Social engagement across the retirement transition among “young-old” adults in the French GAZEL cohort

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Abstract The objective of this study was to test predictors of change in social engagement across the retirement transition in a cohort of 10,692 French utility workers retiring between 1992 and 2004, aged 51–65 in 2004. Three measures of social engagement (organizational activity participation, number of close family members, and number of close friends) were collected in 1991 and 2004; 1991 scores were subtracted from 2004 scores to determine change. We used ordered logistic regression to model predictors of change. Compared with those retiring

just before the follow-up measure, those retiring 2–5 years earlier had greater positive change in organizational activity participation (OR 1.22, 95 % CI 1.07, 1.39) and greater positive change in number of close friends (OR 1.19, 95 % CI 1.04, 1.37) after retirement compared with before, but no difference in family contact, and no clear linear trend by retirement timing relative to the follow-up measure. Women were less likely than men to increase organizational activities and contact with close family ties. Poor self-rated health at follow-up consistently predicted decreased engagement. For specific activities, those retired longest had not only the greatest odds of increased political/religious organizational involvement and sports/hobby/leisure involvement but also the greatest odds of decreased volunteering. Those of low midlife socioeconomic status (SES) were more likely to decrease levels of formal engagement from before retirement to after, compared to those of higher SES. Overall, certain changes in social engagement emerged with increasing time in retirement. However, retirement timing was a weaker predictor of change in engagement than factors such as low midlife SES or poor health. Findings suggest that disparities in social engagement may emerge during retirement.

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Introduction

Social engagement—defined by number, frequency, and quality of an individual’s connection to those in his or her social environment—is a widely recognized determinant of current and future health status (Pillemer et al. 2000). Particularly among older people, it has been shown to

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predict mortality, disability, cognitive function, and mental health and well-being, among myriad outcomes (Berkman et al. 2004; Berkman and Syme 1979; Crooks et al. 2008; Glass et al. 2006; Golden et al. 2009; Saczynski et al. 2006; Thomas 2012; Wahrendorf et al. 2010).

Given the wealth of research documenting the health benefits of social engagement, achieving and maintaining social engagement is considered a key component of successful aging (Menec 2003; Rowe and Kahn 1998). However, the retirement transition itself is not often considered as a potential determinant of social engagement. In fact, few studies have rigorously assessed changes in social engagement before and after retirement. Given the major life changes that occur with retirement, in terms of both social activities and social roles (Szinovacz et al. 2003; Wang 2007), it is important to understand the extent to which retirement represents a naturally occurring inflection point for changes in social engagement and whether a change in engagement during retirement indicates that retirement is a sensitive period for individuals to become more engaged.

Among those studies that explicitly assess the role of retirement on social engagement, evidence is mixed as to whether retirement might strengthen or weaken engagement (Kim and Moen 2002; Moen 2000; Pillemer et al. 2000). The small body of existing research has suggested that effects of retirement on social engagement may differ by factors such as one's main occupation during working life, gender, health, or earlier-life levels of engagement (Kim and Moen 2002; Moen 2000). Additionally, acute effects of the retirement transition on engagement may be different than the long-term trends in engagement as retirement progresses (Moen 2000). On one hand, some evidence suggests that in retirement, individuals have more time to see family and friends and to pursue leisure activities. Retirees may also be more likely to pursue activities such as volunteering as a way to replace the social productivity lost in the work-to-retirement transition (Bass and Caro 2001). Conversely, retirees may experience a loss of connection to co-workers and their professional network, as well as age-related health difficulties that could reduce or limit participation. Further complicating analyses of the relationship between engagement, retirement, and health is the endogeneity of non-statutory retirement in many populations of workers; less healthy individuals may retire earlier and are often not comparable to those who retire later for both health and non-health reasons (Barnes-Farnell 2003).

