Assessment of pain: a community-based diary survey in the USA

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Summary [Word count 265]

Background: Pain is costly and a major reason for seeking medical care. We used a novel method to assess the percentage of people experiencing pain at randomly selected times and pain severity for a representative sample of U.S. residents.

Methods: A community-based telephone survey was designed and 3,982 of approximately 10,700 U.S. residents contacted by random-digit dialing were interviewed (response rate of 37%). After collecting diary information for one 24-hour period, ratings of pain on a 0-6 anchored scale for three randomly selected 15-minute intervals of the day were obtained. Outcome measures were the fraction of intervals with non-zero pain, the fraction of intervals with pain above 3 (the scale midpoint), and the average pain rating. Activities of those who reported substantial pain were also examined.

Findings: About 28 percent of respondents reported some pain at sampled times. Those with lower income or less education spent a higher proportion of time in pain and reported higher average pain. The average pain rating was higher for older subjects, but displayed long plateaus at midlife, with little difference between men and women. The average pain rating was higher during certain activities, such as lawn care, even in comparison to the level of pain at other times of a person's day. People who spent much time in pain watched more television and worked less than others. Satisfaction with life or health and the pain indicators tended to move in opposite directions.

Interpretation: Our diary-based method reveals the association of pain with certain activities, which has not been previously studied. We also confirm the socioeconomic gradient of pain prevalence.

Introduction

Pain imposes considerable costs on the health care system and economy. The occurrence of pain is a major reason that individuals seek medical attention and take medications. American spent over $2.6 billion on non-prescription analgesics in the 52 weeks ending March 25, 2007[1] and $13.8 billion on outpatient prescription analgesics in 2004, the most recent year available.[2] Pain also depresses labor force participation and is estimated to cost over $60 billion a year in lost productivity.[3,4,5]

Our current understanding of people's pain experiences is largely limited to pain associated with certain conditions (e.g., arthritis, back injury) and to those suffering from chronic pain.[6,7,8] Little is known about the prevalence or severity of daily pain from any origin in the American population. The Center for Disease Control (CDC) recently conducted a survey of the number of days people recalled experiencing pain during the previous month[9], but this study's month-long recall period was likely to cause considerable telescoping and distortion.[10] Four studies from other countries provide estimates of the prevalence of any pain during a day or at the moment the survey was filled out. Gerdle and colleagues[11] found that 49% of a Swedish sample reported current pain in a postal survey ("Do you have pain anywhere in the body today?") and Turunen[12], who asked a sample of Finns in a postal survey about their point-in-time pain ("Do you feel any pain or ache right now, at this very moment?"), also reported a high prevalence rate, 37%. Buskila and colleagues reported that 44% of a southern Israel sample indicated pain on the day they were interviewed.[13] Finally, a survey of 5,000 residents of Spain interviewed by telephone found that 30% of respondents had pain the

previous day.[14] Pain appears to be quite prevalent in these countries, but previous pain surveys have not focused on the activities in people's daily lives that are associated with pain.

From a new diary-based survey, we are able to estimate the likelihood and severity of pain in the general population at representative moments (defined as 15-minute intervals), along with social and environmental descriptions of each episode, thus providing a more accurate and richer description of the pain experience than previous studies.[9,15,16,17] These data are used to address the following questions: What fraction of the U.S. population experiences pain at any given time, henceforth called "point-in-time prevalence," based on occurrences in 15-minute intervals in our data? How does the point-in-time prevalence of pain vary across demographic groups? What activities of daily life are associated with pain? Do people who suffer from pain over much of the day spend their time differently than others?

Understanding the likelihood and manifestations of pain in the general population can give healthcare providers and researchers a better sense of the circumstances that may cause many individuals to seek medical treatment and of the background level of pain experienced by the general population.

