

Macro- and micro-level predictors of age categorization: results from the European Social Survey

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Abstract This study evaluated macro- and micro-level variables associated with individuals' perception of the ending of youth, the beginning of old age, and the length of the middle age period. The European Social Survey is a biennial multi-country, cross-sectional survey. Our analysis is based on the fourth wave, which included a rotating module on ageism. The source sample consisted of 28 countries and a total of 54,988 respondents. Whereas macro-level variability accounted for 14 % of the variance associated with the perception of the ending of youth, only 5.7 % of the variance associated with the perception of the beginning of old age was accounted for by macro-level variability. Almost 10 % of the variance associated with the perception of the middle age period was associated with macro-level variability. Different patterns of macro- and micro-level correlates emerged for the ending of youth, beginning of old age, and the period of middle age. Overall, results demonstrate that individual differences in the perception of the ending of youth, the beginning of old age, and the length of the middle age period are more pronounced than contextual differences. Results also suggest that individuals' mental maps regarding the timing of these events are not necessarily concordant.

Keywords Contextual level · Subjective · Hierarchical analysis · Epidemiology · Terror management theory

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Introduction

This study evaluated two specific age categorizations: individuals' perception of the ending of youth and the beginning of old age. These periods represent the beginning and ending of middle age. The period of middle age is less defined relative to youth or old age, as individuals may admit to not being young anymore; but still differentiate themselves from the elderly, by considering themselves as not old just yet (Markides and Boldt 1983; Packer and Chasteen 2006). This period has received substantially less research attention compared to transitions to early adulthood or old age (Toothman and Barrett 2011).

The view of age as a socially constructed phenomenon is shared by many researchers (Cameron 1969; Neugarten et al. 1965; Nikander 2000; Roebuck 1979; Vincent 2008). As a socially constructed phenomenon, age has major implications and ramifications at the macro-, meso-, and micro-levels (Hendricks 2004; Settersten et al. 2003). At the societal/macro-level, age underlies the organization of almost every important aspect in our lives, including, family, education, work, and leisure time activities (Hagestad and Uhlenberg 2005). Age also plays a substantial formal role in laws, regulations, and policies. At the group (meso) or individual/micro-level, age plays a large informal role by determining individuals' expectations, appraisals, and actual behaviors (Settersten et al. 2003).

Despite the numerous definitions of age, chronological age is most often used to categorize individuals as young versus old (Nikander 2009). Nevertheless, chronological age is not always associated with other markers of aging, such as disability, marital status, retirement status, living arrangement, or subjective age (Bowling et al. 2005). As a result, there is no uniformly agreed upon age, at which the

ending of youth or the beginning of old age are expected to take place.

Over the years, attempts have been made to more clearly define certain life periods, with the period of young adulthood receiving considerable attention. Researchers have examined this period in relation to major milestones, such as the entrance into the labor force, the acquisition of residential and economic independence, and the formation of a family (Andrew et al. 2006; Benson and Furstenberg 2006; Billari and Liefbroer 2010; Kirkpatrick Johnson et al. 2007). Others have identified personal qualities as indicative of the emergence of young adulthood (Arnett 2000; Johnson et al. 2006). Similar to the diverse opinions concerning the entrance to young adulthood and its determinants, there is no uniformly agreed upon definition of old age (Kaufman and Elder 2002; Kirk 1992). Although in the developed world, the age of 65 is often considered the official beginning of old age (Sanderson and Sergei 2008), variations in the perception of the beginning of old age and its determinants have been noted (Covey 1992; Denton and Spencer 2002; Gilleard 2009).

Nydegger (1986) proposed that in addition to a general timetable, widely shared by many, specialized, personal, and interdependent timetables also exist. These timetables might be associated with individuals' perceptions regarding the ending of youth and the beginning of old age. Specialized timetables refer to social contexts as being responsible for some of the variations in the perception of life stages. These social contexts include, but are not limited to various forms of social inequality, such as age, gender, or socioeconomic status. Hence, even though these timetables are not shared by all, they are shared by certain segments of the population. Personal timetables, on the other hand, emphasize the individual's own unique experiences, which are not necessarily in accordance with the general or the specialized timetables, as clearly put by Nydegger (1986, p. 145); these are the experiences that are "not shared and not normative." In this study, subjective and objective health and well-being represent unique experiences potentially associated with one's personal timetables. Finally, interdependent timetables refer to the mutual influences between individuals' life course trajectories (Nydegger 1986). Living with a spouse or partner, for instance, could be one example in which, individuals' lives and perceptions are interrelated.

Adapting this perspective, this study evaluates how specialized, personal, and interdependent timetables are associated with the perception of the ending of youth, the beginning of old age, and the period of middle age. Accordingly, chronological age constitutes a form of social inequality that may be associated with one's specialized timetable (Nydegger 1986). Research has shown that as individuals grow older, the discrepancy between their

subjective and objective age tends to increase, as they increasingly define their subjective age as younger than their chronological age (Kleinspehn-Ammerlahn et al. 2008). The few studies that have examined chronological age in relation to age categorization have yielded similar findings (Hori 1994; Toothman and Barrett 2011). Therefore, older chronological age is expected to be associated with higher thresholds for the ending of youth and beginning of old age.

Gender may also be associated with specialized timetables. Although both men and women suffer from the negative effects of ageism (Palmore 2001), the effects of ageism on women appear stronger (Bart 1969; Clarke and Griffin 2008). For instance, research has shown that relative to men, women are perceived as older at a younger age (Kogan 1979). In addition, women are expected to go through various life transitions at an earlier age than men (Hori 1994). In contrast to the gender of the person being categorized, the gender of the observer who is engaged in age categorization may yield different predictions. Studies have shown that women report later deadlines for various life course transitions (Toothman and Barrett 2011). They also are more likely to report a younger age identity when compared to men (Barrett 2005), possibly, as a means to enhance their social status in the face of amplified ageist views. Given past research, we expect women to report higher thresholds to the ending of youth and beginning of old age relative to men.