This study aimed to disentangle the evidence surrounding social engagement and retirement by analyzing the relationship between these factors in a population of retired French workers (the GAZEL cohort). GAZEL was chosen for this study because retirement age is statutory

(on average at age 55) and is calculated for each individual according to lifetime working history and demographic factors; see “Measures” for a more detailed description of the policy. That individualized retirement timing offers several advantages for this analysis. First, statutory retirement in the cohort decreases health selection into retirement compared with many US studies; as cohort members could apply for and be granted earlier retirement based on poor health, we were able to eliminate the 2 % of people who retired due to poor pre-retirement health. Second, chronological age and retirement age are uncoupled because there is a distribution of job histories (and thus retirement ages) among people in each birth cohort. Third, the cohort is also diverse in terms of occupational history, lifetime socioeconomic status, gender, and other measures by which engagement may vary, allowing us to observe associations between those covariates and changes in social engagement.

Based on prior studies and the “young-old” status of our sample (on average age 60 at our post-retirement follow-up measure in 2004), we hypothesized that overall, close social ties and leisure-oriented activities would increase after retirement, given fewer work demands on participants than they had at earlier periods. We hypothesized that organizational activities, particularly those associated with the workplace, would decrease with retirement. We also hypothesized that the magnitude, direction, and significance of observed changes would vary by age, socioeconomic status, health status, and pre-retirement engagement levels, in addition to retirement timing.

Methods

Sample

The study was conducted in GAZEL, a socioeconomically diverse, longitudinal occupational cohort of French gas and electricity workers (Goldberg et al. 2007, 2014). The cohort was established in 1989 among 20,625 professionally active employees of the French national gas and electricity company (EDF–GDF), aged 35–50 at inception; each year, participants are mailed a self-report questionnaire with questions about their work and non-work exposures, health behaviors, and health outcomes. Retirement year was extracted from company records. We excluded those who retired between 1989 and 1991 ($n = 1370$) because we wished to capture those who retired in between our two exposure assessment occasions in 1991 and 2004. For the same reason, we excluded those who retired after 2004 ($n = 2722$), who died before 2004 when our follow-up measure was collected ($n = 417$), and who retired for health-related reasons ($n = 291$). Thus, 15,825

were eligible to be included in this analysis. After excluding individuals who were missing data on social engagement in 1991, 2004, or both ($n = 5,133$, 32 %), our final analytic sample consisted of 10,625 people.

Measures: social engagement

In 1991 and 2004, participants were given a modified French version of the Berkman Social Network Index (Melchior et al. 2003), which quantifies social participation along three axes: marital status, social ties with family and friends, and membership and active participation in organizations. As nearly all participants (87 %) were married or cohabitating in 2004, we adjust for marriage in our models but do not include it in our engagement measures. For the dimension of close social ties, also conceptualized as informal social engagement, participants were asked the number of family members and the number of friends to whom they felt close (scale for each category: 0, 1–2, 3–5, 6–9, 10, or more). As the intervals in the scale were uneven, we combined 0 and 1–2 contacts into a single group. We determined category of close friends and close family members for both 1991 and 2004. We then subtracted the 1991 ties category from the 2004 ties category to determine the change in category of ties during the follow-up (range -3 to 3 , where negative scores indicate decreased ties and positive scores indicate increased ties).

To capture organizational activity participation, we asked about involvement in each of five types of organizations: sports, hobby, or leisure organizations; professional organizations or unions; political parties or religious movements; organizations involving one's children; and humanitarian or voluntary organizations. For each type of organization, individuals were asked whether they considered themselves members; those who were members were then asked whether they participated in an active fashion. For each type of organization, those who were not members were scored as 0; those who were members but not active were scored as 1; and those who were both members and active were scored as 2. In this way, we captured intensity of engagement. We then added up the scores for each of the organizational activities to create a continuous scale (range 0–10) for both 1991 and 2004. We then subtracted the 1991 score from the 2004 scale to determine change in engagement (range -10 to 10 , where negative scores indicate decreased participation and positive scores indicate increased participation). This scale is hereafter referred to as “active organizational participation score.” Additionally, for the four most common organizational activities (hobby/sports leisure; political/religious; humanitarian/volunteering; professional/union), we created individual measures of change in involvement (range for each -2 to 2).