Methods

Data collection

The survey, called the Princeton Affect and Time Survey (PATS), was designed by the authors and administered by the Gallup Organization in a telephone survey from May through August, 2006. An attempt was made to interview approximately 10,700 individuals using a random-digit dialing (RDD) technique such that every residential telephone number in the country had an equal probability of selection. One person was randomly selected per household. Respondents were told that participation in the study was voluntary and they did not have to answer any question they did not want to answer. As many as 9 callbacks were made to each sampled phone number. PATS was patterned on the Bureau of Labor Statistics' American Time Use Survey (ATUS) and the Day Reconstruction Method.[*] The Day Reconstruction Method is a technique for characterizing experiences over the course of a day that has been described elsewhere.[18] In PATS, respondents were first asked to describe each episode (defined as an interval of time in which the respondent engaged in an activity; the average respondent reported 17.8 episodes) in the preceding day, from 4 AM of the previous day to 4 AM of the survey day. Information about the activity, others present, and location were collected for each episode.

After the entire day was described in this manner, three 15-minute intervals were randomly selected from the non-sleeping portion of the day by the BLAISE computer software, and respondents were reminded of the activity that they participated in at the time, and then asked the extent to which they experienced six different feelings (pain, happy, tired, stressed, sad, and interested) during each interval, on a scale from 0 to 6,

[*] The PATS questionnaire and a description of its sampling procedures and weights are available at www.krueger.princeton.edu/PATS.htm. For details of the ATUS, see www.bls.gov/tus/home.htm.

where 0 meant “not at all” and 6 meant “very strong.” The feelings questions were asked of just three intervals to reduce interviewing time and respondent burden. The order in which the feelings were presented was randomly assigned to respondents from six different permutations.

The pain question asked, “From 0 – 6, how much pain did you feel during this time, if any?” We chose this 7-point, anchored, numeric rating scale to assess pain intensity in part to present respondents with a set of consistent response scales throughout the questionnaire, including the assessment of emotions and pain. Considering the lack of major differences in pain assessments based on various scale types and response options (e.g., visual analog scales, numeric rating scales, verbal descriptor scales), we expect that results from our 7-point scale would be similar to those obtained if a more standard 11-point pain scale was used.[19]

Respondents were also asked for an overall assessment of their satisfaction with their life and health. They were asked “Taking all things together, how satisfied are you with your life as a whole these days?” and “How satisfied are you with your health these days?” For each of the two questions, participants chose among “very satisfied, satisfied, not satisfied, or not at all satisfied.” Participants were also asked “Do you have a disability that limits the kind or amount of work that you can do? Yes or no.”

Analysis

Weights were developed by the Gallup Organization to make the sample representative of the population regarding geographic region, gender, age and race. The weights were based on estimates of the population from the Current Population Survey, household size, the number of phone lines in respondents' houses, and demographic information collected in the survey. Pain ratings across the three randomly selected intervals pooled over all respondents are summarized in three ways: 1) to examine the point-in-time prevalence of any pain, the percentage of 15-minute intervals in which reported pain exceeded 0 was computed; 2) to examine the point-in-time prevalence of higher levels of pain, the percentage of 15-minute intervals in which reported pain exceeded 3 (the midpoint of the scale) was computed; 3) to examine the overall level of pain on the reference day (which combines frequency and intensity), the average pain rating (0-6 point scale) was computed, including zero and nonzero values. Given random selection of time intervals, these statistics provide an unbiased estimate of the population average of each pain measure at representative times of the day. (Equivalently, the first two indicators can be interpreted as the percentage of time that respondents spent with pain rated above 0 or 3.) To examine a group with high pain throughout much of the day, we also identified respondents who rated pain above 3 for all three sampled intervals and compared their activities to those of the rest of the sample.

