Full-Length Research Report

Protective Factors in Midlife

How Do People Stay Healthy?

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Abstract. The detection of psychological variables with a positive impact on health during middle age is of great interest. The data of 393 middle-aged participants (aged 35–45 at T1 and 45–55 at T2) of the National Survey of Midlife Development in the United States (MIDUS) were analyzed to investigate the associations between health, optimism, positive affect, social support, and a cumulative burden score. Results show a positive association of the protective factors and a predictive value of positive emotions on health over time. The burden score showed no unique association with health. Overall, the predictors explained 17% of the variance of physical health and 33% of the variance of mental health. These findings emphasize the importance of investigating protective pathways.

Keywords: midlife, health, protective factors, burden, successful aging

Introduction

To date, midlife has played only a subordinate role in research in the social and behavioral sciences, and it has tended to be considered a nondramatic phase of life (Willis & Martin 2005). However, middle-aged individuals bear a high level of social and societal responsibility; numerous normative and biographical transitions take place during this span of life (Whitbourne, 2005; Martin & Willis, 2005), and the successful accomplishment of these transitions is critical to further life outcome. Additionally, the shared lifetime of people of middle age and people of advanced age is increasing with rising life expectancy. This leads to new life constellations, such as being simultaneously parents of adolescent children and caregivers for one's own parents. Thus, faced with numerous potentially burdensome and stressful life events, we find it increasingly important to understand which factors may contribute to stable health in midlife.

Among others, psychosocial factors in midlife have been associated with the likelihood of successful aging (Britton, Shipley, Singh-Manoux, & Marmot, 2008). Moreover, the quality of aging can be predicted by variables assessed in midlife, including the use of effective coping mechanisms, physical and mental health, and social support (Vaillant & Mukamal, 2001).

Factors with a negative effect on health outcomes in turn work against successful aging. Throughout our lives, we encounter stressful situations, from daily hassles to major life events, chronic stress periods, and traumas. Yet stress does not affect everybody in the same way: Triggering a stress reaction always depends on the personal appraisal of the situation (Lazarus & Folkman, 1984). Individuals have their very own susceptibility to stress and burden, and the same incident can thus have various effects on the different parties concerned. There is empirical evidence for the association between various types of burden and health. Social strain negatively affects physical health (i.e., Davis & Swan, 1999) as well as health-related quality of life in general (Sherman et al., 2003). High demands at work have been shown to be associated with depression and anxiety disorders (Virtanen et al., 2007). Financial problems are generally associated with problems in terms of physical and mental well-being (Gorgievski-Duijvesteijn, Giesen, & Bakker, 2000) and an increase in somatic symptoms, especially in elderly populations (Krause & Baker, 1992). Moreover, finances indirectly affect health by enabling access to health care and screening. Nevertheless, given that not every individual with a certain amount of burden develops a physical or mental illness, pathogenetic factors must have their counterparts.

What Prevents People from Falling Ill Despite Their Burdens?

Salutogenetic health models (i.e., Antonovsky, 1987) build on a biopsychosocial concept and focus on protective factors

that prevent people from falling ill. The health status of individuals is therefore affected by their way of coping with internal and external demands, drawing upon their (internal and external) resources (Becker, Schulz, & Schlotz, 2004). A general model of how people face adversity is provided by the concept of *resilience*. Resilience is the ability to recover from or withstand extremes such as trauma, deprivation, threat, or stress (Atkinson, Martin, & Rankin, 2009). While adversity, entailing the aspects of challenge, change, and disruption, is the main antecedent of resilience, effective coping, mastery and positive adaptation are its significant consequences (Earvolino-Ramirez, 2007). Various constructs have a positive association with coping with adversity. In the following, we discuss optimism, positive affect, and social support as possible contributors to a resilient way of facing strain and examine their connections with health.

Until recently, positive emotions were regarded only as *markers* of subjective well-being (Fredrickson, 2004) and were more or less neglected as *predictors* of physical health (Pressman & Cohen, 2005). The existing studies show that positive affect is associated with a lower morbidity and decreased symptoms and pain (Pressman & Cohen, 2005), greater resistance to infections such as common colds, and a lower report of somatic symptoms (Cohen, Doyle, Turner, Alper, & Skoner, 2003). Additionally, a link with protection against stroke in older adults has been shown (Ostir, Markides, Peek, & Goodwin, 2001). Moreover, there is also a connection between positive affect and longevity (Danner, Snowdown, & Friesen, 2001). The experience of positive emotions can help to build enduring personal resources, which – once acquired – are independent of acute emotional states and contribute to more positive values in several areas of life, i.e., health and resilience (Fredrickson, 2004). Moreover, it is assumed that the altered thought-action repertoires caused by positive emotions outweigh the aftermaths of acute negative emotions by dampening their impact (the so-called undoing hypothesis; Fredrickson, Mancuso, Branigan, & Tugade, 2000).

To summarize, positive affect, defined as an emotional state, appears to be a major resource for health stabilization and health promotion, especially with reference to mental health, defined as an overall and outlasting condition.

A further psychological factor that has an association with resilience and health is an *optimistic mindset*. Optimism is assumed to be a relatively stable personality trait that can be validated irrespective of the setting in which it takes place (Scheier & Carver, 1985). In terms of attributional styles, optimists consider the causes for a negative event to be unstable, specific, and external, which prevents negative self-concept. While persons with pessimistic attitudes are assumed to capitulate faster, individuals with optimistic attitudes are often efficient at work, mostly healthier, and live longer (Seligman, 1991). More precisely, optimism is linked to several health-related issues, such as faster recovery after surgery (Scheier et al., 1989), physical well-being (de Moor et al., 2006), and active coping and acceptance (Carver et al., 1993).

The third potential protective factor discussed at this point is social support, a well-accepted contributor to resilience (i.e., Earvolino-Ramirez, 2007). Social support is associated with protection of physical health in general, i.e., better physiological functioning such as better immune functions, cardiovascular regulation, lower blood pressure (Uchino, Cacioppo, & Kiecolt-Glaser, 1996), and general health dimensions of perceived physical health and perceived mental health in MS patients (Krokavcova et al., 2008). Links have also been shown with the manifestation and progression of mental illnesses such as lower risk for the onset of major depression (Wade & Kendler, 2000) and anxiety disorders (Plaisier et al., 2007). Moreover, low social support is associated with elevated stress hormone activity in systemic hypertension (Wirtz et al., 2006).

