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Predictors of Subjective Age in People Aged 40-79 Years: A Five-year Follow-up Study.

The Impact of Mastery, Mental and Physical Health

Abstract

### **Objectives**

Assessing subjective age perception (SAP) and changes in SAP as well as exploring which variables of socio-demographic, health and personal mastery independently predicted SAP.

### **Methods**

The panel data are from two waves of the Norwegian Study of the Life Course, Ageing and Generations (NorLAG). Our sample consists of 2,471 people aged 40-79 years at baseline who were surveyed in 2002/03 (T1) and 2007/08 (T2). Univariate and multiple regressions were performed; multivariate analyses assessing the relative importance of the independent variables (at T1) for the SAP at T2.

**Results**

Older chronological age, good physical health, good mental health, a high level of personal mastery and having lower education significantly predicted a youthful SAP. For the whole sample, older age and a high level of personal mastery were the most important predictors. For those aged 40 to 49 being a man, having lower education, good physical health and high personal mastery predicted a younger SAP, whereas in the group aged 50-59 years being married/cohabiting and having a high level of education were predictors of an older SAP. For those aged 60-69, high personal mastery was the only independent predictor of a younger SAP. For those aged 70-79 years, only health – good mental and physical health – independently predicted a younger SAP..

**Conclusions**

Most respondents feel younger than their chronological age, the more the older they are. Self-rated physical and mental health and personal mastery are associated with subjective age perception and vary in different age groups.

**Keywords:** Subjective age perception, personal mastery, mental and physical health, longitudinal panel study

Predictors of Subjective Age in People Aged 40-79 Years: A Five-year Follow-up Study.

The Impact of Mastery, Mental and Physical Health

### **Introduction**

Subjective age, studied in a longitudinal perspective (with panel data), is the focus of this paper. Reasons for focusing on subjective age is important to wellbeing, health and services (Uotinen, Rantanen, & Suutama, 2005). We examine how age identity changes as people age and the factors which predict subjective age. A special emphasis is on mastery, in addition to mental and physical health.

The concept of subjective age, also known as age identity, cognitive age or perceived age, provides a multidimensional view of the aging process and encompasses more social, psychological and personal meaning than chronological age (Barrett, 2003; Henderson, Goldsmith & Flynn, 1995; Hubley & Arim, 2012; Kaufman & Elder, 2003; Montepare, 2009; Teuscher, 2009). After the age of 40, people have reported feeling, on average, 20% younger than their chronological age (Rubin & Berntsen, 2006). Demakakos, Gjonca and Nazroo (2007) suggested that age perceptions and age self-perceptions (age identity) are in part shaped by dynamic interactions with social and cultural systems that frame our understanding of age. If people tend to feel younger than they are, this implies that they have a mental representation of age against which to compare their own current age status. Subjective age reflects personal evaluation of chronological age, role involvement, health and physical limitations as well as awareness of social age norms (Uotinen, Rantanen, & Suutama, 2005).

Subjective or self-perceived age has been measured in many ways, ranging from single items to a multi-item scale or a multidimensional measure with subcomponents such as psychological and physical age (Arbeau, Galambos, & Jansson, 2007; Barak, 2009; Galambos, Turner, & Tilton-Weaver, 2005; Montepare, 1996; Stephan, Caudroit, & Chalabaev, 2011; Teuscher, 2009). Subjective age may be reported in years (or individuals may rate their subjective age relative to their chronological age on a scale ranging from “a lot younger than my

age” to "a lot older than my age" (Galambos, Barker, & Tilton-Weaver, 2003;Montepare, 1996). Regardless of how it has been measured, consistent age-related differences in subjective age are reported.

### **Longitudinal Studies**

Barrett (2003) pointed out that nearly all reported work on age identity had used cross-sectional data. Almost ten years later, there are still rather few examples where researchers empirically examine age identity in a longitudinal design. But over time, some studies have had a longitudinal design (Boehmer, 2007; Bowling, See-Tai, Ebrahim, Zahava, & Priyha, 2005; Demakakos et al., 2007; Kleinspehn-Ammerlahn et al., 2008; Markides & Bolt, 1983; Markides & Ray, 1988; Uotinen et al., 2005; Uotinen, Rantanen, Suutama, & Ruoppila, 2006). The follow-up periods of longitudinal studies of subjective age varies from four years (Markides & Bodt, 1983) and eight years (Markides & Ray, 1988) to a short period of one year (Demakakos et al., 2007). Also the age groups included and variables examined differ.