Statistical analyses were carried out with STATA 10 SE. Separate F-tests were used to test for statistically significant differences across demographic and other groups. Multiple regressions using the pain measures as the dependent variable were estimated to simultaneously control for demographic and other explanatory variables (including

income, age, education, race, and sex), although univariate averages are mainly presented because they paint a similar picture. Kernel regressions were used to display age patterns.[20] All statistics are computed using sample weights to make the weighted survey respondents representative of the population. Because three intervals were rated for pain intensity per respondent, the observations are not independent. Consequently, p-values and robust standard errors allow for correlated observations within each person's day using the STATA cluster option.[21]

Role of the funding source

The sponsors of the study had no role in the study design; collection, analysis, or interpretation of the data; writing of the report; or in the decision to submit the paper for publication. The authors had complete access to the data and freely made the decision of where to submit the paper for publication.

Results

Study Population

A total of 3,982 people completed the survey. The American Association of Public Opinion Researchers (AAPOR) provides widely used standards for measuring survey cooperation and response rates. The cooperation rate was 75 percent and the AAPOR (RR3) response rate was 37 percent.[22] These figures are similar to the CDC survey's response rate of 35 percent for the median state and cooperation rate of 75 percent.[23] Our examination of possible non-response biases suggested that the weighted sample was representative of the national population. Most importantly, the allocation of time across

activities in our sample and in the ATUS was quite similar (correlation = 0.99), indicating that our sample was representative of the population in terms of its daily activities. Although it is possible that PATS respondents differ from the population in their pain experiences, the finding that they participated in similar daily activities suggests otherwise.

Sixty-one percent of participants in PATS were women; 88 percent were white; 17 percent had a disability; 90 percent had a high school education or higher; and 40 percent had annual household income less than $40,000. The average age was 51.4 years (range 15 to 99). The weighted sample had fewer women (53 percent), higher income (36 percent below $40,000), fewer disabled (13 percent) and a lower average age (45.2 years), but otherwise was similar.

Demographic Predictors of Pain

Table 1 reports summary statistics for the occurrence and severity of pain across the randomly sampled 15-minute intervals by demographic group. Men and women did not report significant differences in the proportion of intervals with nonzero pain or their average pain rating (which includes all ratings, including zeros). Figure 1 presents a graph of average pain rating by sex and age, using a Kernel regression technique to flexibly portray the data over age and control for income, race and education. The average pain rating rises with age, but not smoothly. There is a surprising plateau in the average pain rating across people in their mid 40s (later for women) to those in their mid 70s. The graph indicates that at younger ages, women report a slightly lower average

pain rating than men, and at older ages women report a higher average pain rating than men.

The data reveal a strong pattern by socioeconomic status (SES), with lower income associated with significantly higher pain occurrences and severity. The average pain rating is twice as high for those in households with annual incomes below $30,000 as for those in households with incomes above $100,000. Over one third of the sampled time intervals for those in the lowest income category were spent in some pain (pain>0), and nearly one fifth were spent in higher levels of pain (pain>3). When the sample is restricted to workers or pre-retirement-age individuals, the income-pain gradient continues to hold. Part of the SES-pain gradient is likely due to occupational status: the average pain rating for blue collar workers is 1.00 during work and 0.84 during non-work, and for white collar workers it is 0.61 during both work and non-work episodes.

Participants with less than a high school degree reported twice the average pain rating as did college graduates. On all three pain indices, married and unmarried respondents reported similar point-in-time prevalence and severity. Blacks and Hispanics had higher values than whites and Asians for the percent of intervals with pain rated above 3, although the other two pain measures revealed a similar, nonsignificant pattern. Multiple regression analysis revealed that among the demographic factors analyzed, income, age and education were the strongest, statistically significant predictors of pain scores, while race and ethnicity were not significant predictors.

The data also showed a strong relationship between disability status and pain. Participants who indicated that they had a disability reported an average pain rating of 2.50, compared to 0.65 for those without a disability. Remarkably, although the disabled make up just 13 percent of the weighted sample, they account for 28 percent of all time intervals with pain rated above 0 and 44 percent of all intervals with pain rated above 3.

Pain and Subjective Well Being

All three measures of pain were strongly inversely related to self-reported life and health satisfaction. As a group, participants who were not at all satisfied with their health rated more than half of their time with pain above 3, while those very satisfied with their health rated just 5 percent of their time with a score above 3. The average pain rating was 7 times greater for those not at all satisfied with their health compared to those very satisfied with their health.