The Present Study

This study investigates the protective effect of the above-described resilience factors optimism, positive affect, and social support on health in early midlife. The early middle adulthood period between 35 and 45 years is essentially characterized by having to deal with the combined obligations and challenges of private and professional life that peak around this age (Martin & Mroczek, in press; Moen & Wethington, 1999). Developmental tasks in this phase thus differ from earlier developmental periods, characterized by having to establish a professional career and intimate relationships; and differ from later developmental periods, characterized by becoming a member of the group of older workers having to cope with physiological changes and changes in the family structure such as the empty-nest situation; or old age characterized by demands to set new goals and later to manage declining health. Therefore, we assume that mental health in the age group examined with the highest combined demands from work and family and potentially exhausted coping resources should most critically depend on the effects of protective factors, and mental health problems on the effects of risk factors.

Midlife, with the numerous transitions that take place during this period, is an important phase on the lifelong pathway to successful aging. Therefore, factors contributing to the achievement of this state should be further elucidated. Additionally, the interplay of protective and pathogenetic factors is addressed by adding a burden score to the analysis, consisting of various burden domains such as social environment strain, work strain, strain due to financial situation, and strain caused by discrimination. The main aim of the cumulative burden score was to focus on the overall impact of different areas of life stress – not to report the effect of single strains. These theoretical assumptions are in line with Schafer and Shippee (2010), and Steptoe and Marmot (2003).

First, we expected the protective factors to have a positive association with physical and mental health, and to serve as predictors of health over time. We also hypothe-

sized that the burden score would be negatively associated with physical and mental health and would serve as a predictor of health status over the given time period of 10 years.

Data and Methods

Participants

The data for this study come from the MIDUS survey (National Survey of Midlife Development in the United States), which was designed to investigate the role of behavioral, psychological, social, biological, and neurological factors in understanding age-related differences and changes in physical and psychological health and social responsibility (see Brim, Ryff, & Kessler, 2004). The survey began in 1995 (T1), followed by a reassessment approximately 10 years later in 2005 (T2). MIDUS is a national probability sample, drawn with random-digit dialing procedures, which consists of English-speaking, noninstitutionalized adults with at least one telephone per household. The sample was stratified by age and sex, with an oversampling of older people and of men. Data were collected via telephone interview and self-administered questionnaire. The core sample at T1 consisted of 3,485 adults, aged 25 to 74 years. For details regarding the response rate of the MIDUS survey, see Brim et al. (2004).

The present study focused exclusively on middle-aged participants between 35 to 45 years at T1. From a sample of 949 individuals, only those participants were included who rated their physical and mental health at T1 at least as *good*, *very good*, or *excellent* on a 5-point scale ranging from *poor* (1) to *excellent* (5; for details, see below), leaving 668 participants at T1. From the excluded participants ($n = 281$), 18.2% rated their mental health as *poor* (1) or *fair* (2), 22.4% their physical health and 12.8% participants rated both their physical and mental health as *poor* or *fair*, and 46.6% of the participants were excluded due to nonresponse to the physical and/or mental health variables. From the remaining sample, we further excluded those participants who did not participate at both measurement occasions (T1, T2) and who failed to respond to more than 50% of the questions as a whole or were considered as "deniers" in the sections used for the analysis. This selection procedure resulted in a final sample of 393 middle-aged participants comprised of 192 males and 201 females with a mean age of 40.21 years, $SD = 3.321$. For descriptive statistics of physical and mental health at T1 and T2, see Table 1.

Attrition analyses have shown that those participants who were included in this study were more likely to be female ($\chi^2(1) = 7.05$, $p < .01$) than those participants who dropped out. No attrition effects were found for the variables of interest (i.e., social support, positive affect, optimism, and in the overall burden).

Table 1. Descriptive statistics of physical and mental health at T1 and T2

		T1		T2	
		Number	%	Number	%
Physical health	Poor	–	–	5	1.3
	Fair	–	–	24	6.1
	Good	138	35.1	112	28.5
	Very good	183	46.6	180	45.8
	Excellent	72	18.3	72	18.3
Mental health	Poor	–	–	3	0.8
	Fair	–	–	15	3.8
	Good	130	33.1	110	28.0
	Very good	153	38.9	168	42.7
	Excellent	110	28.0	97	24.7

Subjectively Perceived Health

Physical and mental health was evaluated by two self-assessment items from the phone questionnaire: "In general, would you say your physical health is . . ." and "What about your mental or emotional health?" with the response options (1) *poor*, (2) *fair*, (3) *good*, (4) *very good*, or (5) *excellent* (for more descriptive information on physical and mental health status, see Table 1).

Participants rating their physical and mental health at least as *good*, *very good*, or *excellent* at T1 were considered mentally and physically healthy (see above). Self-reported health may predict various health outcomes: There are significant associations between self-reported health and physical and mental diseases (Goldberg, Guéguen, Schmaus, Nakache, & Goldberg, 2001), changes in functional ability in daily life (Idler & Kasl, 1995), and mortality among middle-aged males (Idler & Angel, 1990). Self-reported health assessments in middle-aged populations are regarded as valid health indicators to be used in research studies (Miilunpalo, Vuori, Oja, Pasanen, & Urponen, 1997). Thus, self-report measures have been considered to constitute an adequate operationalization of health in the given dataset.

Protective Factors

Social Support

In this study, social support was operationalized as perceived care and appreciation of the social network consisting of family members, friends, and companions (see Walen & Lachman, 2000). The four items contributing to the factor *Social Support* were the following (adjusted for the four subscales family, friends and spouse or partner): (1) How much do they understand the way you feel about things? (2) How much do they really care about you? (3) How much can you rely on them for help if you have a

serious problem? (4) How much can you open up to them if you need to talk about your worries? Answers were given on a four-point Likert-type scale with the options (1) *a lot*, (2) *some*, (3) *a little*, (4) *not at all*, as well as the possibility to say that they do not know. The total scale score was determined by calculating the mean of each of the sub-scales. The Cronbach's α of the total scale *Social Support* accounts for .83 at both measurement occasions.

