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Disability, participation, and subjective wellbeing among older couples

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A B S T R A C T

This paper investigates the link between disability and subjective wellbeing, using data from the 2009 Disability and Use of Time supplement to the Panel Study of Income Dynamics, the longest running national panel study in the United States. Disability is construed broadly to include both the presence of any physical, cognitive, or sensory impairment or activity limitation and also the severity of underlying impairments. Subjective wellbeing is measured using two distinct approaches: reports of life satisfaction and of moment-to-moment wellbeing—both positive and negative—on the previous day. The latter, collected through 24-h time diaries, also offers for the first time the ability to explore the role of participation in particular kinds of activities linking disability to subjective wellbeing. The analytic sample included married persons ages 60 and older and their spouses ($n = 751$ married individuals) who completed 1498 diaries. Several new findings emerged: no matter what the measure of wellbeing, older married adults with disability report worse subjective wellbeing than those without, and neither different demographic and socioeconomic profiles nor differences in participation fully account for these disparities. Influences of disability on global life satisfaction and episodic reports of happiness were relatively small and of comparable size. However, notably sizeable differences were identified in the cumulative number of pleasant minutes experienced yesterday by disability status - on the order of 71 fewer minutes on average for those with a disability of average severity. Differences appear to be more strongly linked to somatic symptoms of pain and feeling tired than to differential intensity of experiencing happiness, sadness, frustration, or worry. We also found limited support for the notion that participation partially mediates the relationship between disability and global, but not episodic, subjective wellbeing.

Introduction

Older adults around the globe report as much satisfaction and happiness with life as their younger counterparts, and in some cases more so (Blanchflower & Oswald, 2008; Diener & Suh, 1997; Easterlin, 2006; Yang, 2008). At the same time, although not an inevitable consequence of aging, impairments in physical, cognitive and sensory functioning and related activity limitations become more common at older ages, and such limitations have been linked to reduced subjective wellbeing. Despite well-known qualitative findings that individuals with disability often continue to report high quality of life (Albrecht & Devlieger, 1999), a comprehensive review by Pinquart and Sorensen (2000) identified nearly two dozen studies that linked lack of competence in daily activities in later life to both lower life satisfaction and less (decontextualized) happiness.

To date, such studies have focused almost exclusively on global, decontextualized measures of positive wellbeing (e.g., reports of life satisfaction and happiness). More recently, the distinctive nature of experienced wellbeing – moment to moment reports of how one is feeling – has gained interest and studies suggest this measure of subjective wellbeing may have quite different predictors than global satisfaction (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004, 2006; Schwarz, Kahneman, & Xu, 2008). Because disability is closely linked to the nature and context in which activities are performed, one might hypothesize that it may be even more closely linked to experienced wellbeing than to global satisfaction. Yet until now data have not been available to test such a hypothesis.

Moreover, refinements in the conceptualization of disability over the last decade (Institute of Medicine, 2006; Whiteneck, 2006; World Health Organization, 2002) have highlighted the importance of participation in meaningful activities as a potential mechanism linking the disablement process to the wellbeing paradigm. Yet to date, research has not explored whether participation in particular types of activities—e.g. productive, social, physical, or other leisure pursuits—mediates this relationship.

The purpose of this paper is to explore the relationship between disability and subjective wellbeing in a national sample of older

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adults. We use a representative sample of couples from the longest running national panel study in the United States, the Panel Study of Income Dynamics. We define disability broadly to include the presence of any physical (mobility-related), cognitive, or sensory impairment or activity limitation and also include a measure of the severity of underlying impairments. Subjective wellbeing is measured using two distinct approaches: reports of life satisfaction and of moment-to-moment wellbeing, both positive and negative, on the previous day. The latter approach, collected through 24-h time diaries, coupled with stylized time use questions about productive and social activities in the previous week, permits researchers to explore the role of participation in linking disability to subjective wellbeing.

Framework

Our guiding framework links the major concepts that fall under the umbrella of disability (World Health Organization, 2002) to both experienced and evaluative subjective wellbeing (see Fig. 1 for a simplified diagram). In this framework disability is construed broadly to denote impairments in body functions and structures and related activity limitations, both of which stem from underlying health conditions. Disability in turn influences the nature and extent of participation in daily life—that is how individuals use their time. The bottom half of the figure suggests that participation is a pivotal link between disability and both life satisfaction and experienced wellbeing. Although both wellbeing concepts suggest a positive orientation toward life, they differ in important ways: life satisfaction, although not permanent, is evaluative and not affected by transient mood, whereas moment-to-moment wellbeing changes frequently in response to the immediate environment (George, 2010). Generally the two are thought to move in the same direction with more positively experienced wellbeing being associated with higher life satisfaction, although one can imagine situations that lead to an inverse relationship. For instance, working hard toward a goal or caring for a child or adult may temporarily produce stress, frustration, or worry, but may also produce a sense of accomplishment or purpose that enhances life satisfaction.