Thus, studies exploring the association between how individuals perceive their age and different variables across a longer lifespan are limited (Montepare, 2009). Henderson, Goldsmith and Flynn (1995) stated that studies of subjective age tend to have small convenience samples. Researchers stated that studies on age identification are in most cases based on North American data (Barak, 2009; Barak & Rahtz, 1999; Uotinen et al., 2006; Zola, 1962). The main aim of our study is to assess subjective age and changes in subjective age over a 5-year period among middle-aged and older Norwegian people (40-79 years old) living in their own homes. We want to explore which variables of

demographic and social characteristics as well as mental health, physical health and 'sense of control' independently of each other predict subjective age 5 years later.

Furthermore, we want to assess which variables of demographic and social characteristics as well as mental health, physical health, and 'sense of control' independently of each other predicts subjective age 5 years later in the separate age groups 40-49 years, 50-59 years, 60-69 years, and 70-79 years. We have not found any studies that have examined whether demographic and social characteristics, as well as mental health, physical health and 'sense of control', independently of each other predict subjective age for subjects aged 40 -79 years in a large study of people (N=2,471) living in their own homes, using a longitudinal design. Mental health and physical health are frequently used variables. We suggest that sense of control may have an independent influence on the way people react to their own aging. People who feel more in control of their own health situation and circumstances of life may have a more youthful subjective age.

## **Material and Methods**

### **Subjects**

This article is based on panel data from the Norwegian Life Course, Ageing, and Generation Study (NorLAG), that was started (Time 1) in 2002/3, with respondents aged 40-79 years at T1. The second wave of the study was conducted in 2007/8 (Time 2). NorLAG made use of a random stratified (by age and sex) sample of adults from 30 municipalities in Norway, representing different geographic regions. A combination of telephone interviews and postal questionnaires was used in both waves. The first wave of data collection included a gross sample of 8,298 adults. At T1, a total of 5,559 persons (67 %) responded to the telephone interview. Subsequent to this, 4,149 (75 %) returned the postal

questionnaire. Response rates were lower among older groups, and among persons with lower education (Holmøy, 2004). The net sample of the Nor LAG panel (persons interviewed at Time 1 and Time 2) consists of 3774 individuals, which implies that 71.6 % of the eligible respondents from T1 were retained at T2. This corresponds to 50 % of the eligible gross sample at T1 (Bjørshol, Høstmark, & Lagerstrøm, 2010), which may result in selectivity that may have affected the longitudinal patterns in subjective age. Both at T1 and T2, the most important reason for not participating was not wishing to participate (21 % of the gross sample at T1, 28% of the gross sample at T2). The oldest participants were more often hindered from participating, compared to other age groups (Bjørshol, Høstmark, & Lagerstrøm, 2010). The current study includes data from all those who answered the question about how old they felt (see the section "The Measurements") at both T1 and T2 (N=2,471). The study was approved by the Norwegian Social Science Data Services. All the participants in the study received written information about the study.

### **The Measurements**

Most commonly, subjective age is measured as the age a person feels (Galambos et al . 2005; Hubley & Russell, 2009). It is also called 'felt age' (Henderson et al., 1995; Infurna et al., 2010; Kaufman & Elder, 2002; Kleinspehn-Ammerlahn et al., 2008 ; Stephan, Caudroit, & Chalabaev, 2011). To assess *felt age*, researchers usually ask participants how old they feel. In our study, felt age has been measured using the response to the question, "Many people feel younger or older than they actually are. How old do you generally feel in years?" This is in line with previous research (Barak & Rahtz, 1999; Kaliterna, Larsen & Brkljacic, 2002; Teuscher, 2009; Stephan, Caudroit, & Chalabaev, 2011).

In order to obtain information about the interaction between participants' chronological age and felt age, we created a new variable following the procedure used previously by Uotinen, Rantanen, Suutama, and Ruoppila (2006). In this study, a difference score called subjective

age perception (SAP) was computed by subtracting participants' chronological age from their felt age. A positive score indicates the years that the persons feel older than they are, a negative score the years the persons feel younger than they are (ibid).

### **Demographic and social characteristics.**

The respondents' age is measured in years, ranging between 40 and 79 years. The age reported is the age at the time of the interview; at T1 and T2. Chronological age was categorized in 10-year intervals; 40-49; 50-59; 60-69; 70-79 years old. Gender is coded 1 for women, 0 for men.

Educational attainment is measured in two categories corresponding to those who reported to have university or college education get the value 1, and those who have lower than university or college education get the value 0. Partnership status is measured by a dummy variable coded 1 if the respondent was at that time married or cohabitant, if not, (being single) it was coded as zero (0). These data are from public records (Statistics Norway), added with the respondents' informed consent.