Socioeconomic status as measured by education is another determinant of more specialized timetables. This is because socioeconomic status is highly correlated with many life course trajectories, including marriage, employment, and parenting (Martin 2004; Thorton et al. 1995). In general, those of higher socioeconomic status tend to go through various life course stages later in life and, thus, postpone the ending of youth or entrance to adulthood (Smith 2004). They also tend to enjoy better health and a longer life expectancy, which are all associated with a younger age identity (Barrett 2003; Markides and Boldt 1983; Taylor 2010) and potentially later thresholds for various life stages (Toothman and Barrett 2011). Therefore, we expect respondents of higher levels of education to assign higher thresholds to the ending of youth and the beginning of old age.

Both objective and subjective health indicators are potential determinants of one's personal timetables (Toothman and Barrett 2011). Researchers have attempted to define biological age, using physical or biological indicators, such as maximum breathing capacity, visual acuity, reaction time, or the division of cells (Demongeot 2009; Mitnitski et al. 2002). These indicators correlate well with visible signs of aging, suggesting for example, that individuals who appear old also have deteriorated physical

abilities and worse health status (Barrett 2003; Borkan and Norris 1980). Self-perceived health has also shown to be a highly reliable measure of one's physical health and even mortality (Ayalon and Covinsky 2009). Consistently, research has shown that more impaired individuals are more likely to report an older age identity (Bowling et al. 2005; Hubley and Russell 2009). Therefore, we expect that those individuals of worse health also are more likely to perceive lower thresholds for the ending of youth and the beginning of old age.

Well-being may also be associated with one's personal timetables. Better well-being has shown to be associated with better health and even a lower risk for mortality (Wiest et al. 2011), with all of these variables being strong predictors of age identity (Bowling et al. 2005; Hubley and Russell 2009). The alternative view of age identity as a predictor of well-being also yielded consistent findings (Baum and Boxley 1983; Westerhof and Barrett 2005; Westerhof et al. 2012). Hence, it is expected that higher levels of well-being (in this study measured as life satisfaction) are associated with higher thresholds for the ending of youth and the beginning of old age.

Interdependent timetables reflect the interconnectedness in individuals' life course trajectories (Nydegger 1986). In this study, we examine whether sharing a residence with a spouse or a partner is related to age categorization. Past research has shown that not being married is associated with an older age identity (Logan et al. 1992). This was largely attributed to widowhood or divorce, which pose additional life roles on the individual. Hence, it is expected that sharing a residence with a spouse or partner would be associated with higher thresholds for the ending of youth and the beginning of old age.

Although, no doubt, micro-level variables are responsible for some of the deviations from the general, widely accepted timetable, macro-level (contextual, at the country-level) variations in timetables and life course trajectories should also be considered (Barak 2009; Dannefer and Daub 2009). Differentiating between macro- and micro-level predictors provides information on how much of the variability in people's age categorization is due to broader socio-cultural effects and how much can be attributed to individual differences among people. This reflects a long tradition in the social sciences seeking to explain categorization by either macro- (e.g., social identity theory; Tajfel and Turner 1986) or micro-level variables (e.g., authoritarian personality style; Brown 1965). It also reflects a debate between two competing life course theories concerning the way life courses are organized. Whereas the institutionalization approach argues that opportunities and constraints imposed by the state determine the life course developments (i.e., macro-level effects) (Kohli 2007), the individualization approach argues that norms and

expectations have a reduced effect on the life course, which is nowadays primarily determined by individual choice (i.e., micro-level effects) (Buchmann 1989).

Consistent with the distinctions among specialized, personal, and interdependent timetables at the micro-level (Nydegger 1986), it is possible to identify macro-level variables of potential associations with these various timetables. In this study, we evaluate several sources of societal inequality at the macro-level as potential determinants of one's specialized timetables. Relying on chronological age, but taking into consideration the fact that the average life expectancy varies across the world, demographers defined old age as the starting point at which the remaining average life expectancy is between 10 and 15 years (Sanderson and Sergei 2008). Although old age in the developed world is broadly defined as the age of 65, in the developing world, old age is defined as the age of 50 or 55 (World Health Organization; WHO 2011). It is expected that countries that enjoy a higher life expectancy also hold on average, higher thresholds for the ending of youth and the beginning of old age (Denton and Spencer 2002).

Similar to the case of socioeconomic status at the micro-level, it is expected that macro-level indicators of socioeconomic status are also associated with deviations from the general timetable. Specifically, countries that enjoy higher levels of education and higher gross national income (GNI) also are more likely to enjoy better health and a longer average life expectancy (Kunst and Mackenbach 1994; Preston 2007). Therefore, individuals in these countries are expected to report higher thresholds for the ending of youth and the beginning of old age.

The Gini coefficient, on the other hand, is commonly used as a measure of inequality of income or wealth, with a higher score indicating greater inequality (Atkinson 1970). As past research has shown, greater societal inequality is often associated with scarce resources which intensify tension and intolerance toward out-group members (Esses et al. 2001). We hypothesize that in those countries that suffer from higher levels of inequality, individuals will be more likely to perceive earlier thresholds for the ending of youth and the beginning of old age, as this potentially represents more stigmatizing attitudes.

As for macro-level variables associated with personal timetables, official retirement age is a potential macro-level indicator of importance, because it represents the country's demands and norms regarding the beginning of old age (WHO 2011). A higher official retirement age is expected to be associated with respondents perceiving higher thresholds for the ending of youth and the beginning of old age.

A macro-level variable of potential association with interdependent timetables is fertility rate in the country. Fertility rate is an indicator of modernity and is highly

correlated with levels of education and average life expectancy in the country (Philip Morgan 2003). At the micro-level, being a parent is associated with an older age identity (Karp 1988). Hence, it is possible that respondents in countries that have a higher fertility rate also assign lower thresholds to the ending of youth and the beginning of old age.