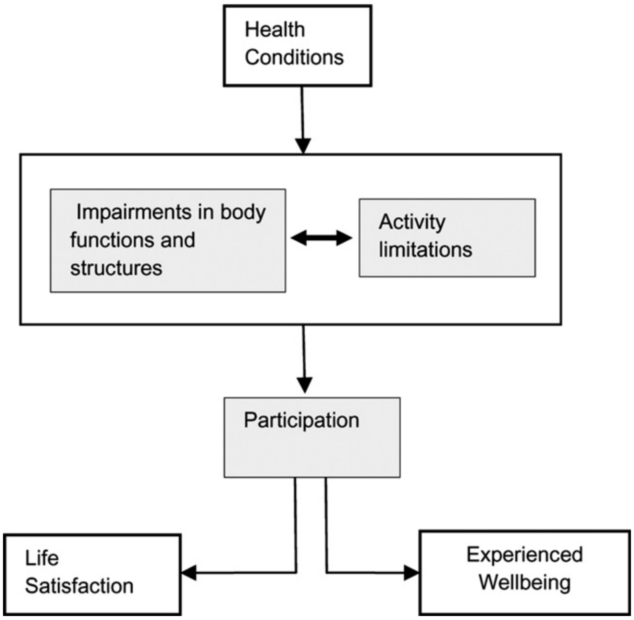

Fig. 1. Framework for linking disability with subjective wellbeing.

We reviewed the psychological literature for guidance in formulating hypotheses about the relationship between disability and evaluative and experienced subjective wellbeing. The classic psychological theory referred to as *hedonic adaptation* (Brickman & Campbell, 1971) asserts that individuals adapt to life events that result in negative material conditions, including disability; however, evidence for hedonic adaptation to disability is actually quite weak (see Lucas, 2007a for a review). For example, panel data show moderate to large drops in life satisfaction after the onset of disability, which subside somewhat but do not return to baseline even after several years (Lucas, 2007a). We therefore expected to observe moderate associations between disability and life satisfaction. A review by George (2010) suggests social integration via community roles is critical to maintaining satisfaction with daily life, but that many other factors also contribute to evaluations of wellbeing. We therefore expected that disability would influence life satisfaction in part through reductions in participation in productive and social activities. In other words, we expected that differences in participation would account for a modest share of the association between disability and life satisfaction.

Unlike life satisfaction, experienced wellbeing is responsive primarily to personal factors such as personality and to the nature and context in which activities are preformed (Kahneman et al., 2004). Because disability influences not only what individuals are able to do, but how they do it, we hypothesized that markers of disablement would have a stronger relationship with experienced wellbeing than with life satisfaction. We also hypothesized that disability was likely to have a stronger relationship with negative somatic expressions such as pain and tiredness than with mood per se (e.g. reports of happiness or sadness). Moreover, we expected that participation in particular types of activities, namely productive, social, physical, and other leisure pursuits, would have an even stronger positive relationship with experienced wellbeing than with life satisfaction, and consequently would account for a substantial share of the relationship between disability and experienced wellbeing.

Not shown in the simplified figure are potentially confounding factors that may influence both disablement and subjective wellbeing. Such factors include personal characteristics and aspects of the environment in which individuals carry out activities. For example, background characteristics such as age and sex, socioeconomic status, personality, and salient social relationships, may be related to both disability and to subjective assessments of wellbeing. The length of time an individual has had to acclimate to a given chronic condition may also influence both the extent of disablement and coping mechanisms (Lucas, 2007a). As described further below, we therefore controlled for such potential confounders in evaluating the relationships between disability and subjective wellbeing.

Data and measures

Data

Data for this study were drawn from the 2009 Disability and Use of Time (DUST) supplement to the 2009 Panel Study of Income Dynamics (PSID). Begun in 1968, the PSID is a longitudinal study of a representative sample of families in the United States, including an oversample of low-income families. From 1968 to 1997, families were interviewed annually whether or not they were living in the same dwelling unit or with the same people. Since 1997 interviews have been conducted biennially. Re-interview rates have been consistently 98% per year (96% over 2 years) and the sample of families now exceeds 8000. Because adult children who have left their parents' households have been followed, with sampling weights the design produces a nationally representative cross-section of families each year. For additional details see Hill (1992).

The core PSID data are collected through a computer-assisted telephone interview. For almost all families, questions are answered by one respondent, about evenly split between men and women in recent years. The PSID collects information on a variety of topics including background demographics, family composition, income and wealth, and since 1999, health status.

The DUST supplement, which was reviewed by the University of Michigan's Health Sciences and Behavioral Sciences Institutional Review Board, was administered to eligible couples by telephone within a few months following the 2009 core PSID interview. To be eligible both spouses had to be at least age 50 and at least one spouse age 60 or older. Because the vast majority of married men and women ages 60 and older have spouses that are age 50 and older the sample essentially represents married people ages 60 and older and their spouses. In order to enhance opportunities for studying disability, couples in which one or both spouses had a chronic condition that limited their daily activities (who were identified in the core interview) were oversampled, and strata further divided by the husband's age (<70, 70+). 73% of eligible couples agreed to participate and completed at least one diary. Two additional couples (completing 8 diaries) were excluded from the study because they were non-respondents in the 2007 wave of the core PSID, the source for lagged control variables (described below) in this analysis. Respondents with a spouse who could not participate because of a permanent condition (e.g. memory loss, hearing loss) were allowed to take part in DUST ($n = 33$), but in those cases diaries were only collected from the spouse without the condition. Our final analytic sample included 751 respondents.

