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Subjective age and dementia

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Abstract

Objective—Existing evidence indicates that a younger subjective age is a marker of successful aging, including better health and cognition. Building upon this evidence, it is likely that individuals with dementia might feel older. However, subjective evaluation of age might not be affected by dementia because these individuals tend to be anosognosic and report positive health-related quality of life.

Methods—Data from two cross-sectional samples from France and the United States were used to compare the subjective age ratings of individuals with and without dementia.

Results—Results from both samples revealed that individuals with dementia felt younger than their age but did not differ from the controls, even after controlling for sex, chronological age, education, and self-rated health.

Conclusion—The present study suggests that there are no large differences in the subjective experience of age between healthy individuals and those with dementia.

Keywords

dementia; subjective age; aging

Introduction

There is considerable evidence that the majority of older adults feel younger than their actual age (Galambos, Turner, & Tilton-Weaver, 2005; Gana, Alaphilippe, & Bailly, 2004; Kleinspehn-Ammerlahn, Kotter-Grühn, & Smith, 2008; Montepare, 2009; Rubin & Berntsen, 2006). This subjective experience of age is an important marker of physical,

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biological, and psychological aging (Infurna, Gerstorf, Robertson, Berg, & Zarit, 2010; Keyes & Westerhof, 2012; Stephan, Demulier, & Terracciano, 2012; Stephan, Sutin, & Terracciano, 2015). Specifically, a younger subjective age is associated with fewer chronic conditions (Kleinspehn-Ammerlahn et al., 2008), fewer depressive symptoms (Keyes & Westerhof, 2012), higher physical functioning and better self-rated health (Infurna et al., 2010; Stephan et al., 2012). In addition, feeling younger is associated with slower biological aging, as indicated by markers of better muscular, pulmonary, and metabolic functions (Stephan et al., 2015).

Subjective age and cognitive functioning

Recent studies have found that subjective age is associated with the level and change of cognitive functioning. Specifically, feeling younger than one's age is prospectively associated with better cognitive functioning (Stephan, Caudroit, Jaconelli, & Terracciano, 2014; Stephan, Sutin, Caudroit, & Terracciano, in press), whereas feeling relatively older compared to peers is predictive of low concurrent memory performance and steeper decline in immediate and delayed recall (Stephan et al., in press). These results led us to question what might be the experience of subjective age in adults with dementia. However, although subjective age is predictive of current and future cognitive performance, longitudinal data indicate that baseline cognitive functioning is unrelated to change in subjective age (Stephan et al., in press). The evidence from previous studies comes from population-based samples of older individuals, not clinical samples with cognitive impairment. Therefore, little is known about the subjective age of people with dementia and whether cognitive impairments are associated with subjective age. Thus, the present study aims to compare subjective age in samples with and without dementia.

Subjective age and dementia

While the impact of dementia on depression, anxiety, and change in personality have been studied extensively, no research has investigated how individuals with dementia perceive their age. Although a younger subjective age is associated with better cognitive performance (Stephan et al., 2014; Stephan et al., in press), there are also reasons to expect that individuals with dementia may report a younger subjective age despite their cognitive, functional, and behavioral impairments. Among individuals with AD and other dementias, cognitive functioning and health-related quality of life (HRQoL) are not linked (e.g., Bosboom & Almeida, 2016; Conde-Sala, Turró-Garriga, Garre-Olmo, Vilalta-Franch, & Lopez-Pousa, 2013; Trigg, Watts, Jones, & Tod, 2011). Indeed, HRQoL tends to remain positive despite increasing severity of dementia and greater cognitive, functional, and behavioral deterioration (Bosboom & Almeida, 2016; Conde-Sala et al., 2014; Selwood, Thorgrimsen, & Orrell, 2005). The difficulties with encoding new information into long-term memory might contribute to the relatively stable self-assessment. In addition, a large proportion of those with dementia suffer from anosognosia about their cognitive function, specifically AD and associated dementias (e.g., Akai, Hanyu, Sakurai, Sato, & Iwamoto, 2009; Derouesné et al., 1999; Migliorelli et al., 1995; Orfei et al., 2010), which is an impaired ability to recognize the presence or appreciate the severity of deficits in sensory, perceptual, motor, affective, or cognitive functioning (Kotler-Cope & Camp, 1995). Anosognosia is associated with more positive self-appraisals and becomes increasingly