Positive Affect

Positive Affect was measured by an existing scale originally used by Mroczek and Kolarz (1998). The scale combines six items: "During the past 30 days, how much of the time did you feel (1) *cheerful*, (2) *in good spirits*, (3) *extremely happy*, (4) *calm and peaceful*, (5) *satisfied* and (6) *full of life*?" The answers are given on a five-point Likert-type scale (*all the time* to *none of the time*). Answers were recoded such that high values in the questionnaire stood for high values in positive affect, and vice versa. The scale *Positive Affect* was generated by calculating the statistical mean for the 6 items. The Cronbach's α of the scale is .89 for T1 and .90 for T2.

Optimism

For the protective factor *Optimism*, the same scale was used as by Johnson and Krueger (2007), who also worked with the MIDUS database. The scale consists of the following two items: "[For the final set of questions,] Please tell me how much [each of the following] the following describes you. What about optimistic?" (response options: (1) *a lot*, (2) *somewhat*, (3) *a little*, and (4) *not at all*) and "Looking ahead 10 years into the future, what do you expect your life overall will be like at that time?" (response options from (0) *worst* to (10) *best*). Again, items were recoded so that high response scores indicated high values in optimism. Both items were combined to form the total scale *Optimism* by using a correction factor (see Shimazu & de Jonge, 2008).

Burden Score

To control whether the protective factors have a direct or a stress-buffering effect on health, a burden score was computed. Seven fields of possible strain were chosen: partnership, family, friends, work, unemployment, finance, and discrimination. As mentioned before, we focused on the cumulative load and not on the single impacts of the different domains (i.e., Steptoe & Marmot, 2003).

The burden score was measured with 17 items from the above-mentioned seven domains of possible strain with different subdomains. Participants indicated whether they had any problems in the respective domains using a 4-point

Likert-type scale ranging from *never* or *none* (1) to *often* or *a lot* (4). As the present study focused on the total burden score, the answers from the 4-point Likert-type scale were recoded in such a way that *never* or *none* denotes a 0, and the 2–4 denotes a 1. If necessary, response options were recoded so that high values always stand for a high burden. Finally, an index of burden with a possible range from 0 to 17 was calculated for every individual. A higher score reflects a higher extent of burden.

The cumulative burden score is composed by the following burden domains: *Partnership strain* was measured with 4 items covering the following: (1) describe relationship with the response options *excellent, very good, good, fair,* and *poor*, (2) chance of separating from spouse/partner, (3) spouse/partner makes too many demands, (4) spouse/partner lets you down. The answers of people who claimed not to be in a relationship at the time of the study but who nevertheless answered the questions from this section were recoded to the response-option indicating the lowest amount of burden, i.e., *never* or *none*. The recoding applies to all burden score sections if people answered sections they stated to be lacking in their own lives. *Family strain* was computed using the following 3 items: (1) family members demand too much, (2) family members let you down, and (3) too many demands at home. *Friend strain* was measured using 2 items: (1) friends demand too much and (2) friends let you down. *Work strain* was measured with 3 items asking about (1) serious problems with somebody at work, (2) other ongoing stress at work (both items with response options *no* and *yes*), and (3) too many demands at work. *Unemployment* was measured with an item that asks for the number of weeks spent unemployed involuntarily or seeking a job. Only zero weeks of unemployment were considered as no burden (0), and any number of weeks starting from one week onward was considered as burden (1). To measure *financial strain*, the following two items were used: (1) money to meet needs is *more than enough, just enough* or *not enough* and (2) difficulty to pay monthly bills with the response options *very difficult, somewhat difficult* and *not very difficult*. Two items were used to measure *discrimination*: (1) discrimination interfered with having a full life and (2) life has been harder because of discrimination.

Results

The Results are presented as follows: In a first step, we report the bivariate correlations among the variables for both measurement occasions. Second, we conducted a series of analyses to evaluate rank-order stability and mean-level change over time of the study variables. Finally, we present the results of two hierarchical regression analyses examining the relationships between physical and mental health and the predictive variables, namely, the three potential protective factors social support, positive affect, op-

Table 2. Correlations, means, and standard deviations for the study variables

Variable	1	2	3	4	5	6	7	8
1. Social support (T1)	–							
2. Positive affect (T1)	.37***	–						
3. Optimism (T1)	.34***	.44***	–					
4. Burden score (T1)	−.27***	−.27***	−.20***	–				
5. Social support (T2)	.23***	.06	.14**	−.23***	–			
6. Positive affect (T2)	.33***	.46***	.28***	−.22***	.24***	–		
7. Optimism (T2)	.30***	.29***	.52***	−.14**	.18***	.42***	–	
8. Burden score (T2)	−.17**	−.13*	−.17**	.47***	−.41***	−.26***	−.24***	–
Potential range	1–4	1–5	1–4	0–17	1–4	1–5	1–4	0–17
M	3.37	3.44	3.40	9.46	3.80	3.38	3.39	8.81
SD	0.47	0.65	0.47	2.66	0.89	0.69	0.50	2.66

Note. $N = 393$. *$p < .50$, **$p < .10$, ***$p < .01$.

timism, and the potential harmful factors combined in the cumulative burden score. In this data analysis, age, sex, ethnicity, and education level were considered potential covariates. These variables are known for their impact on physical or mental health either directly or indirectly by influencing the access to and the knowledge about healthcare systems (i.e., Adler & Snibbe, 2003, Bloom & McIntyre, 1998; Bloom, Simpson, Cohen, & Parsons, 1997). Therefore, the effects of age, sex, ethnicity, and education level were controlled for in the main analyses.

Descriptive Analyses

Bivariate correlations, means, and standard deviations among the variables are depicted in Table 2. The three protective factors, i.e., social support, positive affect, and optimism, show moderately to strongly positive intercorrelations at the first measurement occasion (T1). The mean correlation across the three variables using the Fisher's r-to-z transformation approach was $r = .38$. The correlations with the cumulative burden score at T1 ranged from $r = −.20$ (optimism) to $r = −.27$ (social support and positive affect). At the second measurement occasion (T2), the mean correlation across the three protective factors was moderately positive, $r = .28$. The correlations with the burden score ranged from $r = −.24$ (optimism) to $r = −.41$ (social support). The analyses were rerun controlling for age, sex, ethnicity, and education level. The findings were similar, and the maximum divergences were not higher than 0.01.