Measures: retirement

For these workers, who were employed by EDF–GDF for most of their careers, retirement is largely statutory per company policy, occurring on average at age 55. However, those who spent many years in blue-collar jobs are entitled to retire at younger ages. Workers in certain circumstances (for example, women with three or more children and at least 15 years' service) can also be granted early retirement, although partial retirement is rare. Retirement may also be granted early for long-standing illness or disability; we excluded the 2 % of individuals classified by the company as retiring for this reason. We extracted year of actual retirement from company records; as these records are used for pension payouts, they are quite accurate and precise. We created a categorical variable for retirement year, as we were interested in whether change in engagement was predicted by distance from retirement at follow-up (categories: retired 1992–1994, 1995–1996, 1997–1998, 1999–2000, 2001–2002, 2003–2004).

Other covariates considered include gender, occupational grade at midlife (executive, manager, clerk, or manual worker), birth year (centered at the mean and converted to age in 2004 for tabular purposes), marital status in 2004 (married/cohabitating versus single/divorced/widowed), and self-rated health in 2004 (fair/poor versus good/excellent). We used midlife occupational grade, rather than grade at retirement, because it better reflects lifetime socioeconomic status.

Statistical analyses

For descriptive analyses, we aimed to show both overall level of engagement and change over the follow-up. To show overall engagement, we calculated mean scores in 2004 on each of the major engagement measures, for each of the predictor variables; we used the Kruskal–Wallis test to examine significance of difference in mean engagement within levels of a predictor variable. We also categorized individuals by whether they increased, stayed the same, or decreased in each of the three engagement categories, and plotted those measures by retirement year.

For tests of association, we used ordered logistic regression to model odds ratios for the association between retirement timing categories (as well as other covariates) and change from 1991 to 2004 in each of the three main engagement measures (organizational activity participation score, close family ties, close friend ties). We used ordered logistic regression due to the ranked nature of our outcome variables. In these models, we adjusted for age (centered), gender, midlife SES, self-rated health, marital status, and level of engagement at baseline. We adjusted for the baseline measure to account for regression to the mean and

also because the change measure did not differentiate between those who remained at high levels of engagement versus those who remained at low levels. Including the baseline measure accounted for overall level of participation as well as change. We then repeated analyses using the disaggregated organizational activity measures.

All analyses were conducted using SAS 9.4 (Cary, NC).

Results

The median year of retirement in our sample of 10,692 people was 1999, at a mean age of 54.92 (SD 2.36) (Table 1). At the time of the follow-up measure in 2004, the mean age was 60 years (correspondingly, the mean age at baseline in 1991 was 47 years). Approximately 81 % of our sample was male, 89 % were married or cohabitating in 2004, and 13 % rated their health as fair or poor in 2004. More than half the sample (59 %) held midlevel managerial positions in midlife, while 13 % were executives and 28 % were low wage (either manual or non-manual).

To understand the distribution of age by retirement year—and thus the extent to which retirement year was simply a proxy for age or whether the two were sufficiently different to evaluate separately—we plotted the age distribution by retirement year (Supplemental Fig. 1). We found that the mean age at retirement rose slightly in successive retirement cohorts, and that in each retirement cohort, there was a distribution of retirement ages, such that retirement year and age were not collinear.

Overall, participants scored 2.03 (SD 1.81) on the organizational activity score in 2004, meaning that the average participant either was a member of two different types of organizations or was an active member of one type of organization (Table 2). The average person's category for close family members was 1.25 (SD 0.99) and for close friends was 0.99 (SD 0.96), corresponding to an average of about 3.75 close family members and 3 close friends.

Each of these measures varied significantly ($p < 0.05$) by retirement year, although the pattern was not linear and varied by engagement measure. Men also had significantly greater cross-sectional engagement in organizational activities, family, and friends than did women. Engagement on all three measures was also higher for older participants, for those who were married/cohabiting, and for those with excellent or good self-rated health.

