely to return to travel or other leisure after sport. For people near retirement age, the bi-modal pre-sport activities are non-active leisure and personal care. The retired most often perform personal care before and after sport (and are joined by people aged 36-64 after sport in personal care).

Figure 21 - Women's Activities Before and After Active Travel, Care, and Housework



Source: Office for National Statistics (London), National Time Use Study, 2000-01.

Women and men follow similar patterns before and after self-powered travel, though, (as with sport and productive exercise) women – particularly of working age - are more likely to do non-active housework and care than men, while men are more likely to engage in non-active leisure than women. Likewise, women do more non-active housework and non-active care before and after active housework and active care than men. Men perform more personal care,

paid work and education, and non-active leisure before and after active housework and active care than women.

Conclusions

This paper began by asking the question of whether data from the 2000-2001 UK national time use study support and explain medical evidence and media perceptions that people in the United Kingdom are leading sedentary lifestyles. We now see that data from this study support and compliment these discussions. A proportion of the British population – among young people in particular - engage in low levels of energy expenditure on an average day. Artefacts of the diary collection process are unlikely to have influenced the results. A combination of lifestyle, resource access (including possessing a driving license and access to the internet at home), and social relations issues affect the degree of exercise in which people engage. The capacity for influencing the level of physical activity in which people engage likewise are varied. True, policies encouraging people to walk and cycle more and to use their cars less would improve the general level of physical activity in the UK. Nevertheless, scope exists for developing policies that encourage people to exercise by, for example, helping neighbours by walking dogs, hovering houses, and painting fences. Debates over strategies to improve working conditions and education policy might consider methods for expanding the level of exercise people typically experience at work and in school.

The time diary literature already notes that population groups tend to alter their daily routines over the long rather than the short term (Gershuny 2000, Gershuny and Fisher 2000). Changing levels of physical activity will take time. This paper highlights some encouraging trends, such as the increasing take-up of dance and physical education courses by secondary education students, and these trends could serve as a basis for policy. Nevertheless, it might be more realistic to define progress in the short-term on some of the less encouraging trends, such as the increasing car dependence of young people, by reducing the growth of car dependence rather than reversing the trend.

The results of this study also challenge some common stereotypes. Women generally are as active as men. Older people living in private households tend to lead active and productive lives. The present debates about retirement that have focussed on expanding the proportion of

older people in the workforce to help pay for pensions and the medical needs of older people in the ageing UK population may have to develop a broader focus. Health services and leisure industries will need to cater for the active elderly as well as for the dependent elderly.

Finally, this paper reveals that time diaries offer significant potential for studying physical activity. Diaries capture information not always available in other resources, such as the degree of participation in active housework and active care. By revealing how physical activity fits into the daily routine, diary data offers the ability to assess the context as well as the presence or absence of participation in exercise.

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