worse with the progression of dementia (Clare, Marková, Verhey, & Kenny, 2005; Conde-Sala et al., 2014). Therefore, compared to their cognitively healthy counterparts, individuals with dementia may be less sensitive to impaired cognitive and physical functioning when rating their subjective age. Finally, prior research on personality change in dementia has shown that people with AD may underestimate changes in their personality traits (Duchek, Balota, Storandt, & Larsen, 2007; Pocnet, Rossier, Antonietti, & Gunten, 2011; Rankin, Baldwin, Pace-Savitsky, Kramer, & Miller, 2005). They may fail to update their self-image once affected by the disease and assess their former personality rather than current personality traits (Rankin et al., 2005). Thus, these studies suggest that patients with dementia may feel as young as they were before the onset of dementia.

The present study

The purpose of the present study is to examine subjective age among individuals suffering from dementia. Specifically, we test two competing hypotheses. First, based on our previous work (Stephan et al., 2014; Stephan et al., in press), we expect that individuals without cognitive impairment will report a younger subjective age compared to patients with dementia. Second, based upon prior studies (e.g., Bosboom & Almeida, 2016; Conde-Sala et al., 2014; Pocnet et al., 2011; Rankin et al., 2005), individuals with dementia might not update their felt age and might maintain a younger subjective age despite worsening health conditions. These contrasting hypotheses were tested using data from two independent case-control studies from France and the United States (US). Two samples were included for replication and generalization.

Methods

Participants

There were two participant subgroups, one in France and one in the US. To be eligible for the dementia group in the France sample, the individual had to meet Diagnostic and Statistical Manual of Mental Disorders 4th edition (DSM-IV) criteria, or the National Institute of Neurological and Communication Disorders and Stroke–Alzheimer’s Disease and Related Disorders Association criteria (McKhann et al., 1984), but was screened out if they could not state their subjective age. Sixty-eight individuals from nursing homes and assisted living residences met inclusion criteria, but 19 were excluded because they were unable or refused to answer to the assessments, including 9 individuals who were specifically unable to report their subjective age (Figure 1). Thus, complete data were obtained from a convenience sample of 49 individuals diagnosed with mild-to-moderate dementia of Alzheimer’s type aged 73–93 years old (MoCA: mean = 15.96, $SD = 3.60$). In the US, individuals with dementia, mainly AD but also mixed cases or other diagnosis (e.g., vascular dementia, frontotemporal lobar degeneration) were recruited through a not-for-profit community organization that offers support groups to caregivers, respite for individuals with dementia, and other services to families of individuals with dementia. Thirty-seven individuals met inclusion criteria and 7 were excluded because they could not state subjective age. The final sample included 30 individuals with dementia aged 77–82 years (MoCA: mean = 10.70, $SD = 5.11$).

There were no formal inclusion criteria for the control group but individuals were excluded if their cognitive screening score evaluated by the Montreal Cognitive Assessment (MoCA) was in the impaired range or if they could not state their subjective age. In France, 81 individuals from community centers and seniors clubs were recruited. Of the 81 older adults originally recruited, 16 participants were excluded because of MoCA < 26, suggesting the presence of mild cognitive impairment (MCI) or dementia (Nasreddine et al., 2005). The final sample included 65 individuals aged 60–91 years not cognitively impaired. In the US, a total of 60 individuals were recruited from a retirement community, but 6 individuals were excluded from the analyses because of missing subjective age (or they wrote down that they felt “younger” without specifying an age), 14 individuals were excluded from the analyses because of MoCA < 26, and 9 individuals were excluded because of both missing subjective age and MOCA < 26. The final sample included 31 individuals aged 77–81 years.