When we plotted overall change (decreased, stayed the same, or increased between 1991 and 2004) for each type of engagement by retirement cohort, we observed little difference by cohort on any of the three measures (Fig. 1). For active organizational participation, across retirement cohorts, approximately 40 % decreased involvement, 30 % remained stable, and 30 % increased involvement. Close ties with

Table 1 Demographic and health characteristics of sample ($n = 10,692$)

	N	%
Year of retirement		
1992–1994	951	8.89
1995–1996	1311	12.26
1997–1998	1950	18.24
1999–2000	2788	26.08
2001–2002	2539	23.75
2003–2004	1153	10.78
Gender		
Man	8693	81.30
Woman	1999	18.70
Midlife SES		
Executive	1397	13.07
Manager	6278	58.72
Non-manual low-wage	1265	11.83
Manual low-wage	1752	16.39
Age, 2004		
51–58	3965	37.08
59–61	3215	30.07
62–65	3512	32.85
Marital status, 2004		
Not married/cohabitating	1227	11.49
Married/cohabitating	9449	88.51
Self-rated health, 2004		
Excellent/good	9285	86.84
Fair/poor	1407	13.16

family and friends were more likely to remain at pre-retirement levels, with about 25 % of individuals decreasing, 45 % remaining the same, and 30 % increasing.

Change in active organizational participation score

We tested whether change in active organizational participation during follow-up was predicted by retirement timing as well as by other known predictors of social engagement; all models are mutually adjusted (Table 3). Odds ratios are interpreted as the odds of increasing (or decreasing) by one unit on the outcome measure. For change in organizational activity participation, compared to those who retired 0–1 years before the 2004 measure, those who had been retired slightly longer were more likely to increase involvement (OR for 2001–2002 retirement cohort 1.22, 95 % CI 0.17, 1.39; OR for the 1999–2000 cohort 1.19, 95 % CI 1.04, 1.36). However, the retirement cohorts prior to these were not significantly different from the most recently retired group. We observed a negative socioeconomic gradient in organizational activity involvement wherein those of lower midlife occupational

Table 2 Social engagement characteristics of sample at follow-up in 2004, by sociodemographic and health characteristics

	Organizational activity score (range 0–10)			Mean category of close family members (3–4 contacts per category; range 0–3)			Mean category of close friends members (3–4 contacts per category; range 0–3)		
	Mean	SD	P for difference	Mean	SD	P for difference	Mean	SD	P for difference
Overall	2.03	1.80		1.25	0.99		0.99	0.96	
Year of retirement			0.0354			0.0002			<0.0001
1992–1994	1.97	1.81		1.34	1.00		1.04	0.94	
1995–1996	2.00	1.79		1.25	0.98		1.05	0.95	
1997–1998	1.99	1.75		1.30	1.01		1.04	0.98	
1999–2000	2.08	1.80		1.23	0.99		0.98	0.97	
2001–2002	2.10	1.84		1.23	0.99		0.96	0.97	
2003–2004	1.93	1.81		1.16	0.98		0.89	0.93	
Gender			<0.0001			<0.0001			<0.0001
Man	2.10	1.82		1.30	1.00		1.04	0.98	
Woman	1.72	1.70		1.01	0.92		0.77	0.85	
Midlife SES			<0.0001			<0.0001			<0.0001
Executive	2.45	1.98		1.27	0.98		1.08	1.02	
Manager	2.04	1.77		1.23	0.99		0.98	0.96	
Non-manual low-wage	1.75	1.72		1.17	0.99		0.87	0.93	
Manual low-wage	1.87	1.78		1.35	1.02		1.05	0.97	
Age, 2004			0.0432			<0.0001			<0.0001
51–58	1.97	1.78		1.21	0.99		0.95	0.96	
59–61	2.06	1.78		1.22	0.98		0.98	0.96	
62–65	2.07	1.85		1.31	1.01		1.05	0.97	
Marital status, 2004			0.2977			<0.0001			0.0117
Married/cohabitating	2.04	1.81		1.28	1.00		1.00	0.97	
Not married/cohabitating	1.98	1.77		0.98	0.93		0.93	0.88	
Self-rated health, 2004			<0.0001			<0.0001			<0.0001
Excellent/good	2.06	1.80		1.27	1.00		1.01	0.97	
Fair/poor	1.81	1.79		1.07	0.95		0.85	0.91	