The DUST instrument was designed as a 30–40 min diary, which was paired during the first of two interviews with a 15–20 min supplemental questionnaire (including items on global wellbeing, functioning, accommodations, self-assessed memory, marital quality, and stylized time use questions). In order to obtain a balanced sample of days, couples were systematically assigned interview days that would yield one weekday diary and one weekend diary. Hence up to 4 diaries could be completed per couple. The diary asked about all the activities occurring on the previous day, beginning at 4 am and continuing until 4 am the morning of the interview. The 751 respondents completed 1498 diaries (i.e. 4 people were missing a second diary). Following the fieldwork, trained coders assigned 3-digit codes to all reported activities. This analysis uses the preliminary (version 3) research file. Further details are available in Cornman, Freedman, & Stafford (2011).

Subjective wellbeing

We measured subjective wellbeing using two distinct approaches. Evaluative wellbeing was measured with a multi-part life satisfaction question. Respondents were asked as part of their first DUST interview, "Taking all things together, how satisfied are you with your life these days?" and were given a scale from 0 to 6, where 0 meant not at all satisfied and 6 meant very satisfied. They were then asked to rate different parts of their life on the same scale, including their health, memory, financial situation, work situation (if they were working or looking for work), and their marriage (available for $n = 751$ respondents).

Two sets of experienced wellbeing measures were constructed from the diary portion of the interview. For each activity reported, respondents were asked whether during that activity they felt mostly unpleasant, mostly pleasant, or neither. We summed the duration of the activities over the day according to responses to this question to create measures of minutes spent feeling pleasant and unpleasant on the previous day ($n = 1498$ diaries). In addition, for up to three randomly selected times of day ($n = 4370$ distinct activities, after excluding sleep, times for which activities were missing, and duplicate activities), respondents were asked to report how intensely they felt five emotions (calm, happy, sad, frustrated and worried) and two somatic symptoms (how tired and how much pain) on a scale from 0 to 6 (where 0 meant not having the feeling and 6 meant the feeling was very strong). The latter questions were modeled after the Day Reconstruction Method (Kahneman et al., 2004) and Princeton Affect and Time Study (Krueger, 2007).

Disability and severity of impairments

Respondents to the DUST supplement were asked 6 items developed for the U.S. Census and the companion American Community Survey to identify the population of Americans with disabilities. The items ask about serious difficulty hearing; serious difficulty seeing even when wearing glasses; serious difficulty concentrating, remembering or making decisions because of a physical, mental or emotional condition; serious difficulty walking or climbing stairs; difficulty dressing or bathing; and difficulty doing errands alone such as visiting a doctor's office or shopping because of a physical, mental, or emotional condition. From these measures we created a single dichotomous indicator of whether or not the respondent had a disability (Weathers, 2005).

In addition, DUST respondents were asked whether they experienced common impairments in the last 7 days, and if so, on how many days did that impairment limit their activities (none, 1–2 days, 3–4 days, 5 or more days). Specific impairments included: breathing problems; heart or circulation problems; stomach problems; back or neck problems; limited strength or movement in one's shoulders, arms, or hands; limited strength or movement in one's hips, legs, knees, or feet; low energy or easily exhausted; and difficulty remembering every day things. We found that these items formed a one-factor severity scale (ranging from 0 to 30), with all but one factor loading exceeding 0.40 (stomach problems, which we retained for completeness). Cronbach's alpha also suggested acceptable levels of internal consistency ($\text{alpha} = 0.76$). We found that the correlation between this measure of severity of impairment and the presence of any disability was 0.49, which suggests the measures are related but capture distinct aspects of disablement.

Activities

We measured participation in activities in two ways: with questions about any time spent during the last week in particular types of activities and with a diary-based assessment of whether those particular activities were carried out yesterday. The following seven activity categories were constructed: shopping, working for pay, volunteering outside the home, looking after a child or helping another adult with daily activities; socializing in person with friends or family not living with the respondent; doing physical activities such as playing a sport, working out at the gym, walking for pleasure, or other kind of exercise; and going out for enjoyment such as going to the movies, out to dinner, or other leisure activity.

Other potentially confounding factors

Finally, we controlled for a number of respondent, spouse, and couple-related factors that were likely to be related to both the presence and nature of disability and to subjective wellbeing. Respondent characteristics included gender, ten-year age groups, and the duration of the underlying limiting condition. The latter was constructed using items from the 1999 to 2009 core PSID waves. Every two years respondents were asked whether a doctor ever told them they had a given condition (a stroke, a heart attack, coronary heart disease, angina or congestive heart failure, high blood pressure, asthma, chronic lung disease, diabetes, arthritis, a learning disorder, cancer, an emotional, nervous, or psychiatric problem, or other serious chronic condition) and, if so, whether it limited their normal daily activities a lot, somewhat, just a little or not at all. We identified limiting conditions as those that limited activities "a lot" or "somewhat." For respondents reporting a limiting condition in 2009, we identified the earliest year in which he or she reported a limiting condition and calculated the duration accordingly. To control for family context, we include spouse's age (in 10-year age groups) and whether the spouse currently has a disability (using the same items that identify whether the respondent has a disability). Couple-level indicators include lagged measures of family income and wealth quartiles from the 2007 PSID interview and a measure of marital quality. The marital quality measure was constructed from six DUST items, which were drawn from a standardized instrument reflecting both strain and support (Whalen & Lachman, 2000). Respondents were asked to rate six aspects of their relationship with their spouse with answer categories a lot, some, a little, or not at all. Confirmatory factor analysis suggested one factor was appropriate (with all loadings 0.55 or higher) and Cronbach's alpha reached an acceptable level of 0.77. The final marital quality scale (ranging from 4 to 32) was divided into quartiles.