Testing the Stability of the Study Variables

To examine rank-order stability of the study variables over 10 years, stability correlations were performed (see Table 2). Stability coefficients for the protective variables ranged from $r = .23$ (social support) to $r = .52$ (optimism). The mean rank-order stability index for the protective variables

calculated using the Fisher's r-to-z transformation approach was $r = .41$. The rank-order stability of the burden score was $r = .47$. Controlling for the covariates did not alter the rank-order stability of the study variables. Overall, the findings demonstrated individual differences in change for both the protective factors as well as the cumulative burden score.

To examine potential mean-level change over time in the study variables, a series of repeated-measures analyses of covariance (ANCOVA) were conducted for each of the protective factors as well as for the cumulative burden score. Age, sex, ethnicity, and education level were controlled for. The analyses showed that, on average, the protective factors did not change over time: social support (T1: $M = 3.37$, $SE = .02$; T2: $M = 3.80$, $SE = .05$; $F[1, 386] = 3.08$, $p < .10$, $\eta^2 = .008$), positive affect (T1: $M = 3.44$, $SE = .03$; T2: $M = 3.38$, $SE = .04$; $F[1, 386] = 0.49$, $p > .10$, $\eta^2 = .001$), and optimism (T1: $M = 3.40$, $SE = .03$; T2: $M = 3.39$, $SE = .03$; $F[1, 386] = 3.22$, $p < .10$, $\eta^2 = .008$). Finally, the cumulative burden score also did not show a mean-level change over 10 years (T1: $M = 9.48$, $SE = .13$; T2: $M = 8.82$, $SE = .14$; $F[1, 386] = 1.06$, $p > .10$, $\eta^2 = .003$). The findings imply that the protective factors and the burden score are relatively stable with respect to the mean-levels.

Predicting Physical and Mental Health

Two separate hierarchical regression analyses were conducted to examine the extent to which the three protective factors (e.g., social support, positive affect and optimism) and the cumulative strain measured by the burden score predict physical and mental health, respectively. In each regression, the effects of age, sex, ethnicity, and education level were controlled for by entering them at Step 1. The T1 variables (i.e., the protective factors and the cumulative burden score) were entered at Step 2, and finally the T2 variables were entered at Step 3. As Table 3 shows, Step 1 was significant

Table 3. Summary of the hierarchical regression analysis for the prediction of physical and mental health at T2 by the protective factors social support, positive affect and optimism and the burden score

Predictor variables	Step 1 Physical health ΔR^2	Step 1 Physical health β	Step 1 Mental health ΔR^2	Step 1 Mental health β	Step 2 Physical health ΔR^2	Step 2 Physical health β	Step 2 Mental health ΔR^2	Step 2 Mental health β	Step 3 Physical health ΔR^2	Step 3 Physical health β	Step 3 Mental health ΔR^2	Step 3 Mental health β
Age	.06	–.06	.03	–.03	.05	–.06	.15	–.03	.07	–.06	.14	–.05
Gender		–.02		–.10*		–.03		–.12*		–.03		–.12**
Ethnicity		–.05		–.04		–.06		–.05		–.07		–.07
Education level		.23***		.14**		.23***		.12**		.24***		.14**
Social support T1						.09		.12*		.06		.06
Positive affect T1						.15**		.26***		.05		.12*
Optimism T1						.03		.12*		.04		.05
Burden score T1						.01		–.01		.05		.03
Social support T2										–.04		–.11*
Positive Affect T2										.29***		.37***
Optimism T2										–.07		.11*
Burden score T2										–.08		–.08

Note. [a] Dependent variables: physical health T2, mental health T2. *$p < .05$, **$p < .01$, ***$p < .001$.

(F_{change}[4, 386] = 6.02, $p < .001$). After controlling for age, sex, ethnicity, and education level, positive affect (T1) retained a unique association with physical health (Step 2: F_{change}[4, 382] = 4.87, $p < .01$). However, this association disappeared after entering the T2 variables in Step 3 (F_{change}[4, 378] = 7.38, $p < .01$). Thus, in the final model (Step 3), education level and positive affect at T2 retained unique and positive associations with physical health (see Table 3). The cumulative burden scores (T1 and T2) retained no unique relationships with physical health. Overall, the predictors explained 17% of the total variance in physical health.

A slightly different picture emerged with respect to the prediction of mental health (Table 3). The control variables explained 3% of the variance in mental health in Step 1 (F_{change}[4, 382] = 3.19, $p < .05$). In Step 2 all three T1 protective factors showed unique and positive associations with mental health (F_{change}[4, 386] = 18.13, $p < .001$). Finally, after entering the T2 variables in Step 3 (F_{change}[4, 378] = 19.40, $p < .001$), all three T2 protective factors were significantly related to mental health, although the effect of social support became negative (see Table 3). It is noteworthy that T1 positive affect retained a unique and positive association with mental health. Thus, positive affect at T1 can explain variance over and above the effects of the control variables as well as the other protective factors. Similar to the findings with respect to physical health, the cumulative burden scores (T1 and T2) were virtually unrelated to mental health. Overall, the predictors explained 33% of the total variance in mental health. The present findings imply that positive affect may play a major predictive role most notably for mental health. By contrast, the cumulative burdens showed no unique associations with physical and mental health.

We also performed additional hierarchic regression analyses with different orders of adding the burden score in a separate step before versus after the protective factors in order to determine the unique predictive value of both types of predictors compared to each other. The modified order did not change the results. The standardized betas were identical with the betas in the three-step model reported in this paper. Moreover, other constitutions of the burden score tested by the authors did not change the results overall. We also tested for possible interaction effects between the protective factors and the burden score in predicting physical and mental health. Results of hierarchical regression models with the interaction terms did not evidence statistically significant effects in the present study.

Discussion

This study shows the associations between protective factors, especially positive affect, social, support and optimism, and health in midlife, and highlights the importance of a reinforced consideration of protective and resilience factors in health and gerontology research in general. A subsample of 393 healthy, middle-aged MIDUS participants was investigated to elucidate the effects of protective and pathogenetic factors on their health over a timespan of 10 years. In line with our hypothesis, we found that psychological constructs, especially positive affect, have a positive impact on health. Overall, 17% of the variance in physical health – and even 33% of the variance in mental health – is explained by the protective factors, the burden score, and the confounding variables age, sex, ethnicity, and education level. As expected, education level was significantly related to both physical and mental health. This finding is in line with other studies showing that education is associated with higher levels of knowledge about health and health-related behaviors (e.g.,

Adler & Snibbe, 2003; Johnson & Krueger, 2005). The current literature is dominated by studies investigating the effects of one or more protective factors on one disease or health consequence in particular. The benefit of this data analysis is the finding that a general positive association can be assumed which applies not only to specific aspects of health, but to midlife health in general. Moreover, this study reveals for the first time that, in the case of positive affect, this effect lasts over a period of 10 years, meaning that positive affect can be seen not only as a protective factor, but also as a predictor of subjective health in middle aged adults (35–45 years at T1) over time.