Another potential macro-level variable of interest is the percent of individuals between the ages of 15 and 64. This age group represents the most productive segment of society (Crown 1985). It is possible that because of its multiple caregiving tasks, provided to both younger and older generations (Grundy and Henretta 2006), this group tends to assign differential thresholds to the beginning of youth and the ending of old age. Specifically, we expected that in countries that have a lower proportion of individuals between the ages of 15 and 65, respondents would be more inclined to assign a lower threshold to the ending of youth and a higher threshold to the beginning of old age, as this potentially results in a smaller segment in society one has to care for.

As for the middle age period, given the relative scarcity of research on the topic and the fact that the middle age period depends on the ending of youth as well as the beginning of old age, our predictions concerning this time period are less clear cut. Even though we largely expect the ending of youth and the beginning of old age to go in the same direction, this is not the case for the middle age period. To some degree evaluating predictors of the period of middle age could inform us regarding the relative strength of association of the various predictors with the two time points (e.g., ending of youth and beginning of old age); if a predictor has a stronger positive association with the ending of youth than with the beginning of old age, we would expect it to be associated with a shorter middle age period. On the other hand, if a predictor has a stronger positive association with the beginning of old age, we would expect it to be associated with a longer middle age period. Hence, we do not expect these three time points to go in the same direction, but rather predict an inverse relationship between the ending of youth and the period of middle age, despite a positive relationship between the ending of youth and the beginning of old age as well as between the beginning of old age and the period of middle age.

To sum, using Nydegger's (1986) conceptualization of deviations from the widely shared general timetable due to specialized, personal, and interdependent timetables, this study examines both micro- and macro-level variables of potential association with age categorization. The reliance on both micro- and macro-level predictors adds to the understanding of this complex phenomenon of major implications to the micro-, meso-, and macro-levels (Settersten et al. 2003).

Methods

We base our analysis on the fourth round of the European Social Survey (ESS; <http://www.europeansocialsurvey.org/>). The ESS is a biennial multi-country, cross-sectional survey. The core questionnaire is administered every round and concerns a variety of variables, including media use, human values, demographics, and socio-economics. One of the rotating modules of the fourth round, administered in 2008 focused on ageism (Abrams and Lima 2007; Abrams et al. 2011).

The ESS is led by a center coordinating team, a multinational scientific advisory board, small, multinational methods groups, and a sampling panel. One of the main advantages of the ESS concerns the vigorous attempts to ensure equality or equivalence in sampling, and translation of questionnaires to allow for cross-national comparisons. Target population is defined as "all persons aged 15 years or older residents in private households within the borders of the nation, regardless of nationality, citizenship, language, or legal status" (Hader and Lynn 2007). All interviews are conducted face to face.

Outcome variables

Respondents were asked: "at what age do you think people generally stop being described as young?" Next, respondents were asked: "at what age do you think people generally start being described as old?" A specific age was considered a response, whereas answers such as "it depends" or "it never applies" were classified as missing (15 and 14 % of the sample for the ending of youth and beginning of old age, respectively). To calculate a middle age period, perceived ending of youth was subtracted from the perceived beginning of old age.

Micro-level predictors

Indicators of specialized timetables

Age, gender, and years of education.

Indicators of personal timetables

Whether the individual is hampered in daily activities (yes = 1/no = 0), general subjective health (a higher score indicates better subjective health, range 1–5), and satisfaction with life (0 = extremely dissatisfied, 10 = extremely satisfied).

Indicators of interdependent timetables

Living with a partner or spouse = 1 or not = 0.

Macro-level predictors

Indicators of specialized timetables

Combined life expectancy for men and women and GNI per capita were derived from the WHO's report for the year 2010. Education as measured by life expectancy from primary to tertiary and Gini coefficient as a measure of inequality in the distribution of family income in the country (a higher score indicates greater inequality) were derived from the Central Intelligence Agency (CIA) world fact book (2011).

Indicators of personal timetables

Official retirement age by country was primarily based on the organization for economic co-operation and development (OECD) estimates derived from the European and the national labor force estimates. The official retirement age corresponds to the age at which official pension can be received irrespective of whether a worker has a long insurance record of years of contribution (OECD 2009).

Indicators of interdependent timetables

Fertility rate per woman was derived from the WHO's report (2010). The percent of individuals between the ages of 15 and 64 was derived from the CIA world fact book (2011).

Analysis

We first conducted bivariate analyses to obtain descriptive statistics. This analysis was conducted using SPSS 17.0. Weights were employed to adjust for the complex sampling procedure. Next, multilevel analysis was conducted to account for the hierarchical nature of the data, where one unit of analysis (respondents) is nested within another unit of analysis (country). This analysis tests the assumption that individual observations are clustered within a higher level unit and share a common context, thus, may be more similar than observations from individuals in different higher level units. HLM6.08 was used for multi-level data analysis.

The first step of multilevel analysis (unconditional model) is a one-way analysis of variance (ANOVA) with country random effect. The assumption is that we have sampled from a population of countries, as we usually sample from a population of individuals. This model estimates the outcome per country, rather than per respondent and decomposes the total variance in that number into between country (macro-level) and within country (micro-level; respondent) variance components.

Such an analysis yields an intraclass correlation (ICC) score. ICC reflects the degree to which respondents from

the same country are more similar to one another than respondents from other countries. Thus, it reflects the proportion of the total variance that is due to differences between countries. As a rule of thumb, ICC of .05, .10, and .15 represents small, medium, and large effect sizes, respectively (Hox 2002).

The second model includes micro-level predictors and is designed to answer questions concerning age, gender, or education as potential correlates of perceived ending of youth, beginning of old age, and the period of middle age. This model can also tell whether the associations of micro-level variables with the dependent variables vary by country.