grades were more likely to decrease involvement compared with those in high midlife grades (OR for midlevel managers 0.67, 95 % CI 0.60, 0.75; OR for manual low-wage workers 0.52, 95 % CI 0.45, 0.59). Those with poor health in 2004 were more likely than those in good health to decrease involvement (OR 0.81, 95 % CI 0.73, 0.90). Participation was negatively associated with age (OR for a one-year increase in age 0.97, 95 % CI 0.95, 0.99). Pre-retirement engagement was strongly negatively correlated with change in engagement.

Change in close ties with family and friends

We found no significant differences in change in close family contacts by retirement cohort nor by socioeconomic status or age. We did find that women were more likely than men to increase the number of family to whom they

felt close (OR 0.79, 95 % CI 0.71, 0.88), as were single people (OR 0.78, 95 % CI 0.69, 0.87). Again, pre-retirement ties with family members were strongly negatively associated with change (OR 0.33, 95 % CI 0.32, 0.35).

However, for change in close friends, we did see differences by retirement cohort. We found that compared with those who retired the most recently (2003–2004), earlier retirement cohorts tended to have a greater increase in number of friends, although there was not a clear linear pattern over time [1999–2000 retirement cohort (OR 1.19, 95 % CI 1.04, 1.37); 1997–1998 retirement cohort (OR 1.31, 95 % CI 1.11, 1.54); 1995–1996 retirement cohort 1.29 (95 % CI 1.07, 1.55); and 1992–1994 retirement cohort 1.26 (95 % CI 1.03, 1.55)]. Women had significantly greater decrease in number of friends compared with men (OR 0.78, 95 % CI 0.70, 0.87), as did those in poor health compared to those in good health (OR 0.77, 95 % CI 0.62, 0.86).

Fig. 1 Distribution of percent of the sample who decreased, remained the same, or increased social engagement in each of three domains between 1991 (pre-retirement) and 2004 (post-retirement), by retirement cohort. **a** Distribution of change in organizational activity participation by retirement cohort. **b** Distribution of change in number of close family members by retirement cohort. **c** Distribution of change in number of close friends by retirement cohort

Organizational participation in specific types of activities

Finally, we tested whether change in involvement in certain categories of activities that comprised the overall organizational activities measure was predicted by retirement timing and other activities (Table 4). All retirement cohorts were statistically significantly more likely to increase involvement in sports/hobby/leisure activities, compared with the most recently retired group. Otherwise, we found little evidence of a relationship between retirement timing and change in volunteering, professional organization/union involvement, or political/religious group involvement (although we did find that those who had been retired the longest were significantly more likely than the most recent retirement cohort to increase involvement in political or religious organizations (OR 1.60, 95 % CI 1.03, 2.46)). We also found negative

socioeconomic gradients in change in sports/hobby/leisure activities, volunteering, and political/religious group involvement. For example, compared to those who were executives, those who were midlevel managers were significantly more likely to decrease volunteering involvement (OR 0.57, 95 % CI 0.48, 0.68), as were low-wage non-manual workers (OR 0.39, 95 % CI 0.30, 0.50) and low-wage manual workers (OR 0.38, 95 % CI 0.31, 0.48).

Discussion

Some research suggests that social activities and relationships may shift with retirement. This study tested whether, in a cohort of “young-old” people for whom retirement age is statutory and who were not granted early retirement for health-related reasons, social engagement changes across the retirement transition. Specifically, we tested the extent to which social and demographic factors—particularly timing of retirement relative to the follow-up measure—predict that change. In general, we found that contrary to our hypotheses, time from retirement at the follow-up measure was not a particularly robust predictor of change in engagement over the 13-year period during which all participants retired, and any patterns observed were not linear and were not systematic across different measures of engagement. The more consistent finding was a negative association between midlife socioeconomic status and change in formal engagement from before retirement to after retirement, such that those of low SES were most likely to decrease.