*Sense of control.* Sense of control refers to a persons' feeling or belief regarding the extent to which they can control or influence outcomes (Mirkowsky & Ross, 1998). Individuals with a strong sense of control believe and expect that their action can affect their world. Sense of control can conceptually be separated into two components: assumptions about the controllability of the environment and belief about oneself. Bandura (1977) calls these two components 'outcome expectancy' and 'self-efficacy expectancy'. Sense of control is measured by the Personal Mastery Scale (Pearlin & Schooler, 1978). The scale is comprised of seven items that use a 5-point Likert scale ranging from strongly agree [1] to strongly disagree [5]. This is a short and robust scale focusing on perceived control of those aspects of life that people consider personally important (Pearlin & Piolo, 2003). The seven items are: 1) I have little control over things that happen to me; 2) What happens to me in the future

mostly depends on me; 3) There is really no way I can solve some of the problems I have; 4) There is little I can do to change many of the important things in my life; 5) I often feel helpless in dealing with the problems of life; 6) Sometimes I feel I'm being pushed around in life; and 7) I can do just about anything I really set my mind to. The first two items are from the telephone interview, while the five last items are from the postal questionnaire. The index of sense of control is an average of the person's response scores. In this sample the average ranges from 9 to 35 with a high score indicating a high level of mastery. The Cronbachs' alpha for this sum score is 0.72 in the present study. The Personal Mastery Scale combines the outcome aspect and self-efficacy aspect of sense of control based on the same items (Slagsvold & Sørensen, 2008).

*Physical and mental health summary scores: the Short Form-12 questionnaire.* The Short Form-12 Test (SF-12) is based on self-report and is used as a measurement of the participant's perceived health. We used the summary measures PCS-12 (physical domain of SF-12, scores ranging from 0 to 100) and MCS-12 (mental domain of SF-12, scores ranging from 0 to 100). The SF-12 data were analyzed according to the instruction manual. SF-12 and the Short Form-12 questionnaire (Ware, Kosinski, & Keller, 1996). The SF-12 is one of the most widely used health measurement instruments. Results from the SF-12 can be reported as two summary scores: the mental component summary (MCS) score and physical component summary (PCS) score.

### **Statistics**

The data were analysed using SPSS programs for Windows (version 16.0) (Pallant, 2007). A Pearson chi-square test (for categorical variables) and a t-test (for continuous variables) were used to analyse significant bivariate associations between factors related to health, coping resources, and demographic variables.



The dependent variable of interest is the subjective age-perception: the number of years older or younger than their actual chronological age that they felt (SAP). Univariate linear regression models were performed with "subjective age perception" (SAP) as dependent variable and the other measurements as independent variables. Furthermore, multiple regression models were performed, assessing the relative importance of the independent variables (measured at T1) for the subjective age perception (SAP) at T2. Models are estimated for the total sample and for four age groups each ranging over ten years (40-49, 50-59, 60-69, 70-79).

## **Results**

### **Sample Characteristics at Baseline**

In total, 2,471 persons were studied. In Table 1 the characteristics of the participants at baseline are shown. Mean age at baseline in 2002 was 56.0 years (SD 10.0). Approximately half the sample was female and half were aged 55 years or more. Three-quarters (75.8%) were married or cohabiting at the time. One third (33.4 %) had university or college education; a bachelor degree or more. Analysis by gender shows that the mean age is significantly higher among men than among women at T1 (Table 1): in our sample 56.9 years vs. 55.3 years, ( $p < 0.001$ ). Men had significantly better results on the recorded variables of mental and physical health as well as sense of control compared to women (Table 1). A larger percent of men than women were married or cohabitant. Among both men and women, approximately one in three had been educated to bachelor degree level or more.

[Table 1 approximately here, see page 26 ]

Most persons in our sample felt younger than their actual age. At T1 the mean subjective age perception (SAP) was 7.3 years younger than chronological age (SD=7.5) and at T2 the mean subjective age perception (SAP) respectively was 7.7 years younger (SD=8.0). The mean value of SAP shows a significantly younger age image at T2 than at T1 ( $p=0.01$ ). Men felt significantly younger at T2 than women, though not at T1 (Table 1).

The SAP for the whole sample at T1 ranged from 54 years younger than their chronological age to 48 years older than their chronological age, compared to the range 60 years younger than their chronological age to 29 years older at T2.

SAP in the age groups 40-49; 50-59, 60-69 and 70-79 at T1 were -6.1(SD 6.6), -7.1(SD 7.1), -8.4 (SD 8.2), -8.6 (SD 8.7) and at T2 were -6.6 (SD7.2), -7.4 (SD 7.8), -9.0 (8.2), -8.5 (SD 9.6), respectively. The discrepancy between chronological age and felt age (SAP) increases the older the respondents are (not shown in Table).