Associations between Activities of Daily Life and Pain

Table 2 summarizes the three pain measures, disaggregating the time intervals into periods when respondents engaged in each of 20 activities. The figures can be interpreted as the percentage of time that people experienced pain while engaging in the specified activities or as the average pain rating during those activities. For comparison, the average reported happiness rating during the activities is also shown. Results are shown separately for men and women because t-tests revealed significant gender differences for some activities. The bottom row reports the measures pooling all activities. To adjust for interpersonal differences in the level of pain experienced by

those who engaged in different activities – which could confound effects due to person characteristics with effects due to activities -- in results available on request we computed person-specific means of the pain score over each person's sampled time intervals, and subtracted these person-specific means from each pain rating before computing the mean pain rating during time spent in each activity. (These estimates use differences in activities within a person's day to estimate the relationship between activities and the pain rating.) Because the activity-pain patterns were similar when personal differences were controlled, we focus on the simpler results in Table 2 here, and highlight any noteworthy differences.

Activities coinciding with the highest pain measures were medical care (especially for women), sports and exercise (especially for men), lawn care, and caring for adults. For men and women, the pain ratings during time spent working for pay were similar to those during all other activities. The average pain rating was higher during volunteer activities for men than women, perhaps because volunteering involves different tasks for men than women. Across activities, those with high pain ratings also tended to have lower happiness ratings, with the notable exceptions of sports and exercise and lawn and gardening. Compared with the average activity, participation in sports and exercise was associated with relatively greater happiness than pain. Looking at reported feelings in the periods before and after exercise revealed that pain and happiness increased during exercise and then fell to close to previous levels.

Although pain ratings during periods involving medical care were especially high for women, this finding was largely a result of personal differences regarding who receives medical care. The average pain rating during medical care for women was only 38 percent greater than it was during the average activity after controlling for person-level effects. In other words, those receiving medical care also tended to experience high levels of pain during other episodes of the day.

In results available on request, we examined how the mix of activities varied with age. Older people tended to spend more time watching television, relaxing, eating and drinking, and less time working for pay. There was only a slight tendency for older people to spend less time than younger people engaged in activities associated with higher average pain ratings. Therefore, the shifting activity mix probably does not account for much of the age gradient shown in Figure 1. Older people tended to report greater pain than younger people even when they engaged in the same activities.

We also examined the relationship between the social context of activities and pain. The average pain rating is higher when individuals are alone compared to when they are with friends or a spouse. In a multiple regression, the presence of interaction partners predicted the reported pain rating after controlling for individual effects, activities, and location (e.g., home or elsewhere).

Does Spending Time in Pain Predict Time Use?

The PATS data can be used to classify respondents by their pain experience on the diary day; however, the classification is based on partial information because we only observe three randomly chosen slices of each person's day. Nearly 60 percent of respondents reported feeling no pain in all three of their sampled intervals, while 6.7 percent rated their pain as above 3 (the midpoint of the scale) in all three intervals. We next examine whether the latter group, which reported feeling substantial pain over the part of the day observed, spent their time differently than others.

Table 3 reports the percent of the waking day spent in various activities for subjects who reported pain above 3 for all three sampled episodes and for the rest of the sample. Those reporting pain over much of the day spent almost a quarter of their time watching TV, compared with 16 percent for others. They also spent more time relaxing and less time working and traveling. Although the direction of causality is not known, it is clear that people who reported relatively high pain in all sampled intervals spent their day differently than did those who reported less or no pain. This finding held when we controlled for age and other demographic variables in a multiple regression.