The subsequent model includes effects of macro-level predictors. This model is designed to answer some of the following questions: do countries with a higher life expectancy have a higher threshold for the ending of youth and the beginning of old age? Do countries with a higher official retirement age report a longer middle age period?

The final model includes both micro- and macro-level predictors. Pairwise deletion was employed to account for missing values at level-1.

Results

The source sample consisted of 28 countries and a total of 54,988 respondents. Overall, 85 % provided a numeric response to the question concerning the ending of youth and 86 % provided a numeric response to the question concerning the beginning of old age. These individuals represent the analytic sample of this study. The average age across countries was 39.9 for the ending of youth and 62.0 for the beginning of old age. The ending of youth ranged between 33.7 (SE .25) (Norway) and 51.7 (SE .29) (Greece). The beginning of old age ranged between 55.1 (SE .24) (Turkey) and 68.2 (SE .19) (Greece). The period of middle age was 22 (SE .06) years on average. See Table 1 and Fig. 1 for details.

Across all countries, the correlation between the perceived ending of youth and the beginning of old age was positive (.42, $p < .001$). The correlation between the perceived ending of youth and the perceived length of the middle age period was negative ($-.60$, $p < .001$), whereas the correlation between the perceived beginning of old age and the perceived length of the middle age period was also positive (.48, $p < .001$).

The ending of youth

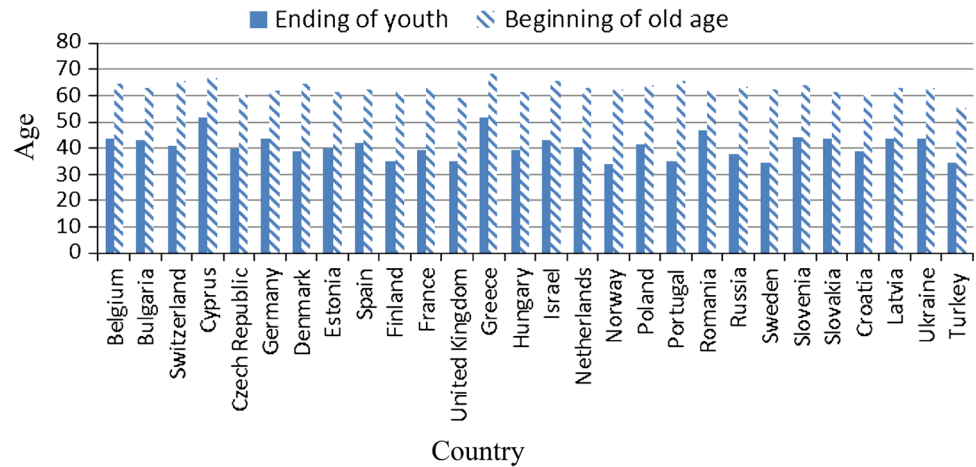
Table 2 outlines the results of the multilevel analysis. The first unconditional model resulted in an ICC of 14.0 %, suggesting that a relatively large portion of the variance in

Table 1 Sample characteristics by country of origin (48,652)