Method of analysis

We tested for differences in mean satisfaction scores by disability status, in minutes yesterday that were mostly pleasant and unpleasant, and detailed wellbeing scores using *t*-tests. Differences in distributions of respondent characteristics by disability status and in the proportion participating in particular types of activities were evaluated using chi-square statistics. All descriptive statistics were weighted using sampling weights that take into account the complex design of the PSID and oversampling by age and limitation status; weights for estimates from yesterday's diary were further adjusted to account for differential probabilities by day of the week; and weights for detailed wellbeing estimates were further adjusted to account for differential probability that an activity was selected (which was proportionate to activity duration).

We then ran a series of ordinary least squares regression models for each of the outcomes of interest: satisfaction with life as a whole and subcomponents demonstrated to be related to disability ($n = 751$); minutes yesterday spent feeling pleasant and unpleasant ($n = 1498$); and detailed affect measures that were different for those with and without disability: calm, happy, sad, tired, and how much pain ($n = 4370$). The base model (1) included only a measure of any disability and a score reflecting the severity of impairments. We then added in model 2 controls for respondent, spouse, and couple characteristics and noted changes in the disability and impairment variables. Finally, we added measures of respondent participation to the models, which varied by outcome: for satisfaction measures we included indicators of any participation last week; for minutes yesterday that were pleasant/unpleasant we included any participation yesterday; and for detailed wellbeing participation measures reflected the 3-digit code assigned to that particular randomly selected activity. Differences between models 2 and 3 in the disability and impairment coefficients suggest the extent to which participation accounts for the disability-subjective wellbeing link. Chi-square tests for differences in -2*log likelihood are also provided and indicate whether incremental variables as a group add significantly to the model.

We also assessed the sensitivity of our regression model estimates to the omission of potentially important respondent and couple characteristics. Because we had more than one observation per respondent and obtained information about both spouses, we were able to estimate mixed effect regression models that included either within-individual or within-couple (fixed) effects. Such models controlled for all variables in Model 3 and for unmeasured aspects of an individual (e.g. personality) or couple (e.g. levels of support). We found that although the individual-effect or couple-effect was uniformly statistically significant, parameters representing disability and severity of impairments did not differ appreciably from the ordinary least square models. Hence, we present only the least square regression findings here.

Findings

Older individuals who report a disability, representing nearly 40% of older married individuals, reported significantly lower scores representing satisfaction with life as a whole than those without such limitations (see Table 1). Focusing on the various components of life satisfaction, differences were largest for satisfaction with health (difference of -1.1; $p < 0.001$) and memory (difference of -0.6; $p < 0.001$).

In terms of episodic wellbeing, individuals with disability reported fewer minutes spent feeling mostly pleasant than those without such limitations, amounting to a difference of over a full hour per day (nearly 72 min; $p < 0.001$). The difference is accounted for by nearly 13 additional unpleasant minutes, 18 additional minutes classified as neither, 14 additional missing minutes, and 28 additional minutes sleeping (all significantly different at $p \leq 0.01$ except minutes classified as neither). Persons with disability also experienced significantly ($p < 0.05$) lower levels of calmness and happiness and slightly greater sadness $p = 0.006$). Differences were especially notable, however, for pain (difference of 0.9; $p < 0.001$) and tiredness (0.7; $p < 0.001$). No statistically significant differences in reports of frustration or worry were evident.

Respondents with disability also differed in other important ways from those who did not (Table 2). For instance, they reported

Table 1
Mean (SD) wellbeing by disability status among older married persons.

	All		Disability status			
			No disability	Disability	*t*-test	*p*-value
	Mean	SD	Mean	Mean		
Satisfaction (0–6) (n = 751)						
Global	5.0	1.2	5.2	4.8	−4.35	<0.001
Health	4.4	1.4	4.8	3.7	−10.46	<0.001
Memory	4.8	1.4	5.0	4.4	−5.63	<0.001
Financial	4.6	1.7	4.7	4.5	−2.01	0.045
Work [a]	4.8	2.9	4.8	4.8	−0.17	0.864
Marriage	5.6	1.1	5.5	5.6	0.30	0.762
Weighted %	100		61.3	38.7		
Wellbeing yesterday (min.) (n = 1498)						
Pleasant	787.1	311.8	815.9	744.2	−4.44	<0.001
Unpleasant	26.1	84.9	21.0	33.6	2.81	0.005
Neither	103.8	246.7	96.5	114.6	1.44	0.150
Missing	16.6	76.6	11.1	24.6	3.12	0.002
Asleep	506.3	157.6	495.2	522.7	3.28	0.001
Weighted %	100		59.8	40.2		
Detailed wellbeing (0–6) (n = 4370)						
Calm	5.4	2.3	5.5	5.3	−2.69	0.007
Happy	5.1	3.3	5.1	4.9	−2.00	0.046
Frustrated	0.8	3.5	0.8	0.8	0.75	0.453
Worried	0.5	2.6	0.5	0.5	−0.38	0.702
Sad	0.3	1.6	0.3	0.4	2.73	0.006
Pain	0.8	2.4	0.5	1.4	11.39	<0.001
Tired	1.5	4.6	1.2	1.9	5.88	<0.001
Weighted %	100		63.3	36.7		

[a] Among those working or looking for work.

Table 2
Frequency (%) and mean sample characteristics by disability status.