Social ties with family and friends

We found that, in general, size of both familial and friend social networks increased after retirement compared with before, and that those who had been retired longer had more positive changes in network size compared with those who had just retired at the follow-up measure. These overall findings of increased engagement during retirement suggest that retirement could have provided participants with more time to spend with their families and friends. Some prior research finds that social networks tend to contract as individuals age (Cornwell et al. 2008; Schnitker 2007), while others have found no change (Pillemer and Glasgow 2001). However, our findings suggest that networks grew after retirement, rather than contracted. This finding is echoed by research showing that individuals younger than age 75 were more likely to add contacts over time, while those aged 75 and older were more likely to lose contacts through widowhood and poor health (van Tilburg and Broese van Groenou 2002). As in this study, the average age of participants in 2004 was 60 and thus

Table 3 Time since retirement in 2004 and other covariates as predictors of odds ratio (95 % CI) of a one-unit change in organizational activity involvement, changes in close family ties, and changes in close friends ties between 1991 (pre-retirement) and 2004 (post-retirement)

	Odds of change in organizational activity involvement		Odds of change in close family members		Odds of change in close friends	
	OR	95 % CI	OR	95 % CI	OR	95 % CI
Retirement cohort						
Retired 1992–1994	0.97	(0.79, 1.19)	1.20	(0.98, 1.47)	1.26	(1.03, 1.55)
Retired 1995–1996	1.08	(0.90, 1.29)	1.04	(0.87, 1.25)	1.29	(1.07, 1.55)
Retired 1997–1998	1.06	(0.90, 1.24)	1.15	(0.98, 1.35)	1.31	(1.11, 1.54)
Retired 1999–2000	1.19	(1.04, 1.36)	1.10	(0.96, 1.26)	1.19	(1.04, 1.37)
Retired 2001–2002	1.22	(1.07, 1.39)	1.12	(0.98, 1.27)	1.13	(0.99, 1.29)
Retired 2003–2004	1.0		1.0		1.0	
Gender						
Man	1.0		1.0		1.0	
Woman	0.99	(0.89, 1.10)	0.79	(0.71, 0.88)	0.78	(0.70, 0.87)
Occupational grade at midlife						
Executive	1.0		1.0		1.0	
Professional	0.67	(0.60, 0.75)	0.95	(0.85, 1.07)	0.94	(0.83, 1.06)
Nonmanual	0.58	(0.50, 0.68)	1.13	(0.97, 1.32)	0.92	(0.78, 1.07)
Manual	0.52	(0.45, 0.59)	1.03	(0.90, 1.19)	0.96	(0.84, 1.11)
Marital status						
Married	1.0		1.0		1.0	
Single	1.06	(0.94, 1.18)	0.78	(0.69, 0.87)	1.03	(0.91, 1.15)
Self-rated health						
Excellent/good	1.0		1.0		1.0	
Fair/poor	0.81	(0.73, 0.90)	0.74	(0.67, 0.82)	0.77	(0.62, 0.86)
Age (continuous, centered)	0.97	(0.95, 0.99)	0.98	(0.97, 1.00)	0.99	(0.97, 1.01)
Pre-retirement engagement (continuous)	0.54	(0.53, 0.55)	0.33	(0.32, 0.35)	0.29	(0.28, 0.31)

falls into the category of “young-old” (Neugarten 1974), our sample may not yet have experienced decreasing network size associated with age. It is possible that with longer follow-up we would observe some decrease.

Organizational activity participation

We found that certain social and demographic factors predicted increases in organizational activity participation, while others predicted decreases. Overall, those in the immediate post-retirement period tended to have the greatest positive change in activities overall, while effect estimates for earlier retirement cohorts also showed positive trends but were not statistically significant. When we looked more closely at the activities comprising the organizational activity measure, we found the strongest positive change by retirement cohort for sports/hobby/leisure activities and for political/religious organizations but not for volunteering or professional organizations/unions.