Procedure

Procedure was the same in all subgroups and countries. All participants were assessed individually in quiet rooms by trained licensed clinical neuropsychologists or trained research assistant. After giving informed consent, participants in the dementia and control groups completed a questionnaire measuring socio-demographic characteristics, self-rated health, and subjective age. In the dementia US sample, the trained research assistant obtained informed consent from all caregivers, and the consent or assent was obtained from the individuals with dementia, depending on capacity. Of note, prior research revealed that individuals with mild to moderate dementia are able to complete standardized questionnaire providing reliable self-evaluations (Trigg, Jones, & Skevington, 2007). All participants also completed the MoCA. This information was used to exclude individuals from the control group and to provide an overall level of cognitive functioning in each group. No compensation was offered for participating in the study.

Measures

Subjective age—In both the French and US samples, subjective age was assessed by asking participants to specify, in years, how old they felt most of the time. Drawing upon prior research (Kotter-Gröhn & Hess, 2012; Mock & Eibach, 2011; Rubin & Berntsen, 2006), participants’ felt age was subtracted from their chronological age, and this difference score was divided by chronological age. When a participant’s felt age was younger than his or her chronological age, a positive score was obtained, whereas a negative value reflected a tendency to feel older. For example, a participant who scored +0.10 felt 10% younger, whereas a participant who scored –0.10 felt 10% older than his or her chronological age.

Global cognitive functioning—In both samples, global cognitive functioning was assessed with the MoCA (Nasreddine et al., 2005). The maximum possible score was 30 points. An extra point was added to the total score for participants with <12 years of education. Higher scores indicated better cognitive functioning.

Self-rated health—In the French sample, self-rated health was measured with a single item: “As a whole, how do you rate your current health?” with a Likert-type answering scale ranging from 1 (*poor*) to 6 (*excellent*) (Benyamini, Leventhal, & Leventhal, 2003). In the

control US sample, the self-rated health was assessed with a single item “In general, would you say your health is...” with response options ranging from 1 (*poor*) to 5 (*excellent*). For the sample with dementia, we asked the caregivers, “In general, would you say his/her health is...” with response options ranging from 1 (*poor*) to 5 (*excellent*).

Covariates—A number of variables potentially associated with subjective age were controlled for in the analysis. In both the French and US samples, chronological age (in years), sex (coded as 0 for women and 1 for men), and education (number of years of formal schooling) were included as covariates. For the French sample, participants in the control group were asked to give their date of birth. For individuals with dementia, this information was obtained from medical records. In the US sample, age of the individuals with dementia was obtained from the caregivers. Individuals in the control group reported their age.

Data analysis

In both the French and US samples, a one-way analysis of variance (ANOVA) was conducted to test whether dementia group and control group differed in chronological age, education, self-rated health, and cognitive functioning; chi-square tests were used to compare the number of women and men between the groups. An analysis of covariance (ANCOVA) was then conducted in each sample to compare the subjective age of the groups with and without dementia, controlling for sex, chronological age, education, and self-rated health.

Results

Preliminary analysis

Descriptive statistics for French and US samples are presented in Table 1. For the French sample, the ANOVA revealed that the group with dementia was older $F(1, 113) = 65.35, p < .001$, had less education, $F(1, 113) = 13.03, p < .001$, and worse cognitive functioning $F(1, 113) = 651.32, p < .001$, compared to the control group. There was no significant differences between groups for self-rated health, $F(1, 113) = 0.13, p = .72$, or sex ($\chi^2(1) = 3.38, p = .07$). For the US sample, the group with dementia had fewer women ($\chi^2(1) = 8.93, p = .003$), fewer years of education, $F(1, 60) = 25.13, p < .001$, worse self-rated health, $F(1, 59) = 20.27, p < .001$, and worse cognitive functioning, $F(1, 60) = 320.56, p < .001$, compared to the control group. There was no significant difference in chronological age, $F(1, 60) = 0.30, p = .59$.

Main analysis

French sample—On average, individuals with dementia felt 13.4% younger than their chronological age, whereas cognitively healthy controls reported feeling 14.3% younger. The analysis of Covariance (ANCOVA) found no statistically significant difference for subjective age between cases and controls, $F(1, 107) = 0.06, p = .80$, controlling for sex, chronological age, education and self-rated health.

US sample—In contrast to the French sample, the group with dementia reported a greater tendency to feel younger (17.3%) compared to controls (15.8%), but the difference was not

significant. Indeed, controlling for sex, chronological age, education and self-rated health, the ANCOVA found no significant difference between groups, $F(1, 54) = 0.56, p = .46$.