	All	Disability status			
		No disability	Disability	*t*-test or *F*-test[a]	*p*-value
Respondent characteristics					
Severity of impairments (0–30; M score)	4.0	2.0	6.9	12.26	<0.001
Female	50.4	54.1	45.0	4.14	0.042
Age				15.54	<0.001
50–59	9.7	10.1	9.1		
60–69	54.0	64.6	38.4		
70–79	24.5	17.9	34.2		
80+	11.9	7.5	18.3		
Duration of limiting condition (M yrs)	2.1	0.8	3.9	11.03	<0.001
Spouse characteristics					
Age				9.14	<0.001
50–59	9.5	10.5	7.9		
60–69	53.8	61.0	43.1		
70–79	24.8	19.9	32.0		
80+	11.9	8.7	16.9		
Disability (Yes/No)	41.8	36.2	50.1	10.39	0.001
Couple characteristics					
Income 2007				6.54	<0.001
1st quartile (lowest)	24.4	18.9	32.5		
2nd quartile	24.8	24.0	26.1		
3rd quartile	24.7	24.9	24.5		
4th quartile	26.1	32.3	16.8		
Wealth 2007				5.06	0.002
1st quartile (lowest)	23.2	18.4	30.5		
2nd quartile	25.7	24.3	28.0		
3rd quartile	25.0	29.4	18.6		
4th quartile	26.1	27.9	23.0		
Marital quality				1.14	0.331
1st quartile (lowest)	19.7	18.7	21.3		
2nd quartile	27.2	25.2	30.2		
3rd quartile	26.5	27.0	25.7		
4th quartile	26.6	29.1	22.9		
Activities last week					
Shopping	82.6	87.8	74.9	13.43	<0.001
Working	36.0	42.9	25.8	14.71	<0.002
Volunteering	24.6	27.8	19.9	4.04	0.045
Caring	30.9	34.8	25.1	4.78	0.029
Socializing	86.5	88.8	83.1	3.73	0.054
Physical activity	66.1	73.4	55.4	16.91	<0.001
Going out for pleasure	71.8	76.2	65.3	7.07	0.008
Activities yesterday					
Shopping	44.9	46.4	42.8	1.01	0.315
Working	24.6	30.6	15.6	22.09	<0.001
Volunteering	2.8	2.5	3.4	0.67	0.414
Caring	19.4	19.8	18.8	0.10	0.749
Socializing	47.9	49.9	44.7	2.18	0.140
Physical activity	27.3	31.6	20.9	11.44	0.001
Going out for pleasure	30.6	32.9	27.3	2.96	0.086
Up to 3 random activities yesterday					
Shopping	9.1	8.7	9.8	0.28	0.600
Working	9.3	11.4	5.1	14.25	<0.001
Volunteering	0.3	0.2	0.5	3.44	0.064
Caring	2.6	2.7	2.4	0.08	0.781
Socializing	9.2	12.3	3.9	6.37	0.012
Physical activity	2.3	2.5	2.1	0.50	0.479
Going out for pleasure	2.3	2.7	1.8	2.46	0.117

$n = 751$ respondents, 1498 diaries capturing activities yesterday and 4370 random activities.

[a] For the two continuous variables in the table (severity and duration), the significance test is a *t*-test. For all other variables, the significance test is an *F*-test. In correcting for survey design, the Stata software converts the chi-square test of independence into an *F*-test (StataCorp, 2009).

more severe underlying impairments (score of 6.9 vs. 2.0 out of 30; $p < 0.001$), were on average older and more likely to be in the lower income and wealth quartiles, and reported having a limiting chronic condition for longer on average (3.9 vs. 0.8 years; $p < 0.001$). Their spouses were also older and more likely to report a disability. Of particular interest, the activity profiles of individuals reporting a disability also differed substantially: the percentage participating in the seven activities of interest in the prior week was lower across the board for those with a disability than for those without. Diary-based activity profiles appeared more similar, with differences in only working and physical activity reaching significance at $p \leq 0.001$. Finally, the randomly selected activities differed significantly only with respect to the percentage that involved work (difference of 6.3 percentage points; $p < 0.001$) and socializing (12.3 vs. 3.9 percent; $p = 0.012$).

Life satisfaction models

Several noteworthy points emerged from models predicting global reports of life satisfaction (columns 1–3 of Table 3). First, severity of impairment, but not disability per se, predicted lower satisfaction with life as a whole, but effects were relatively small (-0.05, $p < 0.001$ in unadjusted model). Second, adding respondent, spouse, and couple characteristics accounted for only a small fraction of this relationship. Third, adding respondent participation measures further attenuated this relationship by about one-fourth, largely because of the strong relationships among disability, physical activity, volunteering, and life satisfaction, but the relationship between severity score and life satisfaction remained significant. In the final model, having lower than average marital quality was more strongly associated with (lower) life satisfaction than any other indicator, followed by spending time volunteering and in physical activities.

Turning to satisfaction with health, we observed stronger effects of having a disability and severity of impairment (columns 4–6 of Table 3). Despite several significant relationships between the confounders and satisfaction with health (e.g., the longer one has had a limiting condition, the less satisfaction one reported with health), adding respondent, spouse and couple characteristics and participation measures did not change the disability-health satisfaction relationships appreciably.

Like satisfaction with health, satisfaction with memory was lower for individuals with disability and decreases with the severity of impairment. Adding potential confounders to the model did not change these relationships appreciably, and only being age 80 or older emerged as having a significantly ($p = 0.035$) positive association with memory satisfaction.