Country (<i>n</i>)	Ending of youth M (SE)	Beginning of old age M (SE)	Difference between ending of youth and beginning of old age M (SE)	Age M (SE)	Men <i>n</i> (%)	Education M (SE)	Subjective health (1–5) M (SE)	Impaired <i>n</i> (%)	Satisfaction (0–10) M (SE)	Lives with a spouse or partner <i>n</i> (%)
Belgium (1,742)	43.8 (.35)	64.3 (.28)	20.5 (.32)	46.3 (.45)	858 (49.3)	12.7 (.08)	3.9 (.02)	383 (22.0)	7.3 (.05)	1,087 (62.5)
Bulgaria (2,013)	43.2 (.22)	63.0 (.23)	19.9 (.23)	49.2 (.38)	882 (43.8)	11.1 (.08)	3.6 (.02)	345 (17.1)	4.4 (.06)	1,419 (70.5)
Croatia (1,201)	38.9 (.31)	60.1 (.30)	21.2 (.34)	44.0 (.49)	508 (42.6)	11.8 (.11)	3.8 (.03)	258 (21.6)	6.7 (.06)	744 (62.0)
Cyprus (1,024)	51.5 (.32)	66.7 (.20)	15.2 (.26)	44.3 (.55)	526 (51.3)	11.8 (.12)	4.3 (.03)	156 (15.3)	7.2 (.06)	667 (66.4)
Czech Rep. (1,701)	40.0 (.25)	60.4 (.23)	20.4 (.49)	44.2 (.41)	821 (48.3)	12.6 (.06)	3.7 (.02)	472 (28.0)	6.6 (.05)	1,043 (61.8)
Denmark (1,572)	38.5 (.28)	64.3 (.24)	25.8 (.31)	48.9 (.45)	784 (49.9)	12.7 (.12)	4.1 (.02)	416 (26.5)	8.5 (.04)	1,087 (69.3)
Estonia (1,370)	39.6 (.32)	61.4 (.29)	21.6 (.35)	47.4 (.52)	594 (43.4)	12.4 (.09)	3.4 (.02)	342 (25.1)	6.3 (.06)	780 (57.3)
Finland (2,158)	34.8 (.25)	61.1 (.24)	26.3 (.28)	47.7 (.40)	1,062 (49.2)	12.9 (.09)	3.8 (.02)	679 (31.5)	7.9 (.03)	1,359 (63.0)
France (1,989)	39.3 (.32)	63.1 (.27)	23.6 (.31)	45.6 (.41)	911 (45.8)	12.7 (.09)	3.8 (.02)	419 (21.1)	6.4 (.05)	1,333 (67.1)
Germany (2,665)	43.5 (.21)	61.9 (.21)	18.4 (.22)	48.5 (.34)	1,420 (53.3)	13.7 (.07)	3.7 (.02)	732 (27.5)	7.0 (.04)	1,676 (63.1)
Greece (1,761)	51.7 (.29)	68.2 (.19)	16.5 (.24)	42.6 (.38)	813 (46.1)	11.4 (.09)	4.3 (.02)	216 (12.3)	6.0 (.05)	1,167 (66.3)
Hungary (1,487)	39.3 (.32)	61.4 (.22)	22.2 (.32)	47.5 (.49)	689 (46.4)	12.0 (.10)	3.4 (.03)	447 (30.1)	5.3 (.07)	874 (58.9)
Israel (2,063)	42.9 (.36)	65.5 (.27)	22.4 (.29)	42.1 (.41)	946 (45.8)	12.8 (.07)	4.1 (.02)	448 (21.8)	7.4 (.05)	1,185 (60.9)
Latvia (1,447)	43.6 (.31)	62.8 (.28)	19.2 (.30)	48.4 (.49)	548 (37.9)	12.3 (.09)	3.3 (.02)	60 (41.7)	5.8 (.06)	778 (53.8)
The Netherlands (1,727)	40.4 (.31)	62.9 (.28)	22.6 (.29)	46.9 (.42)	840 (48.6)	13.4 (.10)	3.9 (.02)	437 (25.3)	7.7 (.03)	1,193 (69.0)
Norway (1,539)	33.7 (.25)	62.5 (.26)	28.8 (.31)	45.7 (.46)	802 (52.1)	13.4 (.10)	4.0 (.02)	373 (24.3)	7.9 (.04)	990 (64.5)
Poland (1,522)	41.7 (.27)	64.0 (.26)	22.3 (.28)	44.3 (.48)	721 (47.4)	12.0 (.09)	3.6 (.02)	418 (27.5)	6.9 (.06)	913 (60.0)
Portugal (1,786)	35.0 (.29)	65.6 (.21)	30.5 (.32)	49.1 (.47)	733 (41.0)	7.7 (.11)	3.5 (.02)	348 (19.5)	5.7 (.05)	1,154 (64.7)
Romania (1,818)	46.8 (.25)	61.9 (.22)	15.1 (.25)	43.3 (.39)	824 (45.3)	11.5 (.08)	3.6 (.02)	281 (15.8)	6.2 (.06)	1,228 (67.6)
Russia (1,975)	37.7 (.21)	63.5 (.21)	25.7 (.25)	44.1 (.42)	864 (43.8)	12.3 (.07)	3.2 (.02)	624 (32.2)	5.5 (.06)	1,102 (55.8)
Slovakia (1,504)	43.6 (.29)	61.0 (.25)	17.2 (.28)	47.4 (.46)	613 (40.8)	13.3 (.08)	3.6 (.02)	297 (20.0)	6.6 (.06)	855 (57.8)
Slovenia (1,164)	44.3 (.38)	63.9 (.33)	19.5 (.36)	46.3 (.55)	539 (46.3)	11.7 (.10)	3.6 (.03)	339 (29.2)	7.0 (.06)	695 (60.6)
Spain (2,164)	42.1 (.33)	62.1 (.30)	20.1 (.36)	45.9 (.41)	1,036 (47.9)	11.0 (.10)	3.8 (.02)	340 (15.8)	7.3 (.04)	1,294 (59.8)
Sweden (1,732)	34.2 (.27)	62.2 (.27)	27.9 (.31)	47.1 (.45)	882 (50.9)	12.8 (.11)	4.0 (.02)	467 (27.0)	7.9 (.04)	1,096 (63.4)
Switzerland (1,701)	41.0 (.30)	65.3 (.29)	24.2 (.21)	46.2 (.44)	805 (47.3)	11.3 (.08)	4.2 (.02)	307 (18.1)	8.0 (.04)	1,032 (60.7)
Turkey (1,980)	34.4 (.18)	55.1 (.24)	20.6 (.26)	38.0 (.37)	997 (50.4)	6.4 (.09)	3.7 (.02)	220 (11.2)	5.7 (.07)	1,253 (65.2)
Ukraine (1,555)	43.6 (.27)	63.1 (.24)	19.4 (.27)	46.1 (.45)	600 (38.6)	12.2 (.09)	3.1 (.02)	644 (42.6)	4.3 (.07)	893 (57.8)
UK (2,291)	35.2 (.25)	59.0 (.24)	23.7 (.27)	46.0 (.38)	1,095 (47.9)	13.6 (.08)	4.0 (.02)	485 (21.2)	7.1 (.04)	1,339 (58.5)

Responded to at least to one of the questions about age categorization. *M* (SE) means and standard errors are reported for continuous variables; *n* (%) frequencies and percentages are reported for dichotomous variables

Fig. 1 A graphical presentation of the ending of youth, the beginning of old age, and the difference between the two time points by country



the perceived ending of youth can be attributed to contextual (macro-level) variables. The remaining 86.0 % can be attributed to micro-level variables or individual differences. The significant random variance associated with the intercept suggests that it varies across countries.

Model 2 examined micro-level predictors. Older age, being a woman, better subjective health, and residence with a spouse or partner were all associated with a higher threshold for the ending of youth. The significant random variance associated with all micro-level variables examined in this analysis suggests that their associations with the perception of the ending of youth are not uniform across countries. The increase in the ICC suggests that once micro-level variables are taken into account, cross-country differences are intensified.

Model 3 examined potential macro-level predictors of the ending of youth. In countries that had a higher life expectancy, lower GNI, and a higher percentage of individuals between the ages of 15 and 64, respondents were more likely to report a higher threshold for the ending of youth. These variables, however, resulted in a minimal reduction in the variance associated with macro-level differences.