At T1 more than three out of four of the sample (76.7 percent) perceived themselves to be younger (i.e. a youthful age image) than their chronological age, while 16.5 percent were feeling as old as their chronological age, i.e. no age discrepancy, and 6.8 percent perceived themselves as older than their chronological age. The corresponding figure at T2 was 75.6, 16.3 and 8.2 percent.

A closer look at the persons who were in the 'no age discrepancy' category at baseline (16.5 % of the whole sample) showed that at the follow-up 41.3 % of them had remained in that category, whereas 42.8 % had shifted into the more youthful and 16 % into the older subjective age category. Regarding those feeling more youthful at T1, at T2 85.7 percent still felt more youthful, 9.6 percent reported no age discrepancy, and 4.7 percent reported feeling older. Furthermore, among those in the category of older subjective age perception, 27.8 % remain in that

category while 31.4 % moved into the no age discrepancy category and 40.8% into the youthful age image category at T2 (not shown in Table). There was thus a significant shift to a more youthful age category (chi square= 480,  $p < .001$ ). There were no significant differences regarding gender with respect to subjective age perception at T1, but at T2 men had a significantly younger age perception than women (see Table 1).

### **Prediction of SAP**

The result of the univariate regression analyses shows that all the variables measured in 2002/2003, except for the variable married/cohabitant (yes or no), significantly predicted subjective age perception in 2007/2008 (Table 2).

[Table 2 approximately here 27]

Older chronological age, being a man, having lower education, good physical health, good mental health as well as a high level of personal mastery at baseline were all significantly associated with a youthful SAP in 2007/2008.

Regarding educational level, ancillary analyses show that those with the lowest level of education (8-10 years) feel most youthful, with a discrepancy between actual age and felt age (SAP) of -8.6 years at T2, on average. With increasing levels of education, SAP decreases. Among those with the highest level of education (18 years or more), SAP is -7.0 years, i.e. they feel 7 years younger than their actual age.

The multivariate analyses revealed that older chronological age, good physical health, good mental health, a high level of personal mastery and having lower education were independently of each other were significant in predicting a youthful subjective age image in 2007/2008 (Table 2).

Educational attainment can be expected to differ by age. That is, younger age groups tend to be more highly educated than older groups. In order to determine whether the effects of education and the other independent variables are modified by age, we estimated separate models for four age groups, 40-49, 50-59, 60-69, and 70-79 years old.

When searching for predictors of SAP in 2007/2008 separately in the four age groups (40-49, 50-59, 60-69,70-79), the results of the univariate as well as the multivariate regression analyses are shown in Table 3.

[Table 3 approximately see page 28]

According to the univariate analyses, chronological age in 2002/2003 did not significantly predict SAP at 2007/2008 in any of the four age groups. Good physical health and mental health were significant in predicting younger SAP in the youngest age group (40-49) and the oldest age group (70-79). A high level of personal mastery predicted a younger subjective age image among those aged 40-49 years and those aged 60-69 years. Furthermore, being a man was significantly associated with a younger SAP in the age group 40-49 years, and being single correspondingly in the age group 50-59 years.

In Table 3, the last four columns show the multivariate analyses. For those aged *40 to 49 years*, being a man, having a lower education, good physical health and high perceived mastery all independently of each other predicted a younger SAP. In the group aged *50-59 years*, being married/cohabiting independently predicted an older SAP and having a lower level of education predicted a younger SAP at T2. In the age group *60-69 years*, a high perceived personal mastery was the only independent predictor of a younger SAP. In the oldest age group, *70-79 years*, good mental and physical health independently of each other predicted a younger SAP at T2.

### Discussion

The present investigation has revealed that during middle age and across the later adult years before the age of 80 years, individuals experience discrepancies between their subjective and actual ages. For the whole sample aged 40-79 years, older age as well as a high level of personal mastery were the most important predictors significantly associated with a more youthful SAP.

Our results on SAP and of a younger SAP are in line with prior research (longitudinal and cross-sectional) that has consistently shown that adults and older people feel younger than their chronological ages (Hubley & Hultsch, 1996; Kaufman & Elder, 2002; Mock & Eiback, 2011; Montepare, 2009; Montepare, 1996; Öberg & Tornstam, 2001; Stephan, Caudroit, & Chalabaev, 2011; Hubley & Russel, 2009; Kaliterna et al., 2002; Keyes & Westerhof, 2012; Kleinspehn-Ammerlahn et al., 2008; Rubin & Berntsen, 2006; Teuscher, 2009). The general conclusion drawn from these studies is that the difference between people's chronological age and the age people feel they are becomes more pronounced with advancing chronological age.