Discussion

By collecting time diary data with the procedures used in the ATUS along with recalled emotional experiences, the PATS survey method can be used to describe a representative sample's experiences with pain. The PATS provides a rich summary of how pain varies across respondents at randomly selected time intervals, which can be linked to the activities in which individuals engaged. Our use of a single item to measure pain intensity

at recalled episodes is consistent with recent consensus recommendations[24] and with common practice in clinical trials[25], while the short recall period is consistent with recent FDA recommendations.[26] For ease of interpretation and comparability to the medical literature, it would have been preferable, however, to use a more standard 11-point, numeric rating scale for the measurement of pain intensity, and we recommend that future diary studies employ such a scale.

The PATS diary assessment yielded findings that replicate previous ones, that contradict some previous findings, and that extend our knowledge about daily pain and activities. The results also raise several important new questions about the experience of pain. Regarding the point-in-time prevalence of pain, Turunen's Finnish study[12] comes closest in methodology to the current one, and it reported a prevalence rate about ten percentage points higher than the rate reported here. Possible explanations for the difference include the populations studied, which could have inherently different rates of pain or manners of reporting pain, and potential methodological differences due to the self-selected time of questionnaire completion in the Turunen's study versus the random selection of 15-minute periods in this study. Turunen's study also included "pain or *ache*" whereas the question in this study was limited to pain. We observed little support for the previous finding that females have higher levels of pain than men.[9,11,12, 14]

The strong SES-pain gradient is consistent with the CDC study that found a strong effect of income on the number of days with pain recalled in the past month, which also is in accord with the chronic pain literature.[6] It also supports the more general finding that

SES predicts health and longevity.[27] The strong association between self-reported disability status and pain is notable given concerns by economists and some policymakers that able-bodied individuals may seek benefits from the Disability Insurance system.[28] Our finding that blue collar workers experience higher average pain during work episodes than do white collar workers, both absolutely and in comparison to off-work episodes, suggests that the role of occupational status in explaining the SES-pain gradient deserves further scrutiny. Consistent with expectations and with Turunen's results, pain was associated with individuals' satisfaction with health and life. Though the direction of causality is unknown, life satisfaction is unambiguously lower among those who report higher levels of pain.

Prior research on daily pain has found higher reported pain for older subjects, which is generally consistent with the results of this study. However, the long plateaus in the relationship that we find were unexpected. The finding deserves replication and careful consideration if it is confirmed; fully documenting the nature and causes of the increase in pain during mid-life could advance our understanding of pain over the life course.

Our study revealed new associations between daily activities and pain. Although the mix of activities differs between younger and older populations, the elderly do not appear to shift toward activities associated with less pain. In addition, people who experience much pain during the day also watch more TV and work less than others, possibly consequences of dealing with pain. If the relationship with pain is causal, palliative care may have the potential to increase the quality of life and range of activities in which

people participate. More generally, the pattern of pain across activities – which is similar within an individual's day and across individuals who engage in different activities – suggests that pain can be raised or lowered by changing the mix of subjects' activities. In addition to being a pathological problem, our data suggest that pain should also be viewed as an economical and social burden.

The survey design attempted to interview a representative sample of individuals concerning representative moments of their day. Sample weights were developed to adjust for the fact that only 37% of sampled individuals responded to our survey and they may have differed from the population regarding geographic region, gender, age and race. Nonetheless, the generalizability of our findings to the broader population may be limited by the response rate.

Another limitation of our survey is that we have no information on respondents' causes of pain, location of pain, duration of pain, objective medical conditions, and any medications or treatments they may take. Nonetheless, chronic pain and these other factors are reflected in the pain ratings provided by subjects. In future studies, additional qualities of the pain experience could be included in a PATS-like survey. Sensory qualities of pain, pain location, medication usage, and pain coping could all be examined from this perspective, and would provide a greater understanding of pain at a population level. Future studies could also sample more than three time intervals.

In summary, our study demonstrates the utility of a diary-survey method for studying pain with a representative sample of the population. The method affords a more microscopic examination of environmental, demographic, economic and social correlates of everyday pain that hitherto have been accessible only with intensive real-time data capture techniques such as electronic diaries for specialized populations. For researchers, our method can be used to complement other approaches to pain assessment to provide a more thorough and representative description of the experience of pain in the population. For clinicians, although we are not recommending this assessment methodology for routine care, our results suggest new ways in which it may be informative to combine pain assessments with information about activities of daily living.