Model 4 examined micro- and macro-level predictors simultaneously. Older age, being a woman, better subjective health, and living with a spouse or partner were associated with a higher threshold for the ending of youth. Respondents in countries with a higher life expectancy, a higher GINI coefficient, and a higher percentage of individuals between the ages of 15 and 64 were more likely to perceive a higher threshold for the ending of youth. The random variances associated with all micro-level variables examined in this study suggest that their associations with the outcome variable vary by country. The ICC of this model increased relative to the unconditional model, suggesting that once micro- and macro-level variables are included, unexplained country-level variance increases, rather than decreases.

The beginning of old age

Table 3 outlines the results of the multilevel analysis. The unconditional model resulted in an ICC of 5.7 %, suggesting that a moderate portion of the variance is attributed to macro-level variables. The remaining 94.2 % are attributed to individual differences, rather than country-level differences. The significant random variance associated with the intercept suggests that it varies across countries.

In model 2, micro-level variables were added as potential correlates. Older age, being a woman, higher levels of education, better subjective health, higher life satisfaction, and residence with a spouse or partner were all associated with a higher threshold assigned to the beginning of old age. With the exception of subjective health and residence with a spouse or partner, the associations of all other micro-level variables with the outcome variable varied across countries, as evident by their significant random variance. Compared to the unconditional model, the ICC slightly increased, suggesting that once micro-level variables are accounted for, macro-level variability increases.

In model 3, macro-level variables were entered into the model. Respondents in countries of higher levels of education or a higher Gini coefficient tended to report a higher threshold to the beginning of old age. None of the other macro-level variables examined in this study was significant. These variables resulted in a small reduction in the ICC.

In model 4, both micro- and macro-level variables were entered. Older age, being a woman, higher levels of education, higher subjective health, higher life satisfaction, and sharing a residence with a spouse or partner were all associated with a higher threshold assigned to the beginning of old age. In countries of higher levels of education and higher Gini coefficient, respondents were more likely to perceive a higher threshold to the beginning of old age.

The significant random variances associated with age, gender, education, impaired health, and life satisfaction suggest that the associations of these variables with the

Table 2 Multilevel analysis of perceived ending of youth

	Model 1: unconditional		Model 2: micro-level		Model 3: macro-level		Model 4: macro- and micro-level	
	Fixed effects	Random variance	Fixed effects	Random variance	Fixed effects	Random variance	Fixed effects	Random variance
Intercept	41.2*** (.87)	21.9***	39.7*** (.92)	24.8***	41.17*** (.70)	19.20***	39.70*** (.83)	22.85***
Micro-level								
Specialized timetables								
Age			.21*** (.01)	.004***			.21*** (.01)	.004***
Women (men ref group)			1.62*** (.22)	1.08***			1.61*** (.22)	1.09***
Education			-.03 (.02)	.09***			-.03 (.02)	.009***
Personal timetables								
Impaired health (not impaired ref. group)			.06 (.19)	.44*			.09 (.18)	.42*
Subjective health			.23* (.10)	.12**			.24* (.10)	.12**
Satisfaction			.07 (.04)	.04***			.07 (.04)	.04***
Interdependent timetables								
Lives with spouse/partner (does not live ref. group)			.98*** (.14)	.29**			.98*** (.14)	.29**
Macro-level								
Specialized timetables								
Life expectancy					.85* (.31)		1.08*** (.33)	
Education					1.25 (.90)		1.15(.99)	
Gross national income					-.00003* (.0001)		-.0001 (.00008)	
Gini coefficient					.12 (.14)		.24* (.10)	
Personal timetables								
Official retirement age					-.15 (.34)		-.43 (.37)	
Interdependent timetables								
Fertility rate					.44 (4.33)		-.59(3.08)	
% between 15 and 64					1.08* (.51)		1.15* (.53)	
ICC		14.0 %		17.7 %		12.5 %		16.6 %

Fixed effects: coefficients and standard errors are reported

*** $p < .0001$, ** $p < .001$, * $p < .05$

outcome variable vary across countries, whereas the associations of subjective health and residence with a spouse or partner with the outcome variable are invariant across countries. The ICC of 10.6 % in the final model suggests that once both micro- and macro-level variables are entered into the model, the variance attributed to cross-country (macro-level) differences actually increases rather than decreases.

The middle age period

Table 4 outlines the multilevel results. The unconditional model resulted in an ICC of 9.7 %, suggesting that a

moderate portion of the variance is attributed to macro-level variability. The remaining 90.3 % are attributed to individual differences, rather than country-level differences. The significant random variance associated with the intercept suggests that it varies across countries.

In model 2, micro-level variables were added as potential correlates. Younger age, higher levels of education, higher subjective health, higher levels of life satisfaction, and living alone were all associated with the perception of a longer middle age period. The associations of all micro-level variables with the outcome variable varied across countries, as evident by their significant random variance. Compared

Table 3 Multilevel analysis of perceived beginning of old age

	Model 1: unconditional		Model 2: micro-level		Model 3: macro-level		Model 4: macro- and micro-level	
	Fixed effects	Random variance	Fixed effects	Random variance	Fixed effects	Random variance	Fixed effects	Random variance
Intercept	62.91*** (.47)	6.49***	61.62*** (.49)	6.73***	62.91*** (.37)	5.27***	61.63*** (.60)	11.39***
Micro-level								
Specialized timetables								
Age			.15*** (.01)	.003***			.15*** (.01)	.003***
Women (men ref group)			1.87*** (.27)	1.94***			1.87*** (.27)	1.95***
Education			.05** (.02)	.004*			.05** (.02)	.004*
Personal timetables								
Impaired health (not impaired ref. group)			-.09 (.16)	.34*			-.08 (.16)	.34*
Subjective health			.51*** (.07)	.06			.52*** (.07)	.06
Satisfaction			.21*** (.04)	.02***			.21*** (.04)	.02***
Interdependent timetables								
Lives with spouse/partner (does not live ref. group)			.53*** (.11)	.12			.53*** (.11)	.13
Macro-level								
Specialized timetables								
Life expectancy					.28 (.18)		.28 (.17)	
Education					1.62* (.60)		1.72** (.59)	
Gross national income					-.00005 (.00005)		.00005 (.00004)	
Gini coefficient					.22** (.06)		.16* (.06)	
Personal timetables								
Official retirement age					-.03 (.19)		.03 (.17)	
Interdependent timetables								
Fertility rate					.76 (1.95)		.30 (1.40)	
% between 15 and 64					.54 (.27)		.41 (.25)	
ICC		5.7 %		6.4 %		4.7 %		10.6 %

Fixed effects: coefficients and standard errors are reported

*** $p < .0001$, ** $p < .001$, * $p < .05$

to the unconditional model, the ICC slightly increased, suggesting that once micro-level variables are accounted for, macro-level variability increases.