We observed negative socioeconomic gradients in organizational activity participation, wherein the lower socioeconomic groups were more likely to decrease participation

overall and in sports/hobby/leisure activities, volunteering, and political/religious organizations, compared with the highest-SES group. Prior studies examining associations between socioeconomic status and social engagement at older ages have found mixed results (Depp and Jeste 2006; Kubzansky et al. 1998). Our finding is troubling because it may indicate that in retirement, those who are the best-off become more engaged and reap attendant health benefits, while those who are of lower status decrease participation and miss out on health-enhancing opportunities. Given the documented health and wellbeing benefits of high social engagement at older ages (Berkman et al. 2004; Pillemer et al. 2000), decreased engagement among less-advantaged retirees may either widen or explain observed health disparities at older ages. Our findings are generally consistent with previous research suggesting that membership in certain types of organizations tends to be higher after retirement (Cornwell et al. 2008), particularly religious attendance and volunteerism (Miller and Nakamura 1996), although there is some evidence that trends in religious attendance may not continue for future retirement cohorts (Broese Van Groenou and Deeg 2010).

Table 4 Time since retirement in 2004 and other covariates as predictors of change in involvement in specific organizational activities between 1991 (pre-retirement) and 2004 (post-retirement)

	Odds of change in sports/hobby/leisure		Odds of change in volunteering		Odds of change in political/religious orgs		Odds of change in professional organizations or unions	
	OR	95 % CI	OR	95 % CI	OR	95 % CI	OR	95 % CI
Retirement cohort								
Retired 1992–1994	1.37	(1.08, 1.75)	0.70	(0.50, 0.98)	1.60	(1.03, 2.46)	0.96	(0.74, 1.25)
Retired 1995–1996	1.33	(1.07, 1.65)	0.95	(0.71, 1.29)	1.42	(0.96, 2.10)	0.94	(0.74, 1.19)
Retired 1997–1998	1.35	(1.12, 1.63)	1.02	(0.78, 1.32)	1.02	(0.72, 1.45)	0.91	(0.74, 1.12)
Retired 1999–2000	1.39	(1.19, 1.64)	1.17	(0.94, 1.47)	1.15	(0.86, 1.56)	0.95	(0.80, 1.14)
Retired 2001–2002	1.27	(1.09, 1.49)	1.23	(0.99, 1.53)	1.22	(0.91, 1.63)	0.99	(0.84, 1.18)
Retired 2003–2004	1.0		1.0		1.0		1.0	
Gender								
Man	1.0		1.0		1.0		1.0	
Woman	1.18	(1.04, 1.34)	0.98	(0.82, 1.17)	0.91	(0.72, 1.16)	0.62	(0.54, 0.72)
Occupational grade at midlife								
Executive	1.0		1.0		1.0		1.0	
Professional	0.82	(0.71, 0.94)	0.57	(0.48, 0.68)	0.65	(0.51, 0.82)	0.93	(0.80, 1.09)
Nonmanual	0.68	(0.56, 0.81)	0.39	(0.30, 0.50)	0.57	(0.41, 0.79)	1.18	(0.96, 1.45)
Manual	0.65	(0.55, 0.76)	0.38	(0.31, 0.48)	0.77	(0.57, 1.02)	1.07	(0.90, 1.29)
Marital status								
Married	1.0		1.0		1.0		1.0	
Single	0.94	(0.82, 1.08)	1.24	(1.03, 1.49)	1.29	(1.01, 1.66)	1.10	(0.95, 1.28)
Self-rated health								
Excellent/good	1.0		1.0		1.0		1.0	
Fair/poor	0.65	(0.57, 0.74)	0.88	(0.74, 1.04)	0.98	(0.78, 1.23)	1.05	(0.92, 1.20)
Age (continuous, centered)	1.01	(0.99, 1.03)	0.94	(0.91, 0.97)	0.96	(0.93, 1.00)	0.99	(0.97, 1.01)
Pre-retirement engagement (continuous)	0.25	(0.23, 0.26)	0.08	(0.07, 0.09)	0.11	(0.10, 0.13)	0.16	(0.15, 0.18)

Time since retirement as a determinant of engagement changes?