Positive Affect in Midlife

The positive association with physical and mental health found in this study agrees with the current literature (i.e., Fredrickson & Joiner, 2002; Pressman & Cohen, 2005). The finding that it also predicts health over time, by contrast, is new. This finding has a high practical impact on disease prevention, maintenance of health in middle age, and successful aging. The fact that the impact of psychological factors on mental health found in this investigation is much higher than the impact on physical health seems to be quite comprehensible. Nevertheless, it is already known from the literature that positive emotions are able to put not only people's minds, but also their bodies, at ease (Fredrickson, Tugade, Waugh, & Larkin, 2003). While the physical consequences of negative affect have often been studied (e.g., concerning dysfunctions of the autonomic nervous system and risk for coronary heart disease; Bleil, Gianaros, Jennings, Flory, & Manuck, 2008), positive affect is known to have a restorative effect following the experience of such negative emotions (e.g., a faster return to baseline levels of cardiovascular activation; Fredrickson et al., 2000). This means that, in addition to a direct effect of positive affect, an indirect effect – in the sense of undoing the harmful aftermath of negative emotions – is assumed (Fredrickson et al., 2000). Therefore, it would be interesting to assess negative affect in further studies in order to shed more light on these pathways. Moreover, negative affect seems to have an impact on the reporting of health (Mora, DiBonaventura, Idler, Leventhal & Leventhal, 2008) and stress – and therefore also burden – although the mechanisms and the quality of the association are still unclear (Johnson & Krueger, 2005), which would lend support to suggestions to control for effect in future research.

The Link Between Positive Affect and Health in Midlife

What could be the link between positive affect and health-related physical processes? There are several possible pathways. The theory that emotions result in action tendencies that could in turn guide health behavior is one of them (Brummett, Boyle, Kuhn, Siegler, & Williams, 2009). Another acknowledged theory is that emotions activate emotion-appropriate behaviors and corresponding physiological systems to result in an adequate response to the situation (Polk, Cohen, Doyle, Skoner, & Kirschbaum, 2005). The involvement and activation of the hypothalamic-pituitary-adrenal axis is of particular interest, because, until now, this hormonal cascade has largely been known as a "stress-triggered axis," which has its activation and consequences after stressful events and results in the release of cortisol at its endpoint in the adrenal cortex. High cortisol levels seem to be associated with diseases such as osteoporosis, hypertension, diabetes mellitus, susceptibility to infections, and depression (Ehlert, Gaab, & Heinrichs, 2001; Schoorlemmer, Peeters, van Schoor, & Lips, 2009) and are also linked to decreased inflammatory parameters (Prather, Marsland, Muldoon, & Manuck, 2007; Steptoe, O'Donnell, Badrick, Kumari, & Marmot, 2008). An association has been shown between positive emotions and lower rises in morning cortisol levels (Brummett et al., 2009) and lower salivary cortisol throughout the day (Steptoe & Wardle, 2005; Steptoe et al., 2008).

Two different models on the effects of positive affect on health are widely discussed in the literature: the main effect model, with its direct effects via changes in health practices, regulation of the HPA axis, changes in immune functions, or social factors, and the stress-buffering model, with its indirect effects in the sense of buffering the effects of stress (Pressman & Cohen, 2005). Both models may in fact be correct simultaneously. Important for this study is another direct effect linking positive affect with better self-reported health and reporting of fewer symptoms (Pressman & Cohen, 2005).

The fact that positive affect acts through several pathways – and its direct link to self-reported health – could be part of the explanation why the association of positive affect and health was tighter than the association of health with the other protective factors investigated.

Optimism and Social Support in Midlife

Various studies found a positive association between social support, optimism, and health (as described in the introductory section). Therefore, it might come as a surprise that the expected positive effect of social support and optimism at T1 on health at T2 is lacking in this study. Although previous research demonstrated that the positive effects prevail, there are also studies showing no impact or even negative effects, as will be discussed in the following.

Findings of a positive impact of optimism on health have often been reported in the current literature (e.g., de Moor et al., 2006; Scheier et al., 1989). Nevertheless, although empirical studies do not provide clearcut evidence, it is suspected that particularly unrealistic optimism could prevent people from correctly assessing risks, e.g., smokers' risk of

lung cancer (Weinstein, Marcus, & Moser, 2005). Moreover, unrealistic optimism is assumed to contribute to the finding that people tend to consider their own risks for health- and life-threatening problems to be below average (Weinstein, 1982), which negatively impacts on compliance with health recommendations (Barnoy, Bar-Tal, & Treister, 2003).

Social support has often been positively associated with health (e.g., Krokavcova et al., 2008; Plaisier et al., 2007). However, social networks can also lead to negative consequences. Contact with others represents one way of spreading diseases; moreover, there is also the possibility of conflict, stress transmission, exploitation, loneliness, and misguided attempts of help, all of which may result in negative health outcomes (Cohen, 2004). There is also a link between social support and negative affect: Negative relationships can lead to negative emotions, and the negative effects of negative affect have already been discussed above (Johnson & Krueger, 2005). Conversely, positive relationships may evoke positive emotions, and, again, positive affect acts as a mediator between social support and health. Finally, there are even studies in which social support was found to be harmful (Smith, Fernengel, Holcroft, Gerald, & Marien, 1994), explained through the fact that it can cause guilt and anxiety when a person is dependent on others (Lu & Argyle, 1992), a loss of autonomy leading to depression. Vaillant, Meyer, Mukamal, and Soldz (1998) even raise the question of whether social support in late midlife is a *cause* or a *result* of successful physical aging. In their study, the association of poor social support and physical health in older age and mortality almost disappeared when smoking, depression, and alcohol abuse in middle age were controlled for. Surprisingly, in our study the effect of social support at T2 on mental health was negative. A possible reason for this contradictory relationship between the two variables might be a suppressor effect (see Cohen, Cohen, West, & Aiken, 2003).