In model 3, macro-level variables were entered into the model. Respondents in countries of lower life expectancy and higher GNI tended to report a longer middle age period. None of the other macro-level variables examined in this study was significant. These variables resulted in a small reduction in the ICC.

In model 4, both micro- and macro-level variables were entered. Younger age, higher levels of education, higher subjective health, higher life satisfaction, and living alone were all associated with the perception of a longer middle age period. The significant random variances associated with all micro-level variables suggest that the associations of these variables with the outcome variable vary across countries. At the macro-level, countries of a lower average life expectancy had a longer middle age period.

Table 4 Multilevel analysis of perceived middle age (the difference between the ending of youth and the beginning of old age)

	Model 1: unconditional		Model 2: micro-level		Model 3: macro-level		Model 4: macro- and micro-level	
	Fixed effects	Random variance	Fixed effects	Random variance	Fixed effects	Random variance	Fixed effects	Random variance
Intercept	21.72** (.72)	15.15***	21.82*** (.75)	16.12***	21.72*** (.67)	12.45***	21.80*** (.66)	14.21***
Micro-level								
Specialized timetables								
Age			-.06*** (.006)	.001***			-.06*** (.005)	.001***
Women (men ref group)			.26 (.16)	.44**			.26 (.15)	.43**
Education			.08* (.03)	.02***			.08* (.03)	.02***
Personal timetables								
Impaired health (not impaired ref. group)			-.02 (.22)	.73**			-.02 (.22)	.72**
Subjective health			.28* (.10)	.15*			.28* (.10)	.15*
Satisfaction			.16*** (.04)	.02**			.16*** (.04)	.02**
Interdependent timetables								
Lives with spouse/partner (does not live ref. group)			-.40* (.15)	.36**			-.41* (.16)	.36**
Macro-level								
Specialized timetables								
Life expectancy					-.57* (.55)		-.66** (.17)	
Education					.33 (.66)		1.03 (.61)	
Gross national income					.0002* (.00009)		.0001 (.0006)	
Gini coefficient					.10 (.15)		.07 (.11)	
Personal timetables								
Official retirement age					.14 (.25)		.25 (.21)	
Interdependent timetables								
Fertility rate					.19 (3.41)		2.25 (3.17)	
% between 15 and 64					-.54 (.43)		-.40 (.39)	
ICC		9.7 %		10.5 %		8.1 %		9.5 %

Fixed effects: coefficients and standard errors are reported

*** $p < .0001$, ** $p < .001$, * $p < .05$

Discussion

This study evaluated macro- and micro-level predictors associated with age categorization. Age, as a socially constructed phenomenon, impacts almost every aspect of our lives ranging from the micro- to the macro-levels (Phelan 2011; Vincent 2008). Age categorizations likely impact not only individuals' own behaviors and life choices (Levy et al. 2009; Nelson 2005) but also their attitudes toward other individuals of various age groups (Phelan 2011).

The notion that individuals are guided by mental maps to determine life course stages or age categories is not new (Neugarten and Hagestad 1976; Toothman and Barrett 2011). What is innovative about this study, however, is the finding that these maps vary not only across individuals but also across countries. The most notable finding of this study is the different role that macro-level variables play in the perception of the ending of youth, the beginning of old age, and the length of the middle age period. Compared with the perceived ending of youth, relative smaller

portions of the variances associated with the perceived beginning of old age or the period of middle age were due to contextual variables. This finding might be explained by the fact that there are official and fairly consistent, country-level signs to suggest the beginning of old age (e.g., retirement age), but no such signs to announce the ending of youth or the period of middle age. Researchers have argued that in today's era, the ending of youth is a highly individualized phenomenon that is dependent on individual circumstances rather than on cultural or societal influences (Arnett 2000). Because the ending of youth and as a result, the period of middle age are more amorphous periods relative to the beginning of old age, it is possible that the different countries provide different unofficial clues about these periods. Further comparative qualitative research might be informative in generating hypotheses about this finding.

Macro-level variability associated with the perceived period of middle age was moderate, somewhat between the two other time periods examined in this study. This probably reflects the fact that the middle age period is directly determined by the two other age categories: the ending of youth and the beginning of old age. Hence, if the ending of youth is highly variable across nations, whereas the beginning of old age is more stable, it makes sense that the middle age period falls somewhat in between these two periods and shows moderate variability across nations.

This is one of very few attempts (e.g., Toothman and Barrett 2011) to examine the two time periods simultaneously. The study provides several indicators to dissimilarities in people's perceptions of the ending of youth versus the beginning of old age. First, compared with the perceived beginning of old age, macro-level variance was larger in relation to the perception of the ending of youth. Second, most micro- and macro-level variables were not associated with the two age periods in a consistent manner. Third, whereas the associations with the perceived ending of youth of all micro-level variables varied by macro-level variables, the associations of several micro-level variables with the perceived beginning of old age were invariant across countries. Finally, whereas a positive relationship exists between perceptions concerning the ending of youth and the beginning of old age as well as between perceptions concerning the beginning of old age and the middle age period, a negative relationship exists between perceptions concerning the ending of youth and the middle age period (e.g., a higher threshold assigned to the ending of youth is associated with a shorter middle age period). These various findings suggest that individuals' mental maps regarding the timing of these two events are not necessarily concordant.