Experienced wellbeing models

Focusing on models predicting positive experienced wellbeing (Table 4), the number of pleasant minutes experienced yesterday was consistently related to both disability and severity of impairment. Although the full model suggested that low marital quality was associated with less time spent feeling pleasant and both working and going out for pleasure are associated with more such time, control variables added in models 2 and 3 did not account for the differentials by disability. Like the unadjusted means in Table 1, the full model predicted that, all else equal, an individual with a disability and with average severity of impairments would report 71 fewer minutes of pleasant time yesterday than an individual without disability.

The relationship between disability and intensity of episodic happiness and calmness echoed findings for global wellbeing: impairment severity score but not disability per se significantly predicted less happiness and calmness and effects were relatively small (-0.04 for happiness in unadjusted model, $p < 0.01$; -0.03 for calmness in unadjusted model, $p < 0.01$). Although some activities were associated with amount of happiness reported for a given episode, differential participation did not account for the relationship between impairment severity and happiness. In final

Table 3
Predictors of life satisfaction among older married adults: unstandardized coefficients from ordinary least squares regression models.

	Life as a whole (0–6)			Health (0–6)			Memory (0–6)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Respondent characteristics									
Disability (Yes/no)	−0.16	−0.18	−0.17	−0.56**	−0.52**	−0.51**	−0.39**	−0.40**	−0.39**
Severity of impairments	−0.05**	−0.04**	−0.03**	−0.11**	−0.09**	−0.08**	−0.04**	−0.03*	−0.03**
Female		0.12	0.09		−0.07	−0.09		0.18	0.20
Age 60–69		0.03	−0.03		−0.20	−0.23		0.18	0.23
Age 70–79		0.29	0.21		−0.01	−0.05		0.33	0.41
Age 80+		0.23	0.15		0.03	−0.01		0.48	0.56*
Duration of limiting condition		0.00	0.00		−0.08**	−0.08**		−0.01	−0.01
Spouse characteristics									
Age 60–69		0.01	0.01		0.12	0.10		−0.12	−0.12
Age 70–79		−0.08	−0.10		0.11	0.09		−0.20	−0.18
Age 80+		−0.11	−0.07		0.15	0.16		−0.12	−0.12
Disability (Yes/no)		−0.12	−0.11		0.00	−0.01		0.03	0.01
Couple characteristics									
Income 1st quartile (lowest)		0.05	0.07		0.21	0.22		−0.09	−0.07
Income 2nd quartile		−0.09	−0.06		0.23	0.24		0.15	0.15
Income 3rd quartile		−0.06	−0.08		0.38**	0.36**		0.04	0.06
Wealth 1st quartile (lowest)		−0.17	−0.09		−0.28*	−0.25		−0.07	−0.11
Wealth 2nd quartile		−0.10	−0.07		−0.35*	−0.32*		−0.01	−0.01
Wealth 3rd quartile		−0.08	−0.09		−0.34**	−0.34**		−0.07	−0.06
Marital quality 1st quartile (lowest)		−0.79**	−0.77**		−0.02	−0.01		−0.22	−0.24
Marital quality 2nd quartile		−0.43**	−0.40**		−0.10	−0.09		−0.18	−0.20
Marital quality 3rd quartile		−0.09	−0.14		0.12	0.10		−0.17	−0.15
Activities									
Shopping			−0.11			0.05			0.13
Working			−0.10			−0.05			0.16
Volunteering			0.21*			0.17			−0.13
Caring			0.07			−0.05			0.00
Socializing			0.00			0.05			0.02
Physical activity			0.33**			0.17			−0.11
Going out for pleasure			0.14			0.01			−0.12
Constant	5.28**	5.55**	5.29**	5.07**	5.19**	4.99**	5.08**	5.01**	4.97**
−2*loglikelihood	2252.3	2185.6	2161.5	2396.5	2346.5	2338.0	2285.8	2265.3	2259.8
Likelihood ratio test[a] (*df*)		66.7,(*18*)**	24.1,(*7*)**		50.0,(*18*)**	8.5,(*7*)		20.5,(*18*)	5.5,(*7*)
($n = 751$)									

$^{*}p < 0.05$; $^{**}p < 0.01$.

[a] The likelihood ratio test is a chi-square test for nested models.

models predicting calmness, some types of activities were inversely associated with calmness (shopping and physical activities), but participation did not account for the relationship between severity of impairment and calmness.

How does negatively experienced wellbeing vary with disability status? As shown in Table 5, the number of unpleasant minutes experienced yesterday was consistently related to severity of impairment, but effects were relatively small, and neither respondent/spouse/couple characteristics nor respondent participation accounted for this relationship. The full model predicted that an individual with a disability and average severity impairment would report on average 18 additional minutes of unpleasant time than an individual without. None of the activity categories predicted time spent feeling unpleasant.

Looking across the three measures of negative experienced wellbeing, disability had a much weaker relationship with sadness than with pain or tiredness. Associations with reports of pain were especially noteworthy and larger than with any other measure of subjective wellbeing considered here. Respondent, spouse, and couple characteristics did not account for these associations nor did differential activity profiles.

Discussion

This analysis offers the first in-depth investigation of the link between disability and subjective wellbeing in later life in the United States. A central new finding is that no matter what the measure of wellbeing, older married adults with disability reported worse subjective wellbeing than those without. Notable differences exist in the cumulative number of pleasant minutes experienced yesterday by disability status - on the order of 71 fewer minutes on average for those with a disability. This effect is as large as or larger than having a poor relationship with one's spouse.