The prospective design allowed us to examine individual shifts in SAP. The discrepancy between our participants' actual age and felt age was larger at T2 than at T1, in line with Uotinen, Rantanen, Suutama, & Ruoppila (2006). Compared with the results from the longitudinal study by Kleinspehn-Ammerlahn, Kotter-Grühn and Smith (2008), we found in our study a significantly lower difference between chronological age and felt age. In our study a mean difference of 7.3 at T1 and 7.7 at T2 were observed. Although it appears that the difference between the means is statistically significant, that difference seems trivial (-7.3 vs -7.7). The mean SAP of 7.3 at T1 is approximately half of the average about 13 years below their actual age in the sample of Kleinspehn-Ammerlahn, Kotter-Grühn and Smith (2008). In their sample, the discrepancy between

people's actual age and their felt age did not change over time. However, their age group ranged from 70 to 104 years, and in their sample older individuals reported larger discrepancies between subjective and chronological age than the sample average. In a (cross-sectional) study by Kaufman and Elder (2002), with an age range of 51-92 years, the respondents felt 8 years younger than their actual age. In their study, there is also greater variance in age identification than in actual age. In our sample, although 39 years separated the youngest from the oldest, the range in subjective age at baseline (T1) was 102 and at the follow-up (T2) 89 years, which corresponds well with Kaufman and Elder (2002), who reported 39 years differences in actual age and 94 in subjective age.

In accordance with other researchers (Gana, Alaphilippe, & Bailly, 2004; Kaufman & Elder, 2003; Kleinspehn-Ammerlahn et al., 2008; Stephan, Caudroit, & Chalabaev, 2011), our results show that chronological age was independently associated with prediction of subjective age perception in the whole sample. However, this result was differentiated when analyzing the four age groups separately. Then age is no longer a significant predictor in any age group. Other factors were more important.

We found a (bivariate) gender difference in the subjective age perception at T2 ( $p=0.012$ ), men feeling younger than women, but not at T1 ( $p=0.058$ ). However, the  $p$  value of 0.058 at T1 was very near to conventional levels of statistical significance ( $p=0.05$ ). The finding that men and women differ on subjective age perception at T2 and almost significant at T1 are inconsistent with most research examining gender difference (Kaufman & Elder, 2003; Logan et al., 1992; Uotinen et al., 2005), finding no gender difference. Some studies, however, have shown gender differences in subjective age, with women feeling younger than men (Barrett, 2005; Pinguart & Sørensen, 2001). The age discrepancy may be a result of our sample including a wider age-span. Predictively, only in the youngest age group (40-49 years), being a man predicts a

younger SAP. To hypothesize: it may be that "young" middle aged men still have a feeling of being attractive, more than women, a gender difference disappearing in older age groups.

Our study indicates that in the younger groups (40-49 years, 50-59 years), those with lower education feel more youthful than those with higher education. This finding is not in accordance with previous research (Barrett, 2003; Markides & Boldt, 1983; Rubin & Berntsen, 2006) which found that respondents who assumed old subjective ages had significantly fewer years of education. However, Kaufman and Elder (2003) reported that education has no significant effect on age identity. Our finding could indicate an interaction between which age group the participants belong to and level of education. However, when statistically analyzing for interaction effect, we found no significant interaction between the age variable and level of education regarding predicting subjective age. A question could be if middle aged people with lower education "need" a younger self-image more than people with higher education. Their higher status and position in working life and organizations, may give people with higher education a self-confidence in middle-age which allows a somewhat less youth-oriented self-image. Age may not be that stigmatizing yet. Also, blue collar jobs traditionally have demanded strength and youth –bodily strength being more significant and higher valued than in traditional white collar jobs (Brandth & Haugen, 2005; Mosse, 1996; Willis, 1977).

In the total sample, being single is a predictor of younger SAP, but further analyzed, we find this result only in the age group 50-59 years. Henderson, Goldsmith and Flynn (1995) concluded that there were no significant relationships between subjective age and gender, marital status, education, income and race when these were examined in two U.S. samples.