Some evidence for the fact that the two time periods are distinct also comes from the public views of these periods.

Although both time periods are viewed with ambivalence (Cuddy et al. 2005; Lachman et al. 1994), the ending of youth enjoys more positive connotations and is seen as a peak period of achievements and competence (Lachman et al. 1994). Old age, on the other hand, is viewed more negatively, as a period of potential decline (Kite et al. 2005).

Using Nydegger's (1986) conceptualization of deviations from the widely shared general timetables due to specialized, personal, and interdependent timetables, we examined several micro- and macro-level variables of potential relevance. As expected, older respondents were more likely to report higher thresholds for the ending of youth and the beginning of old age. This is in accordance with past research that has demonstrated that as individuals grow older, they are likely to pursue a younger age identity (Barak and Stern 1986; Kaufman and Elder 2002) in an attempt to distance themselves from the negative stereotypes associated with old age.

Older age was also associated with a shorter perceived period of middle age. This is somewhat counter intuitive given the fact that old age is associated with higher thresholds for the beginning of old age. However, old age is also associated with a higher threshold for the ending of youth. One potential explanation for the finding is that the association of age with the ending of youth is stronger than its association with the beginning of old age.

As in past research (Barrett 2005), compared to men, women assigned higher thresholds to the ending of youth and the beginning of old age. Past research has shown that women are perceived as aging earlier than men (Barrett and von Rohr 2008; Kogan 1979) and are more likely to suffer from negative ageism (Clarke and Griffin 2008). Hence, it is possible that women try to defend against these negative perceptions by assigning a later threshold to the ending of youth and the beginning of old age.

Higher levels of education were associated with a higher perceived threshold for the beginning of old age as well as with the perception of a longer middle age period. This finding is consistent with past research which found an association between education and the ending of middle age, but no such association between education and the beginning of middle age. This association of higher levels of education with an extended middle age period has been attributed to the fact that education is associated with a variety of life choices (e.g., child bearing, marriage) as well as with better health consequences (Toothman and Barrett 2011).

This study provides support to the important role of subjective versus objective indicators. Better health was associated with a higher threshold assigned to the ending of youth and the beginning of old age as well as with the perception of a longer middle age period. Life satisfaction,

as another potential indicator of personal timetables, was also associated with the beginning of old age and with the perception of middle age, with those who reported higher levels of life satisfaction also reporting a higher threshold for the beginning of old age and a longer perceived middle age period. Interestingly, impaired health, which is a more objective health indicator, was not associated with age categorization. These findings provide further support to the subjective nature of age categorization.

This study examined one micro-level indicator of interdependent timetables. Living with a spouse or partner was associated with higher thresholds for the ending of youth and the beginning of old age. This is supported by past research that has shown that not being married (primarily due to widowhood or divorce) is associated with an older age identity (Logan et al. 1992). Living alone, in contrast, was associated with the perception of an extended middle age period. This implies that potentially living with a spouse or partner is a stronger predictor of the ending of youth than the beginning of old age.

Three specialized macro-level variables had significant associations with age categorization: the average life expectancy in the country, level of education, and the Gini coefficient. Although the WHO refers to an association between life expectancy and the beginning of old age (World Health Organization 2011), this study shows that this association is relevant for determining the ending of youth. In addition, in countries of lower life expectancy, respondents were more likely to report a longer middle age period, potentially due to the prolongation of youth in these countries. In addition, respondents in countries of higher levels of education were more likely to report a higher threshold to the beginning of old age. This is explained by the fact that higher levels of education often postpone the entrance into adulthood and potentially also the entrance to old age at least partially through better health and well-being (Kunst and Mackenbach 1994).

In countries of higher levels of Gini coefficient (i.e., greater inequality), respondents were more likely to report higher thresholds for the beginning of old age and the ending of youth. This finding is contrary to our initial hypotheses. Possibly, in countries that hold high levels of inequality, age-based discrimination is also more prevalent. To address this, individuals might actively refrain from associating themselves with old age by assigning higher thresholds to the beginning of old age and the ending of youth.

One macro-level indicator of interdependent timetables was found significant. In countries that had a higher percent of individuals between the ages of 15 and 64 in the country, respondents were more likely to assign a higher threshold to the ending of youth. This can be explained by that fact that in these countries, the younger and older generations are relatively smaller, and thus, this middle group engages

in less caregiving roles, which are known to affect one's age identity (Andrew et al. 2006; Barrett 2005; Toothman and Barrett 2011).

Despite its strengths, this study was limited by the availability of micro- and macro-level data and limited theory which could potentially point to important predictors that should be explored. The variables examined in this study explained only a small portion of the variance associated with macro-level variables. Moreover, when both micro- and macro-level variables were entered into the models of perceived ending of youth and beginning of old age, the variance associated with macro-level variables increased, suggesting that efforts should concentrate on identifying macro-level variables of importance. The study was also limited by the relative small number of countries for multi-level analysis.

Examining groups of countries or geographical areas based on specific typologies may prove useful. One such typology can be borrowed from Esping-Andersen's seminal book (1990) that suggested three kinds of welfare states (liberal, conservative, and social democratic) (Esping-Andersen 1996). Potentially, liberal states will demonstrate less ageist perspectives than conservative or social democratic ones, and consequently, assign higher thresholds for the ending of youth and of the beginning of old age. It is also interesting to examine whether the ending of youth and beginning of old age vary by the characteristics of the subject judged as aging or by the way the question is phrased. For instance, past research has shown that women are judged to age faster and less gracefully than men (Duncan and Loretto 2004).

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