Although we expected disability would have a stronger relationship with experienced than evaluative wellbeing, a more nuanced picture emerged. Comparing outcomes measured on the same scale (0–6), we discerned larger differentials by disability status for somatic symptoms such as feeling pain or tiredness and for satisfaction with health or memory. Smaller disparities were found for feelings of happiness and sadness and for evaluations of life as a whole. Levels of frustration and worry did not differ significantly by disability status.

We also found only limited support for the notion that participation mediates the relationship between disability and subjective wellbeing. Differences in activity profiles accounted for some of the relationship between severity of impairments and life satisfaction scores. However, counter to our expectations, differences in participation did not account for disability's relationship with either positive or negative experienced wellbeing measures. It may be that other aspects of activities not captured by these broad activity categories—such as whether the respondent was alone or engaged with others or at home or out in the community—are responsible and may be fruitful avenues for further exploration. Or it may be that in later life physical discomfort experienced while carrying out an activity influences wellbeing more than the type of activity per se.

Table 4
Predictors of positive experienced well being among older married adults: unstandardized coefficients from ordinary least squares regression models.

	Yesterday			Random activity yesterday					
	Time spent feeling pleasant (mins)			How happy (0–6)			How calm (0–6)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Respondent characteristics									
Disability (Yes/no)	−38.10*	−41.88*	−40.73*	0.00	−0.08	−0.07	−0.06	−0.08	−0.09
Severity of impairments	−6.79**	−6.47**	−6.23**	−0.04**	−0.03**	−0.03**	−0.03**	−0.02*	−0.01*
Female		−10.82	−7.54		0.01	−0.05		−0.09	−0.13
Age 60–69		28.14	33.33		0.21	0.15		0.30**	0.25*
Age 70–79		33.68	45.89		0.29*	0.21		0.26	0.19
Age 80+		7.67	18.35		0.09	-0.01		−0.01	−0.10
Duration of limiting condition		1.91	2.76		0.00	0.00		−0.02	−0.02*
Spouse characteristics									
Age 60–69		34.61	31.90		0.23	0.20		-0.03	−0.06
Age 70–79		27.30	30.58		0.40*	0.39*		0.15	0.12
Age 80+		−12.51	−12.79		0.29	0.29		0.18	0.16
Disability (Yes/no)		2.64	0.00		−0.09	−0.08		−0.05	−0.04
Couple characteristics									
Income 1st quartile (lowest)		27.63	42.47		0.59**	0.54**		0.32**	0.31**
Income 2nd quartile		−11.58	-4.17		0.41**	0.37**		0.26**	0.25*
Income 3rd quartile		38.08	40.51		0.44**	0.40**		0.26**	0.26**
Wealth 1st quartile (lowest)		7.95	7.42		−0.07	−0.02		−0.11	−0.12
Wealth 2nd quartile		3.87	−0.52		−0.17	−0.13		−0.10	−0.10
Wealth 3rd quartile		5.40	6.33		−0.12	−0.08		−0.20*	−0.20*
Marital quality 1st quartile (lowest)		−63.59*	−61.12*		−0.60**	−0.57**		−0.34**	−0.32**
Marital quality 2nd quartile		−43.46*	−40.24		−0.49**	−0.48**		−0.31**	−0.31**
Marital quality 3rd quartile		25.98	24.29		−0.14	−0.12		−0.17*	−0.16*
Activities									
Shopping			−4.08			−0.11			−0.28*
Working			44.65*			−0.33*			−0.26
Volunteering			54.40			0.51**			0.27
Caring			6.53			−0.06			−0.03
Socializing			15.32			0.29**			0.05
Physical activity			0.77			0.06			−0.29*
Going out for pleasure			37.90*			0.49**			0.09
Constant	829.39**	781.66**	734.50**	5.21**	4.81**	4.90**	5.53**	5.41**	5.57**
−2*log likelihood	20379.0	20321.6	20305.2	13864.0	13635.0	13576.9	13400.7	13266.7	13232.8
Likelihood ratio test[a] (*df*)		57.4 (*18*)**	16.36(*7*)*		229.0(*18*)**	58.1(*7*)**		134.0(*18*)**	33.91(*7*)**
n		1498			4370			4370	

*$p < .05$; **$p < .01$.

[a] The likelihood ratio test is a chi-square test for nested models.

This study has important limitations. First, the sample is limited to only married couples, thus generalizability to single older adults is unclear. It may be that married individuals are better equipped to cope with disability because they do not live alone, particularly if they have a better than average relationship with their spouses. Hence these findings may underestimate the disability-wellbeing relationship. A study that broadens the population to include all older adults irrespective of marital status would be valuable. Second, the PSID currently lacks measures of personality, which prior research suggests is important in the formulation of subjective wellbeing (Diener, Suh, Lucas, & Smith, 1999). To address this limitation we re-estimated models first to control for unmeasured couple characteristics and then to control for unmeasured individual characteristics. Results from these sensitivity analyses suggested that although individual and/or couple effects were important, biases in disability estimates because of the omission of personality or other factors appeared to be negligible. Third, the associations presented here are cross-sectional, and so the relationships we identified should not be interpreted as causal.