In our study, factors related to mental and physical health were found to be associated with prediction of subjective age, which correspond well with previous research (Solomon, Helvitz, & Zedach, 2009). Most research suggests that those suffering from poor health are more likely to evaluate themselves as older relative to their chronological age compare to those in good health (Solomon et al., 2009). Several studies have shown that people with good subjective health feel younger (Barak, 1998; Barrett, 2003; Bowling et al., 2005; Hubley & Russell, 2011; Hubley & Russel, 2009; Kaufman & Elder, 2003; Kleinspehn-Ammerlahn et al., 2008; Stephan, Caudroit, & Chalabaev, 2011; Staats et al., 1993), in line with our results. Our study shows that regarding the whole sample, as well as more specifically in the age groups 40-49 years and 70-79 years, good physical health proved to significantly predict younger felt age compared to those in poorer physical health. “Young” middle-aged people (40-49 years) may appreciate good health giving possibilities of still youthful self-presentation. The relationship between subjective age and health is complex and is probably not due to a simple mechanism. Possible mediators between subjective age and health may be physiological factors such as fitness and strength and/or psychological factors such as self-efficacy and response shift. Response shift is defined as changes in the meaning of one’s self-evaluation resulting from changes in internal standards, values and conceptualization (Sprangers & Schwartz, 1999). Changes in self-evaluation which might occur especially in the two age group 50-59 years and 60- 69 years, might be result of adjustment or adaptation to aging where health is not considered important, by changes in the participants internal standards. Subjective age is a self-perceived construct influenced by a person’s experiences, beliefs, expectations and perceptions. In the age groups 50-59 years and 60-69 years, people may be more adjusted to poor health , an adjustment which may be caused by a change in the participants internal standards. However, this adjustment might be more difficult in the oldest age group. Our study indicates that the moderating effect regarding health seems



to be different in the different age group. Hubley and Russell (2009), found that self-rated health explained a slightly greater proportion of subjective age for individuals 70-97 years old than for individuals 55-69 years old. From a life-span perspective, there are reasons to expect that the relationship between self-rated health and subjective age may vary from early adulthood to old age. In particular, health becomes an increasingly important life goal with advancing age (Smith & Freund, 2002),

Our results also show that good mental health predicted lower subjective age in 2007/2008. Predictive associations were observed in the whole group as well as in the oldest age group (70-79 years), where good mental health (SF-12) was associated with a young subjective age. It seems reasonable that good health (physical and mental) becomes especially important for keeping a younger self-image among older persons, when the risk of reduced health increases rapidly by higher age.

We also observed that having good mastery significantly predicted feeling having a younger age for the whole sample. These results correspond with findings in several previous studies (Boehner, 2007; Bowling et al., 2005; Hubley & Hultsch, 1996; Infurna et al., 2010; Teuscher, 2009). A high sense of mastery is associated with positive health perceptions, less depressive symptoms, and may contribute to positive self-evaluation (Jang, Kim, & Chirboga, 2006). Mastery beliefs may allow individuals to adjust to and downgrade the impact of possible age-related losses in cognitive, physical, or social domains (Baltes & Baltes, 1990). Moreover, experience of mastery may protect individuals from society's partially negative norms of aging (Logan et al., 1992), and support a younger age identity. A youthful subjective age is related to higher general and specific self-efficacy beliefs (Boehmer, 2007; Infurna et al., 2010; Schafer & Shippee, 2010; Stephan, Caudroit, & Chalabaev, 2011). Schafer and Schippee (2010) found that those with younger age identities were more optimistic about their ability to maintain memory

and other aspects of cognitive ability, regardless of their objective age. Thus, this leads to the possibility that individuals harboring a youthful subjective age experience higher levels of life satisfaction because they feel they are able to more successfully deal with the aging process, to better control their circumstances of life. Our results are consistent with key life span proposals about the pivotal role of perceived control for successful aging. Why mastery is significantly predictive in the age group 40-49 years and 60-69 years, has to be left open to further studies.

The age-based identities in our study are generated within a social context with age-conceptions which powerfully shape people's wellbeing (Schafer & Shippee, 2010). In modern cultures, youthfulness is a prized status, and accordingly ageism and negative stereotypes of aging flourish in society (ibid). Eschewing "oldness" and preserving a youthful identity may, therefore, lead to empowering strategies people use to counteract the negative cultural message associated with aging (Heckhausen & Schults, 1998; Schafer & Shippee, 2010). Our study and other studies (; Schafer & Shippee, 2010; Sijuwade, 2009) show the beneficial effects of mastery predicting younger age identities. Youthfulness may thus be both an outcome and an aspect of self-efficacy and mastery

There are some limitations of the study regarding generalization. The respondents for whom we have longitudinal data at T2 are somewhat younger, in better health, and more educated than the sample at T1 (Bjørshol, Høstmark, & Lagerstrøm, 2010). Attrition associated with low education is a limitation when it comes to the generalization of the study. Our data are based primarily on subjective data and could have been improved and more interesting if objective data such as health, diseases, functional capacity and social participation had been available. Subjective health has proved to be predictive of important outcomes like functional decline and mortality (Burke, Schnittger, O'Dea, Buckley, Wherton, & Lawlor, 2012), and to accord well with objective health status (Hunt, McKenna, McEwen, Backett, Williams, & Papp,