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Figure 1. Pain rating by age and sex. Separate kernel regressions (bandwidth = 0.4) were used to smooth the data by age for men and women.

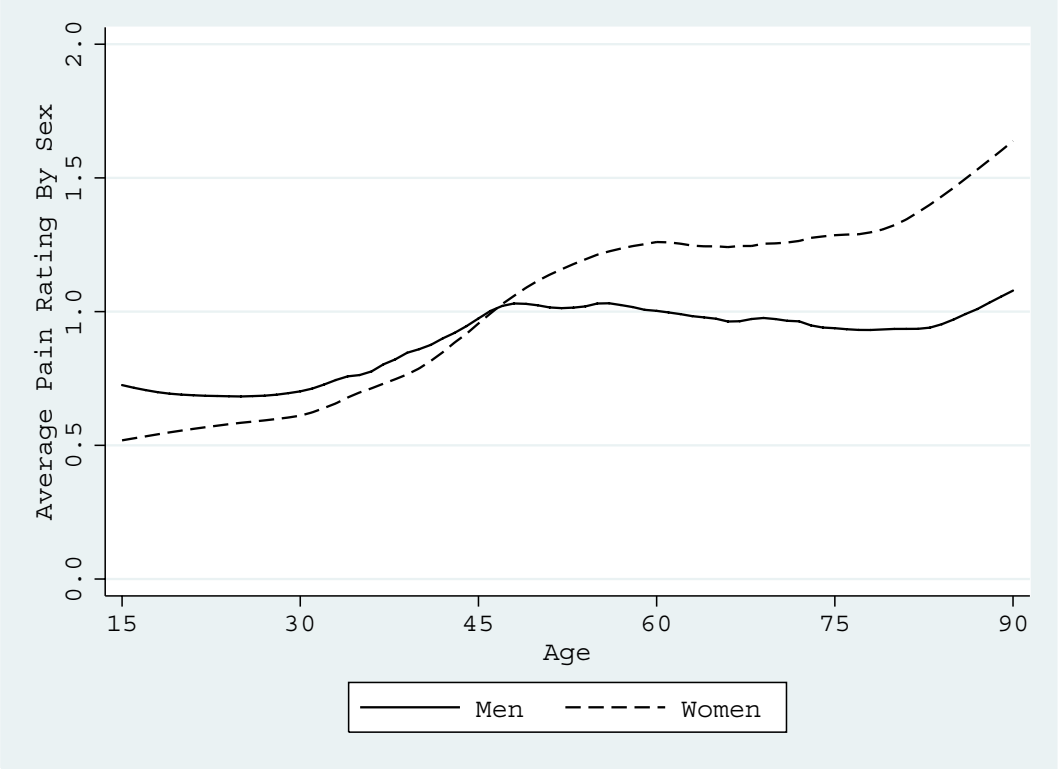

TABLE 1. Point-in-Time Pain Prevalence and Average Pain Rating by Demographic Subgroup