Despite these limitations, our findings have implications for future studies linking disability to wellbeing. Methodologically our study has demonstrated the value in supplementing life satisfaction items with more detailed diary-based measures of activities and experienced wellbeing. Although some findings are surprisingly similar across the two measurement approaches, the diary provides a much more detailed assessment of the negative impact of disability on daily life. In particular, like Krueger and Stone (2008), we find that the diary method is a useful tool for assessing pain and tiredness in this population.

This study is also relevant to the ongoing debate regarding hedonic adaptation. Recent articles (Diener, Lucas, & Scollon, 2006; Headey, 2010; Lucas, 2007b) have challenged the notion that individuals' satisfaction with their life is determined largely by a biological set-point. By combining diary data with a long running panel, we were able to control for the length of time a respondent had a limiting condition. We consistently found that duration of limiting condition either had no association or was associated with worse subjective wellbeing (less calmness, more sadness, pain, tiredness). Hence, we conclude like Lucas (2007b), that if individuals do adapt in later life to disability, that adaptation is incomplete.

Finally, this study also suggests two worthy avenues for future research aimed at improving the wellbeing of older adults who have experienced impairments and activity limitations. Our findings hint that taking steps to ensure that individuals with impairments continue participation in volunteer and physical activities could be beneficial to their feelings about their life as a whole. In addition, in terms of daily experience, attention to the physical symptoms associated with disability—notably pain and exhaustion—appear to be critical targets for improving late-life wellbeing of older adults with disability.

Table 5

Predictors of negative experienced well being among older married adults: unstandardized coefficients from ordinary least squares regression models.

	Yesterday			Random activity yesterday								
	Time spent feeling unpleasant (mins)			How sad (0–6)			How much pain (0–6)			How tired (0–6)		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Respondent characteristics												
Disability (Yes/no)	3.41	8.72	8.37	0.00	−0.02	−0.02	0.40**	0.45**	0.45**	0.36**	0.27*	0.25*
Severity of impairments	1.87*	2.11*	2.06*	0.03**	0.02**	0.02**	0.12**	0.11**	0.11**	0.08**	0.06**	0.06**
Female		−1.93	−3.80		0.11**	0.10*		0.24**	0.22**		−0.03	0.03
Age 60–69		−5.03	−7.57		−0.24**	−0.24*		−0.12	−0.14		−0.52*	−0.49*
Age 70–79		−10.21	−11.91		−0.12	−0.12		−0.04	−0.07		−0.34	−0.33
Age 80+		−3.40	−5.07		0.07	0.07		−0.23	−0.28		−0.40	−0.38
Duration of limiting condition		−1.29	−1.42		0.02*	0.02*		0.03*	0.03*		0.05**	0.05**
Spouse characteristics												
Age 60–69		−11.58	−12.20		−0.01	−0.01		−0.15	−0.15		−0.33	−0.31
Age 70–79		−11.52	−12.44		0.03	0.05		−0.24	−0.19		−0.43	−0.44
Age 80+		−17.23	−18.46		−0.22	−0.20		−0.40*	−0.35*		−0.66*	−0.68*
Disability (Yes/no)		−4.25	−4.87		0.00	0.01		−0.03	−0.01		0.08	0.05
Couple characteristics												
Income 1st quartile (lowest)		−12.67*	−13.22*		−0.25**	−0.27**		−0.14	−0.19		−0.06	0.01
Income 2nd quartile		−4.07	−5.31		−0.24**	−0.25**		−0.02	−0.06		0.08	0.14
Income 3rd quartile		−12.32*	−12.16*		−0.10	−0.12		0.08	0.04		0.02	0.09
Wealth 1st quartile (lowest)		7.25	5.85		0.08	0.09		0.14	0.21		0.22	0.16
Wealth 2nd quartile		−2.81	−3.40		0.05	0.06		−0.04	0.01		−0.02	−0.08
Wealth 3rd quartile		2.31	1.49		0.04	0.05		0.04	0.07		0.02	−0.04
Marital quality 1st quartile (lowest)		7.39	7.38		0.29**	0.28**		−0.22*	−0.21*		0.20	0.15
Marital quality 2nd quartile		11.38	11.07		0.22**	0.22**		−0.02	0.00		0.33*	0.29*
Marital quality 3rd quartile		1.48	1.36		0.06	0.06		−0.08	−0.06		0.16	0.12
Activities												
Shopping			0.87			0.14			0.19			−0.05
Working			−4.46			−0.06			−0.05			0.13
Volunteering			2.55			−0.34**			0.40			0.64
Caring			8.03			−0.03			−0.53**			−0.33
Socializing			5.87			0.08			0.24			−0.49**
Physical activity			−4.15			−0.04			0.55**			0.01
Going out for pleasure			−5.07			−0.17**			−0.11			0.32
Constant	17.26**	37.02*	41.62*	0.20**	0.32*	0.30**	0.25**	0.44*	0.40*	1.04**	1.60**	1.62**
−2*log likelihood	17592.5	17555.8	17547.8	13895.0	13762.6	13746.8	15580.0	15450.2	15429.1	17598.9	17476.2	17460.3
Likelihood ratio test[a] (*df*)		36.7 (18)**	8.0 (7)		132.4 (18)**	15.7 (7)*		129.7 (18)**	21.1 (7)**		122.7 (18)**	15.9 (7)*
n		1498			4370			4370			4370	

*$p < .05$; **$p < .01$.

[a] The likelihood ratio test is a chi-square test for nested models.

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