1980). Another possible limitation is that age groups differ in sample sizes and that might affect the results. There are several strengths of the study. One strength of the study design is that the baseline respondents were a national sample of people aged 40 - 79 years. Another strength is the large sample size, representative of people living in their own homes, and that the design is longitudinal. The study can thus provide clues on the direction of causality. Another strength is the wide age range covered, which may permit a more comprehensive account of how age perception varies and are predicted by different factors in different age groups.

### **Conclusion**

In conclusion, personal age identity changes as people age. The present study emphasizes the subjectivity of aging and the importance of a youthful subjective age. More than three-quarters of the sample perceived themselves to be younger than their chronological age. Subjective age depends on the perception of personal mental and physical health as well as a sense of control. The results showed that perceived health and internal control measures play a significant role in people's (40-79 years old) self-perceived ages. The present study indicates that the relationships between self-rated health, perceived sense of control, and subjective age across the life span vary in different age groups, as people age. Our findings on the causality (predictive power) of the factors included in the analyses, need to be explored in future studies. More established results should be related to theorizing about important factors influencing aging with a youthful identity. Our data may provide clues on the relevance for youthful new strategies in order to maintain physical and mental health, and a feeling of internal control and feeling of mastery when people get older. This strategies might consist of both of physical exercise as well as mental coping with ageing and cultural image

of old age. The study contributes to existing knowledge and paves the way for future research aiming at better understanding of the sources of subjective age from adulthood to old age.

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**Table 1**  
 Characteristics of the whole sample and by gender (n=2471)

| Variables                         | The whole sample<br>(N=2471) |      |              |        |             | Men<br>(n=1177) | Women<br>n=1294) | P-value |
|-----------------------------------|------------------------------|------|--------------|--------|-------------|-----------------|------------------|---------|
|                                   | Min                          | Max  | Perc 25-75   | Median | Mean (SD)   | Mean (SD)       | Mean (SD)        |         |
| <i>Continuous variables</i>       |                              |      |              |        |             |                 |                  |         |
| Chronological age T 1<br>(n=2471) | 40                           | 79   | 48-63        | 55     | 56.0 (10.0) | 56.9 (10.0)     | 55.3 (10.0)      | <0.001  |
| SAP T1*                           | -54                          | +48  | -11.0-(-1.0) | -7.0   | -7.3 (7.5)  | -7.6 (7.4)      | -7.0 (7.6)       | 0.058   |
| SAP T2*                           | -60                          | +29  | -12.0-(-1.0) | -7.0   | -7.7 (8.0)  | -8.1 (8.1)      | -7.3 (7.9)       | 0.012   |
| Physical health (SF-12)           | 10.9                         | 65.3 | 45.6-55.9    | 53.6   | 49.0 (10.3) | 50.2 (9.1)      | 47.9 (11.1)      | <0.001  |
| Mental health (SF-12)             | 14.9                         | 69.6 | 53.2-59.9    | 57.7   | 55.5 (7.4)  | 56.1 (6.6)      | 54.9 (8.0)       | <0.001  |
| Personal mastery (PMS)            | 10.0                         | 35.0 | 23.0-29.0    | 26.0   | 26.0 (4.7)  | 26.2 (4.5)      | 25.8 (4.9)       | 0.014   |
| <i>Categorical variables</i>      |                              |      |              |        |             |                 |                  |         |
| Women ( %)                        | 52.4                         |      |              |        |             |                 |                  |         |

|                        |      |      |      |        |
|------------------------|------|------|------|--------|
| Married/cohabitant (%) | 75.8 | 81.6 | 70.5 | <0.001 |
| Educational level**    | 33.4 | 32.8 | 34.0 | 0.55   |
| University/College (%) |      |      |      |        |
| Employed (%)           | 68.7 | 68.5 | 68.8 | 0.80   |

Abbreviations: SF-12=*The 12-item Short Form health survey* and PMS=Personal Mastery Scale (Pearlin and Schooler 1978), Perc=Percentile, SD=Standard Deviation

T1= measured in 2002/ 2003 and T2= measured in 2007/ 2008

\*Subjective age perception (SAP)= felt age minus chronological age;\*\* level 1: <bachelor, master, PhD (University and college ); level 2: ≥Bachelor, master phd  
(Negative SAP: Feeling younger than one's actual age, Positive SAP: Feeling older than one's actual age)