Demographic Subgroup	Percent of Intervals with Pain Rating > 0	Percent of Intervals with Pain Rating > 3	Average Pain Rating (0-6)	Number of 15-minute intervals
Gender				
Men	28.8%	10.4%	0.86	4,539
Women	26.6%	12.4%	0.90	7,239
p-value	0.138	0.056	0.530	
Age				
<20	21.4%	7.1%	0.64	556
20-29	19.7%	7.5%	0.59	982
30-39	20.7%	6.8%	0.62	1,619
40-49	30.2%	13.0%	0.97	2,050
50-59	33.0%	15.7%	1.13	2,459
60-69	35.7%	16.5%	1.19	1,973
70-79	32.2%	13.5%	1.02	1,384
80-89	34.8%	14.8%	1.08	654
90-99	56.1%	34.9%	2.08	67
p-value	0.000	0.000	0.000	
Household income				
<$30,000	34.2%	18.5%	1.27	2,849
$30,000-$49,999	32.1%	13.4%	1.02	2,412
$50,000-$99,999	23.6%	8.2%	0.69	3,192
>=$100,000	22.9%	7.7%	0.67	1,893
p-value	0.000	0.000	0.000	
Race/ethnicity				
White, non-Hispanic	27.2%	10.8%	0.85	9,652
Black, non-Hispanic	28.0%	15.5%	1.03	756
Asian, non-Hispanic	24.9%	4.9%	0.56	124
Hispanic	30.0%	14.2%	1.05	810
p-value	0.775	0.008	0.039	
Education				
Less than a high school degree	33.0%	16.5%	1.21	1,197
High school degree	30.8%	15.2%	1.06	2,959
Some college, no degree	29.3%	12.0%	0.95	3,437
College degree	20.2%	6.0%	0.54	2,468
Greater than a college degree	24.9%	7.8%	0.69	1,656
p-value	0.000	0.000	0.000	
Marital status				
Married	26.9%	11.0%	0.85	6,384
Unmarried	28.3%	12.7%	0.94	5,204
p-value	0.229	0.192	0.166	
Satisfaction with life				
Not at all satisfied	53.9%	35.8%	2.26	230
Not satisfied	40.8%	23.9%	1.55	1,119
Satisfied	29.4%	11.9%	0.92	5,355
Very satisfied	22.4%	7.7%	0.66	5,019
p-value	0.000	0.000	0.00	
Satisfaction with health				
Not at all satisfied	71.1%	55.6%	3.28	589
Not satisfied	47.0%	22.6%	1.62	2,211
Satisfied	24.3%	7.8%	0.69	5,737
Very satisfied	15.6%	5.0%	0.44	3,193
p-value	0.000	0.000	0.000	
Disability status				
Disabled	61.8%	40.0%	2.50	2,024
Not disabled	22.7%	7.4%	0.65	9,742
p-value	0.000	0.000	0.000	

Notes: p-values from F-tests of the hypothesis that the values for indicated demographic subgroups are equal, allowing for correlated observations within-subjects. Pain ratings were collected from subjects for three 15-minute intervals. Estimates weighted using sample weights.