Analysis combining the results from the French and US samples confirmed that there was no significant difference between the dementia and control groups ($d = 0.03; p > .05$).

Discussion

In this study we examined differences in subjective age between individuals with dementia and cognitively healthy older adults from France and the US. We found non-significant differences between cases and controls in both countries, which suggests that individuals with dementia feel as young as individuals without cognitive impairment.

These null findings are of interest because previous studies have shown that patients with dementia of Alzheimer's type are unaware of their cognitive, functional, and behavioral deficits (e.g., Akai et al., 2009; Derouesné et al., 1999; Orfei et al., 2010), and that anosognosia is associated with more positive self-appraisal (Conde-Sala et al., 2014). Thus, it is likely that when asked to evaluate how old they feel, individuals with dementia are not attuned to their current cognitive and functional status. Furthermore, it is plausible that people with dementia may feel younger because they may have difficulties updating their self-image after the onset of the disease (Rankin et al., 2005). Specifically, it is possible that the felt age of individuals with dementia may correspond to the last age they remember before the onset of the disease.

The present study contributes to existing knowledge on subjective age. Previous research has found that the majority of older adults without cognitive impairment feel younger than they actually are (Galambos et al., 2005; Gana et al., 2004; Kleinspehn-Ammerlahn et al., 2008; Montepare, 2009; Rubin & Berntsen, 2006). Therefore, this study adds to existing literature and shows that the tendency to feel younger extends to people with neurodegenerative diseases. The study also adds to the existing research on the link between subjective age and cognition. Interestingly, it has been shown that individuals in the US without cognitive impairment feel younger than their European counterparts (Westerhof, Barrett, & Steverink, 2003). Although not significant, there were slightly different patterns of results in the French and the US samples, which might be due to cultural factors or might be partially explained by the differences in the level of cognitive impairment (i.e., MOCA scores) between the two samples.

This study has limitations that should be taken into account before drawing conclusions about the subjective experience of age in dementia. Primary data collection in older adults with cognitive impairment is difficult, and recruiting large samples is a challenge. We were able to collect two independent case-control samples, across two countries. Still, the lack of a difference in the tendency to feel younger between individuals with dementia and those without cognitive impairment could be due to the size of the current samples. Indeed, in the French sample, we had about 80% power to detect a medium effect size ($d = 0.5$) at $p = .05$ (two-sided). We had about 50% power to detect a similar medium effect size in the smaller US sample. Thus, it is possible that there are smaller differences between cases and controls

that we were unable to detect given the limited power of this study. Another limitation is the cross-sectional design. Additional longitudinal studies are needed to examine whether subjective age changes during the course of dementia. In addition to long-term changes, longitudinal studies should evaluate the reliability of the subjective age question by repeating the assessment within a short interval to examine test-retest reliability. Future research would also benefit from investigating subjective age in the early stages of the disease, such as mild cognitive impairment (MCI) or other neurodegenerative diseases.

In conclusion, the present study fills a gap in the existing literature on subjective age. It indicates that the tendency to feel younger extends to individuals with dementia. Longitudinal studies are needed to better understand how subjective aging is affected by neurodegenerative disorders.