Although the potentially harmful effects of optimism and social support should not be neglected, the positive associations of the factors seem to be predominant, and the negative impacts result from very specific subdomains of these psychological constructs. Nevertheless, in further studies, the operationalization of social support and optimism needs to be rethought to ensure that only the positive elements of the selected constructs are integrated in the analysis, or that at least the negative parts are controlled for. This was partially done in our study by integrating family, friends, and partner strain – parts of the negative side of a social network – into the cumulative burden score.

Overall, the findings emphasize the importance of positive affect for subjective physical and mental health over time in early midlife. From a lifespan perspective, the results may be used as a starting point for future longitudinal studies examining the developmental changes of the types and impacts of protective and risk factors on the development of health beyond early midlife. It is well conceivable that, due to differences in the types of developmental tasks and challenges faced earlier and later in life, the predictive relations of the protective and risk factors identified for early midlife must change in order to stabilize health across the lifespan. Whereas we identified positive affect, optimism, and social support as protective factors in our early midlife group, assuming that older age is more strongly characterized by developmental tasks of developing post-family and postemployment relationships in older age, factors protecting from social isolation and from physical illnesses should have a larger effect on mental health.

Limitations of the Study

The psychological constructs optimism, positive affect, and social support are only three of any number of possible health-protective variables. Further studies are necessary to elucidate the whole range of protective factors upon which preventive programs might be based. Rebounding, reintegration, high expectancy, self-determination, positive relationships, flexibility, sense of humor, self-esteem, and self-efficacy (Earvolino-Ramirez, 2007) are only some of the defining attributes of resilience – and any of them might have their own impacts on the health of midlife individuals. The variables and their feasible combinations are almost endless, meaning that any study on this subject will be limited in some way.

Likewise, the pathogenetic factors contributing to subjective burden are widespread. In this specific analysis, cumulative burden did not contribute to the variance in health when three protective factors, namely, positive affect, optimism, and social support, were included in the analysis. The fact that the computed burden score did not explain any further variance in health is possibly determined by the construction of the score itself. While optimism, positive affect, and social support are quite stable traits, some of the burden score subdomains are highly variable states. Work situation, joblessness, and social environment might have completely changed in value several times during the timespan between T1 and T2. Thus, it is probable that the assessed data did not fully capture the living situation during the 10 years in between the two measurement occasions. Nevertheless, it must be noted that the picture of a midlife defined by crisis and stress may have to be changed: The crisis and stress commonly attributed to midlife, such as midlife crisis, divorce, or widowhood, to name just a few, seem to be less frequent or severe, and the amount of stress does not seem to be increasing (Aldwin & Levenson, 2001). Nonetheless, it is still a time of change with multiple possible pitfalls. A complete compensation of burden by a few protective factors would undoubtedly be desirable, albeit illusionary, given that earlier research findings clearly show a negative association (e.g., work stress, Virtanen et al., 2007, or strain from partner, family, and friends, Walen & Lachman, 2000). Hence, a rethinking and a revision of the burden score in further studies would be necessary in order to draw more precise conclusions about the interplay of protective and pathogenetic impacts on health.

Conclusion

The elderly population in Europe and around the world is steadily increasing (Lee et al., 2009). In 2000, worldwide there were already 600 million people aged 60 and over, and this number is set to increase to 1.2 billion by 2025 and 2 billion by 2050. (World Health Organization, 2009). It is of the utmost interest to public health to find ways to prevent disabilities and diseases, or at least to delay or minimize them in order to achieve healthy aging (Lee et al., 2009). Midlife is an important and critical period on the pathway of successful aging. To date, little effort has been undertaken to foster middle-aged people and prevention programs for this age group are still rare (Perrig-Chiello, Jaeggi, Buschkuehl, Stähelin, & Perrig, 2009). This data analysis shows the importance of a better understanding of how middle-aged people stay healthy. Moreover, such findings and a greater emphasis on resilience factors in health and gerontology research could also contribute to prevention programs being carried out at the right time to set the course from a prosperous midlife to a successful aging. Further studies are necessary to gain detailed knowledge regarding the direct and indirect – buffering – effects of resilience factors on the health of middle-aged individuals.

References

Adler, N. E., & Snibbe. A. C. (2003). The role of psychosocial processes in explaining the gradient between socioeconomic status and health. *Current Directions in Psychological Science, 12*, 119–123.

Aldwin, C. M., & Levenson, M. R. (2001). Stress, coping and health at Mid-life: A developmental perspective. In M. E. Lachman (Ed.), *The handbook of midlife development* (pp. 188–216). New York: Wiley.

Antonovsky, A. (1987). *Unravelling the mystery of health: How people manage stress and stay well*. California: Jossey-Bass.

Atkinson, P. A., Martin, C. R., & Rankin, J. (2009). Resilience revisited. *Journal of Psychiatric and Mental Health Nursing, 16*, 137–145.

Barnoy, S., Bar-Tal, Y., & Treister, L. (2003). Effect of unrealistic optimism, perceived control over disease, and experience with female cancer on behavioral intentions of Israeli women to undergo screening tests. *Cancer Nursing, 26*, 363–369.

Becker, P., Schulz, P., & Schlotz, W. (2004). [Personality, chronic stress, and physical health: A prospective study for the examination of a systemic demands-resources model]. *Zeitschrift für Gesundheitspsychologie, 12*, 11–23.

Bleil, M. E., Gianaros, P. J., Jennings, J. R., Flory, J. D., & Manuck, S. B. (2008). Trait negative affect: Toward an integrated model of understanding psychological risk for impairment in cardiac autonomic function. *Psychosomatic Medicine, 70*, 328–337.

Bloom, G., & McIntyre, D. (1998). Toward equity in health in an unequal society. *Social Science and Medicine, 47*, 1529–1538.

Bloom, B., Simpson, G., Cohen, R. A., & Parsons, P. E. (1997).

Access to health care. Part 2: Working-age adults. *Vital and Health Statistics, Series 10, Data from the National Health Survey, 10*, 1–47.

Brim, O. G., Ryff, C. D., & Kessler, R. C. (2004). The MIDUS National Survey: An overview. In O. G. Brim, C. D. Ryff, & R. C. Kessler (Eds.), *How healthy are we? A national study of well-being at midlife* (pp. 1–36). Chicago: University of Chicago Press.