**Table 2.**

Linear regression analysis of socio-demographic variables, health, mastery and self-esteem (2002/2003) predicting subjective age perception (SAP)#2007/2008 for the whole group

| Variables at T1                                     | Univariate analyses | Multiple analyses |
|---|---------------------|-------------------|
|   | Beta## (p)          | Beta## (p)        |
| Chronological age when interviewed at baseline      | -0.11 (<.001)       | -0.12 (<.001)     |
| Gender (0=men, 1=women)                             | 0.05 (0.012)        | 0.03 (0.12)       |
| Married/cohabitant (0=no, 1=yes)                    | 0.02 (0.23)         | 0.03 (0.13)       |
| Education (level 1=0[reference value], level 2=1) * | 0.05 (0.01)         | 0.06 (0.003)      |
| Physical health (SF-12)                             | -0.05 (0.03)        | -0.06 (0.01)      |
| Mental health (SF-12)                               | -0.08 (<0.001)      | -0.05 (0.02)      |
| Personal mastery PMS                                | -0.06 (0.002)       | -0.08 (0.001)     |

Abbreviations: SF-12=*The 12-item Short Form health survey* and PMS=Personal Mastery Scale (Pearlin and Schooler 1978)

\*level 1 <bachelor, master, PhD(Universit y and college ) level 2 ≥Bachelor, master, PhD

#subjective age perception (SAP)= "How old do you feel?" (Felt age) minus Chronological age

## Beta is the standardized linear regression coefficient estimate

**Table 3**

Linear regression analysis for variables predicting subjective age perception five years later (SAP) # in different age groups (n=2471)

| Variables 2002/2003     | Univariate analyses                   |                                       |                                       |                                       | Multivariate analyses      |                            |                            |                            |
|-------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                         | 40-49 years<br>(n=758)<br>Beta### (p) | 50-59 years<br>(n=819)<br>Beta### (p) | 60-69 years<br>(n=590)<br>Beta### (p) | 70-79 years<br>(n=304)<br>Beta### (p) | 40-49 years<br>Beta ## (p) | 50-59 years<br>Beta ## (p) | 60-69 years<br>Beta### (p) | 70-79 years<br>Beta### (p) |
| Age when interviewed    | 0.06 (0.11)                           | 0.03 (0.38)                           | 0.02 (0.67)                           | -0.05 (0.36)                          | -0.06 (0.08)               | -0.04 (0.25)               | -0.03 (0.56)               | 0.02 (0.76)                |
| Gender                  | -0.11 (0.004)                         | -0.04 (0.26)                          | -0.02 (0.60)                          | 0.03 (0.57)                           | 0.09 (0.02)                | 0.04 (0.26)                | 0.01 (0.76)                | -0.09 (0.17)               |
| Married/cohabitant      | 0.04 (0.32)                           | -0.09 (0.01)                          | -0.01 (0.86)                          | -0.02 (0.69)                          | -0.01 (0.86)               | 0.11 (0.002)               | 0.01 (0.81)                | -0.04 (0.53)               |
| Educational level**     | -0.07 (0.07)                          | -0.05 (0.14)                          | -0.01 (0.88)                          | -0.05 (0.38)                          | 0.07 (0.05)                | 0.08 (0.03)                | 0.01 (0.82)                | 0.05 (0.37)                |
| Physical health (SF-12) | 0.11 (0.002)                          | 0.05 (0.13)                           | -0.003 (0.94)                         | 0.11 (0.05)                           | -0.10 (0.01)               | -0.06 (0.10)               | 0.03 (0.52)                | -0.14 (0.03)               |
| Mental health (SF-12)   | 0.10 (0.03)                           | 0.03 (0.42)                           | -0.07 (0.10)                          | 0.15 (0.01)                           | -0.05 (0.24)               | -0.01 (0.73)               | -0.03 (0.53)               | -0.14 (0.02)               |
| Personal mastery PMS    | 0.12 (0.001)                          | 0.06 (0.11)                           | 0.10 (0.01)                           | 0.09 (0.14)                           | -0.09 (0.02)               | -0.06 (0.11)               | -0.10 (0.03)               | -0.03 (0.70)               |

Abbreviations: SF-12=*The 12-item Short Form health survey* and PMS=Personal Mastery Scale (Pearlin and Schooler 1978)

#subjective age perception (SAP)= “How old do you feel“ minus Chronological age

;\*\* level 1: <bachelor, master, phd (Universit y and college ); level 2: ≥ Bacherlor, master phd

## Beta is the standardized linear regression coefficient estimate