We had initially hypothesized that we would see clear patterns of change in social engagement by recency of retirement relative to the follow-up measure. In most of our analyses, time since retirement was a less robust predictor of change in engagement than other factors such as gender, self-rated health, or lifetime SES. There are several potential explanations for why we did not see as robust a role of retirement as we expected based on literature to date. The first is methodological; we had only two points of measurement of engagement, and with more assessments spaced throughout the retirement transition, we may have been able to observe a more precise effect of retirement timing, as has been seen in other GAZEL studies (Vahtera et al. 2009; Westerlund et al. 2009; Westerlund et al. 2010; Zins et al. 2011). Substantively, the social and psychological transition into the third age may actually begin before retirement, and thus retirement may not represent a

clear inflection point for change in engagement (Damman et al. 2013; Ekerdt and DeViney 1993). Finally, it is possible that changes in formal and informal engagement would have occurred naturally, and that while retirement co-occurs with the period in which those changes would take place, it is not a causal factor.

Limitations and strengths

Our study has several important strengths. A major limitation of many observational studies of retirement is health selection into retirement; when retirement age is not statutory, less healthy individuals often retire sooner than average, while healthier individuals may continue to work beyond the typical retirement age. Because of statutory retirement in this population, the inability to continue working past that pre-specified age, and our elimination of participants who were granted early retirement for reasons related to poor health, such an effect is less likely, although is possible. Another strength is that the ability to consider

engagement both before and after retirement allows us to examine effects of retirement and life cycle changes that occurred during the intervening period.

The greatest limitation of this study is that we had only two assessments of social engagement, taken 13 years apart. Although we know whether people changed overall, we do not know when during the follow-up those changes occurred, and whether the changes were sudden or gradual. Such knowledge would be necessary in order to articulate a precise intervention point for preventing declines in engagement during retirement.

Furthermore, non-retirement life transitions during the same period as retirement—such as grandparenthood, widowhood, or onset of major illness or disability—may either directly or indirectly influence social engagement (Donnelly and Hinterlong 2010). While we adjusted for age in all models, residual confounding and selection bias are possible. The relatively young average age at retirement in the cohort may lessen the possibility of confounding by other life events associated with older age.

We may also be observing period or cohort differences in engagement that cannot be ascribed to retirement per se or that would have happened even without retirement (Broese Van Groenou and Deeg 2010; Cozijnsen et al. 2010), although the distribution of ages by retirement year partially accounts for this possibility by reducing conflation between year of retirement and age. In addition, recent changes in French policy have raised the retirement age beyond the ages at which participants in the present sample retired. That change, which will affect future cohorts of retirees, may serve as an important instrument by which to disentangle the age, period, and cohort differences in social engagement observed here, permitting analysis of the role of retirement age in shaping changes in engagement.

Another limitation is that, due to data constraints, we were only able to assess two dimensions of social ties and four dimensions of organizational activity participation that we combined to form our overall measure. However, prior research has shown that quality of such relationships and frequency of contacts, rather than quantity of friends or organizational commitments, may be a critical predictor of health status (Lubben et al. 2006). Future studies that examine trajectories of social engagement, especially as it relates to health, may obtain more precise effect estimates by measuring multiple dimensions of social engagement and their quality.

Finally, this study is done in a cohort of French men and women who have had very stable work histories over most of their careers. It remains to be seen whether the experience of this cohort is generalizable to other French men and women in the work force or in other countries. It is important to note; however, that in most other respects, social and economic conditions have been related to health

outcomes in the GAZEL cohort in a way consistent with most other occupational cohorts in other industrialized countries (Zins et al. 2009).

Conclusions

This study adds to the understanding of social engagement patterns trajectories with respect to retirement in a socioeconomically diverse sample. As the global population ages and the number of retirees grows, it is critical to understand the social changes that occur for individuals at the retirement transition.

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