Britton, A., Shipley, M., Singh-Manoux, A., & Marmot, M. G. (2008). Successful aging: The contribution of early-life and midlife risk factors. *Journal of the American Geriatrics Society, 56*, 1098–1105.

Brummett, B. H., Boyle, S. H., Kuhn, C. M., Siegler, I. C., & Williams, R. B. (2009). Positive affect is associated with cardiovascular reactivity, norepinephrine level, and morning rise in salivary cortisol. *Psychophysiology*, *46*, 862–869.

Carver, C. S., Pozo, C., Harris, S. D., Noriega, V., Scheier, M. F., Robinson, D. S., . . . Clark, K. C. (1993). How coping mediates the effect of optimism on distress: A study on women with early stage breast cancer. *Journal of Personality and Social Psychology, 65*, 375–390.

Cohen, J., Cohen, P. West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Erlbaum.

Cohen, S. (2004). Social relationships and health. *American Psychologist, 59*, 676–684.

Cohen, S., Doyle, W. J., Turner, R. B., Alper, C. M., & Skoner, D. P. (2003). Emotional style and susceptibility to the common cold. *Psychosomatic Medicine, 65*, 652–657.

Danner, D. D., Snowdown, D. A., & Friesen, W. V. (2001). Positive emotions in early life and longevity: Findings from the nun study. *Journal of Personality and Social Psychology, 80*, 804–813.

Davis, M. C., & Swan, P. D. (1999). Association of negative and positive social ties with fibrinogen levels in young women. *Health Psychology, 18*, 131–139.

De Moor, J. S., De Moor, C. A., Basen-Engquist, K., Kudelka, A., Bevers, M. W., & Cohen. L. (2006). Optimism, distress, health-related quality of life, and change in cancer antigen 125 among patients with ovarian cancer undergoing chemotherapy. *Psychosomatic Medicine, 68*, 555–562.

Ehlert, U., Gaab, J., & Heinrichs, M. (2001). Psychoneuroendocrinological contributions to the etiology of depression, posttraumatic stress disorder, and stress-related bodily disorders: The role of the hypothalamus-pituitary-adrenal axis. *Biological Psychology*, *57*, 141–152.

Earvolino-Ramirez, M. (2007). Resilience: A concept analysis. *Nursing Forum, 42*, 73–82.

Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society of London, 359*, 1367–1377.

Fredrickson, B. L., & Joiner, T. (2002). Positive emotions trigger upward spirals toward emotional well-being. *Psychological Science: A Journal of the American Psychological Society/APS, 13*, 172–175.

Fredrickson, B. L., Mancuso, R. A., Branigan, C., & Tugade, M. M. (2000). The undoing effects of positive emotions. *Motivation and Emotion, 24*, 237–258.

Fredrickson, B. L., Tugade, M., Waugh, C., & Larkin, G. (2003). What good are positive emotions in crises? A prospective study of resilience and emotions following the terrorist attacks

on the United States on September 11th, 2001. *Journal of Personality and Social Psychology, 84*, 365–376.

Goldberg, P. Guéguen, A., Schmaus, A., Nakache, J. P., & Goldberg, M. (2001). Longitudinal study of associations between perceived health status and self-reported diseases in the French Gazel cohort. *Journal of Epidemiology and Community Health, 55*, 233–238.

Gorgievski-Duijvesteijn, M. J., Giesen, C. W. M., & Bakker, A. B. (2000). Financial problems and health complaints among farm couples: Results of a 10-year follow-up study. *Journal of Occupational Health Psychology, 5*, 359–373.

Idler, E. L., & Angel, R. J. (1990). Self-rated health and mortality in the NHANES-I epidemiologic follow-up study. *American Journal of Public Health, 80*, 4, 446–452.

Idler, E. L., & Kasl, S. V. (1995). Self-ratings of health: Do they also predict change in functional ability? *Journal of Gerontology: Social Sciences, 508*, 344–353.

Johnson, W., & Krueger, R. F. (2005). Predictors of physical health: toward an integrated model of genetic and environmental antecedents. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences 60*, 42–52.

Johnson, W., & Krueger, R. F. (2007). The psychological benefits of vigorous exercise: A study of discordant MZ twin pairs. *Twin Research and Human Genetics, 10*, 275–283.

Krause, N., & Baker, E. (1992). Financial strain, economic values, and somatic symptoms in later life. *Psychology and Aging, 7*, 4–14.

Krokavcova, M., van Dijk, J. P., Nagyova, I., Rosenberger, J., Gavelova, M., Middel, B., Gdovinova, Z., & Groothoff, J. W. (2008). Social support as a predictor of perceived health status in patients with multiple sclerosis. *Patient Education and Counseling, 73*, 159–165.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping.* New York: Springer-Verlag.

Lee, D. M., O'Neill, T. W., Pye, S. R., Silman, A. J., Finn, J. D., Pendleton, N., . . . EMAS Study Group (2009). The European Male Ageing Study (EMAS): Design, methods and recruitment. *International Journal of Andrology*, *32*, 11–24.

Lu, L., & Argyle, M. (1992). Receiving and giving support: Effects on relationships an well-being. *Counseling Psychology Quarterly, 5*, 123–133.

Martin, M., & Mroczek, D. K. (in press). Are personality traits across the lifespan sensitive to environmental demands? *Journal of Adult Development.*

Martin, M., & Willis, S. L. (2005). Midlife development: Past, present, and future directions. In S. L. Willis & M. Martin (Eds.), *Middle adulthood: A lifespan perspective* (pp. 383–389). Thousand Oaks, CA: Sage.

Miilunpalo, S., Vuori, I., Oja, P., Pasanen, M., & Urponen, H. (1997). Self-rated health status as a health measure: The predictive value of self-reported health status on the use of physician services and on mortality in the working-age population. *Journal of Clinical Epidemiology, 50*, 517–528.

Moen, P., & Wethington, E. (1999). Midlife development in a life course context. In S. L. Willis & J. D. Reid (Eds.), *Life in the middle: Psychological and social development in middle age* (pp. 3–24). San Diego: Academic Press.

Mora, P. A., DiBonaventura, M. D., Idler, E., Leventhal, E. A., & Leventhal, H. (2008). Psychological factors influencing self-assessments of health: toward an understanding of the mech-

anisms underlying how people rate their own health. *Annals of Behavioral Medicine, 36*, 292–303.