TABLE 2. Measures of Pain and Happiness by Gender and Actvitiy*

	Percent of Intervals with Pain Rating > 0			Percent of Intervals with Pain Rating > 3			Average Pain Rating (0-6 scale)			Average Happy Rating (0-6)			
Activity	Men	Women	p-value[1]	Men	Women	p-value[1]	Men	Women	p-value[1]	Men	Women	p-value[1]	N
Personal care	42.5%	32.2%	0.264	18.7%	18.2%	0.950	1.39	1.23	0.700	4.29	3.80	0.200	172
Housework	35.2%	33.8%	0.837	15.1%	12.4%	0.568	1.17	0.99	0.441	3.57	3.55	0.917	537
p-value	34.5%	31.9%	0.664	12.7%	14.2%	0.697	1.04	1.08	0.871	3.89	4.06	0.436	595
Lawn and garden	47.8%	41.2%	0.343	18.2%	13.4%	0.360	1.48	1.24	0.358	4.18	4.30	0.629	317
Household management	29.4%	24.4%	0.530	11.6%	8.2%	0.463	0.78	0.73	0.848	3.66	3.33	0.276	235
Caring for children	24.2%	16.7%	0.197	5.8%	6.9%	0.732	0.63	0.54	0.591	4.78	4.57	0.258	376
Caring for adults	29.2%	29.0%	0.986	26.6%	18.5%	0.593	1.41	1.29	0.884	3.92	3.27	0.293	67
Working	26.1%	23.3%	0.356	6.5%	10.2%	0.040	0.70	0.73	0.752	3.76	3.86	0.345	1,672
Education	29.0%	16.0%	0.162	13.9%	10.3%	0.657	1.01	0.62	0.374	3.59	3.65	0.892	143
Shopping	17.4%	29.3%	0.033	8.9%	15.1%	0.156	0.57	1.00	0.049	3.91	4.22	0.188	342
Medical care	38.7%	61.7%	0.098	1.7%	32.0%	0.002	0.65	2.19	0.003	3.66	3.64	0.970	76
Eating and drinking	31.1%	21.8%	0.005	10.6%	10.3%	0.898	0.89	0.72	0.151	4.41	4.72	0.012	1,203
Socializing	23.2%	25.6%	0.610	10.0%	14.2%	0.217	0.71	0.99	0.145	4.79	4.70	0.583	528
Relaxing and leisure	27.1%	28.7%	0.678	9.3%	14.6%	0.058	0.76	1.03	0.066	4.29	4.40	0.369	1,170
Watching TV	26.4%	26.9%	0.860	11.5%	14.5%	0.163	0.89	0.99	0.361	3.80	4.02	0.052	1,938
Sports and exercise	42.3%	29.2%	0.048	17.6%	14.8%	0.617	1.36	0.96	0.128	5.12	5.02	0.522	322
Religious	26.6%	19.7%	0.427	3.0%	6.2%	0.301	0.64	0.59	0.840	4.84	5.05	0.404	151
Volunteering	45.7%	9.0%	0.002	4.1%	3.6%	0.932	1.15	0.24	0.007	3.81	4.46	0.170	53
Telephone calls	30.4%	24.3%	0.560	14.0%	9.7%	0.592	1.01	0.77	0.570	4.40	4.51	0.861	128
Travel	24.8%	24.4%	0.901	10.0%	11.1%	0.629	0.80	0.81	0.948	3.93	4.17	0.048	1,146
All activities	28.8%	26.6%	0.138	10.4%	12.4%	0.056	0.86	0.90	0.530	4.07	4.19	0.016	11,758

[1]p-value from t-tests of the difference between the values by gender, allowing for correlated observations within subjects.

*Estimates weighted using sample weights. N is number of 15-minute intervals with pain and happy ratings.

TABLE 3. Average Percent of the Waking Day Spent in Each Activity, Respondents with Pain Rated Above the Midpoint in All Sampled Intervals of the Day Versus All Others

	Sample:			
Activity	Respondents with Pain>3 All Intervals	All Other Individuals	Difference	P-Value
Personal care	4.7%	4.5%	0.2%	0.654
Housework	4.8%	4.1%	0.7%	0.326
Food preparation and clean-up	4.5%	3.9%	0.5%	0.314
Lawn and garden	1.3%	2.4%	-1.0%	0.089
Household management	1.8%	1.7%	0.1%	0.910
Caring for children	2.9%	3.4%	-0.6%	0.414
Caring for adults	0.4%	0.5%	-0.1%	0.809
Working	12.6%	17.4%	-4.8%	0.019
Education	2.8%	1.8%	1.0%	0.161
Shopping	2.0%	2.7%	-0.7%	0.175
Medical care	1.6%	0.4%	1.2%	0.000
Eating and drinking	8.7%	8.5%	0.2%	0.777
Socializing	3.6%	4.9%	-1.3%	0.126
Relaxing and leisure	13.0%	9.7%	3.4%	0.005
Watching TV	24.1%	15.8%	8.3%	0.000
Sports and exercise	1.4%	3.0%	-1.6%	0.013
Religious	0.1%	1.2%	-1.1%	0.004
Volunteering	0.1%	0.4%	-0.3%	0.307
Telephone calls	0.7%	0.8%	-0.1%	0.654
Travel	5.3%	8.2%	-2.9%	0.000
Sample Size	185	2,713	---	---

Notes: Sample for column 1 is respondents with pain rating greater than 3, the midpoint of the pain scale, for all three randomly selected 15-minute intervals. Sample for column 2 is respondents with a pain rating of 3 or lower in at least one sampled 15-minute interval. Both samples are restricted to weekdays. P-value is for two-sided t-test of differences between first two columns.