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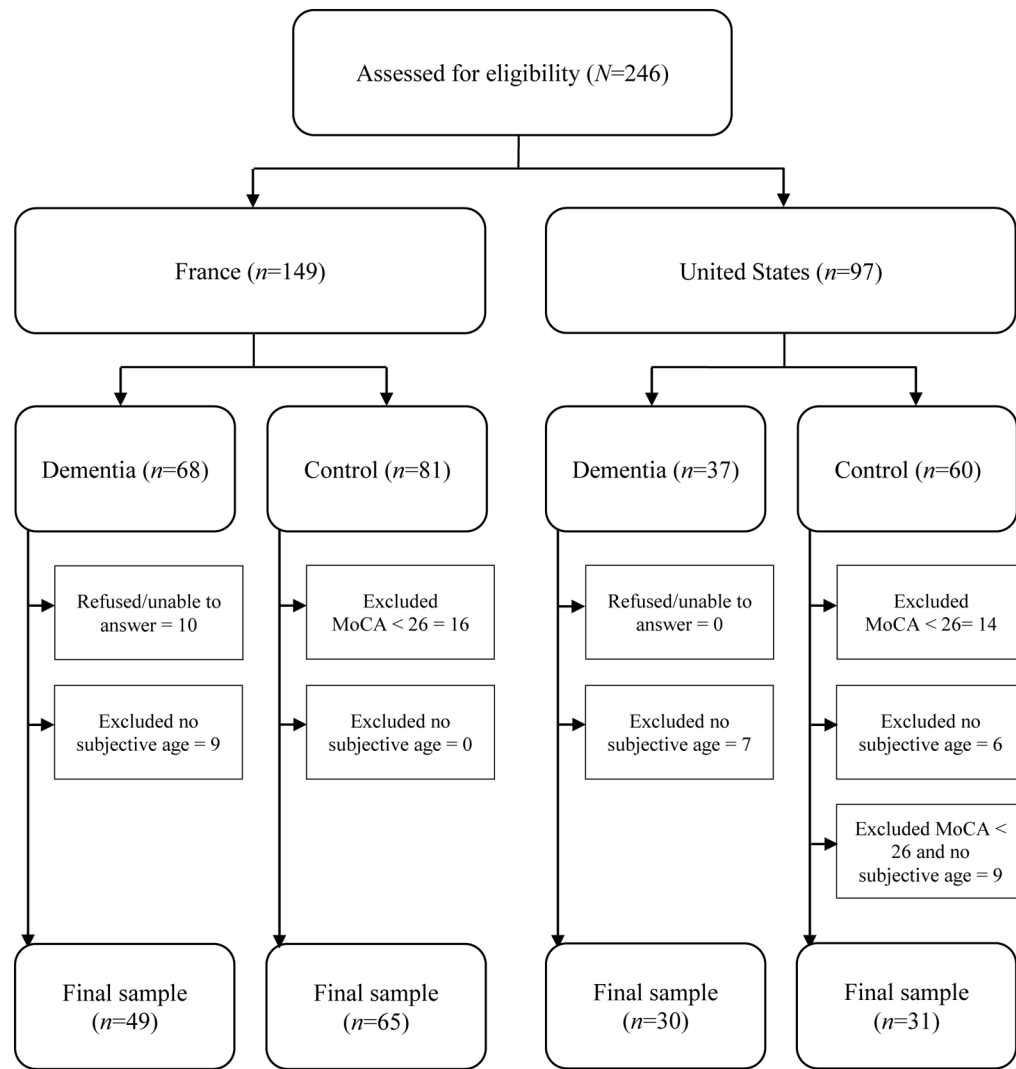


Figure 1.
Recruitment flow diagram.

Table 1
Descriptive statistics for the groups without and with dementia among French and US samples.

	French sample				US sample			
	Control group (<i>n</i> = 65)		Dementia group (<i>n</i> = 49)		Control group (<i>n</i> = 31)		Dementia group (<i>n</i> = 30)	
	<i>M</i> / <i>%</i>	<i>SD</i>	<i>M</i> / <i>%</i>	<i>SD</i>	<i>M</i> / <i>%</i>	<i>SD</i>	<i>M</i> / <i>%</i>	<i>SD</i>
Sex (% female)	66.1	-	81.6	-	90.3 ^a	-	56.7 ^a	-
Age (in years)	73.08 ^a	8.22	83.88 ^a	5.13	78.61	5.71	79.53	7.33
Education	9.21 ^a	3.83	6.63 ^a	3.72	17.31 ^a	2.65	14.00 ^a	2.49
Self-rated health	4.31	0.85	4.24	1.01	3.99 ^a	0.84	3.14 ^a	1.06
MoCA	28.28 ^a	1.29	15.96 ^a	3.60	27.81 ^a	1.47	10.70 ^a	5.11
Subjective age ^b	0.143	0.11	0.134	0.12	0.158	0.12	0.173	0.31

Notes:

^a Reflects significant differences between control group and dementia group among samples.

^b Proportional subjective age = (chronological age - subjective age)/chronological age. A higher value represent a younger subjective age.