Mroczek, D. K., & Kolarz, C. M. (1998). The effect of age on positive and negative affect: A developmental perspective on happiness. *Journal of Personality and Social Psychology*, *75*, 1333–1349.

Ostir, G. V., Markides, K. S., Peek, M. K., & Goodwin, J. S. (2001). The association between emotional well-being and the incidence of stroke in older adults. *Psychosomatic Medicine, 63*, 210–215.

Perrig-Chiello, P., Jaeggi, S. M., Buschkuehl, M., Stähelin, H. B., & Perrig, W. J. (2009). Personality and health in middle age as predictors for well-being and health in old age. *European Journal of Ageing, 6*, 27–37.

Plaisier, I., De Bruijn., J. G. M., de Graaf, R., ten Have, M., Beekman, A. T. F., & Penninx, B. W. J. H. (2007). The contribution of working conditions and social support to the onset of depressive and anxiety disorders among male and female employees. *Social Science and Medicine, 64*, 401–410.

Polk, D. E., Cohen, S., Doyle, W. J., Skoner, D. P., & Kirschbaum, C. (2005). State and trait affect as predictors of salivary cortisol in healthy adults. *Psychoneuroendocrinology, 30,* 261–272.

Prather, A. A., Marsland, A. L., Muldoon, M. F., & Manuck, S. B. (2007). Positive affective style covaries with stimulated IL-6 and IL-10 production in a middle-aged community sample. *Brain, Behavior, and Immunity*, *21*, 1033–1037.

Pressman, S. D., & Cohen, S. (2005). Does positive affect influence health? *Psychological Bulletin, 131*, 925–971.

Schafer, M. H., & Shippee, T. P. (2010). Age identity in context: Stress and the subjective side of aging. *Social Psychology Quarterly, 73*, 245–264.

Scheier, M. F., & Carver, C. S. (1985). Optimism, coping and health: Assessment and implications of generalized outcome expectancies. *Health Psychology, 4,* 219–247.

Scheier, M. F., Matthews, K. A., Owens, J. F., Magovern, G. J., Lefebvre, R. C., Abbott, A. R., & Carver, C. S. (1989). Dispositional optimism and recovery from coronary artery bypass surgery: The beneficial effects on physical and psychological well-being. *Journal of Personality and Social Psychology, 57*, 1024–1040.

Schoorlemmer, R. M., Peeters, G. M., van Schoor, N. M., & Lips, P. (2009). Relationships between cortisol level, mortality and chronic diseases in older persons. *Clinical Endocrinology, 71,* 779.786.

Seligman, M. E. P. (1991). *Learned optimism.* New York: Knopf.

Sherman, A. M., Shumaker, S. A., Kancler, C., Zheng, B., Reboussin, D. M., Legault, C., & Herrington, D. M. (2003). Baseline health-related quality of life in postmenopausal women with coronary heart disease: The estrogen replacement and atherosclerosis (ERA) trial. *Journal of Women's Health, 12*, 351–362.

Shimazu, A., & de Jonge, J. (2008). Reciprocal relations between effort-reward imbalance at work and adverse health: A three-wave panel survey. *Social Science & Medicine, 68*, 60–68.

Smith, C., Fernengel, K., Holcroft, C., Gerald, K., & Marien, L. (1994). Meta-analysis of the associations between social support and health outcomes. *Annals of Behavioral Medicine, 16*, 352–362.

Steptoe, A., & Marmot, M. (2003)- Burden of psychosocial adversity and vulnerability in middle age: Associations with bio-

behavioral risk factors and quality of life. *Psychosomatic Medicine, 65,* 1029–1937.

Steptoe, A., & Wardle, J. (2005). Positive affect and biological function in everyday life. *Neurobiology of Aging*, *26 Suppl 1,* 108–112.

Steptoe, A., O'Donnell, K., Badrick, E., Kumari, M., & Marmot, M. (2008). Neuroendocrine and inflammatory factors associated with positive affect in healthy men and women: The Whitehall II study. *American Journal of Epidemiology*, *167,* 96–102.

Uchino, B. N., Cacioppo, J. T., & Kiecolt-Glaser, J. K. (1996). The relation between social support and physiological processes: A review with emphasis on underlying mechanisms and implications for health. *Psychological Bulletin, 119,* 488–531.

Vaillant, G. E., & Mukamal, K. (2001). Successful aging. *The American Journal of Psychiatry, 158,* 839–847.

Vaillant, G. E., Meyer, K., Mukamal, K., & Soldz, S. (1998). Are social supports in late midlife a cause or a result of successful physical aging? *Psychological Medicine, 28,* 1159–1168.

Virtanen, M., Honkonen, T., Kivimäki, M., Ahola, K., Vahtera, J., Aromaa, A., & Lönnqvist, J. (2007). Work stress, mental health and antidepressant medication findings from the health 2000 study. *Journal of Affective Disorders, 98,* 189–197.

Wade, T. D., & Kendler, K. S. (2000). The relationship between social support and major depression: Cross-sectional, longitudinal, and genetic perspectives. *The Journal of Nervous and Mental Disease, 188,* 251–258.

Walen, H. R., & Lachman, M. E. (2000). Social support and strain from partner, family, and friends: Costs and benefits for men and women in adulthood. *Journal of Social and Personal Relationships, 17,* 5–30.

Weinstein, N. D. (1982). Unrealistic optimism about susceptibility to health problems. *Journal of Behavioral Medicine, 5,* 441–460.

Weinstein, N. D., Marcus, S. E., & Moser, R. P. (2005). Smokers' unrealistic optimism about their risk. *Tobacco Control, 14,* 55–59.

Whitbourne, S. K. (2005). *Adult development and aging: Biopsychological perspectives* (2nd ed.). New York: Wiley.

Willis, S. L., & Martin, M. (2005). *Middle adulthood: A lifespan perspective.* Thousand Oaks, CA: Sage.

Wirtz, P. H., von Känel, R., Mohiyeddini, C., Emini, L., Ruedisueli, K., Groessbauer, S., & Ehlert, U. (2006). Low social support and poor emotional regulation are associated with increased stress hormone reactivity to mental stress in systemic hypertension. *The Journal of Clinical Endocrinology and Metabolism*, *91,* 3857–3865.

World Health Organization. (2009). *Ageing and life course. The world is aging fast, have we noticed?* Retrieved from http://www.who.int/aging/en/

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