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The Role of Personality in Becoming Aware of Age-Related Changes

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Abstract

Awareness of age-related change (AARC) refers to an individual's conscious knowledge about the gains and losses resulting from growing older. Personality traits reflect dispositional patterns of behavior, perception, and evaluation and should therefore influence the experience of AARC. The 4.5-year longitudinal study examines this association between personality traits and AARC in a sample of 423 individuals aged 40 to 98 years ($M = 62.9$ years) using latent change analyses. After controlling for sex, health, and education, a different pattern of associations for cross-sectional vs. longitudinal relations. Cross-sectionally, neuroticism was positively related to AARC losses, whereas openness, conscientiousness, and neuroticism were positively related to AARC gains. Longitudinally, the impact of personality traits on change in AARC was rather limited with only higher conscientiousness acting as a predictor of decreases in AARC losses over time. Overall, the findings add to the existing literature on associations between personality traits and subjective aging. Specifically, the results indicate that personality traits are differentially related to awareness of age-related gains in comparison to awareness of age-related losses.

Keywords

awareness of age-related change; subjective aging; Big Five personality traits

Aging is inseparably tied to the experience of gains and losses in various domains of behavior, such as physical functioning, cognition, or interpersonal relations (Miche, Wahl, et al., 2014). Personality – albeit a subject of age-related changes itself (e.g., Roberts, Walton, & Viechtbauer, 2006) – is thought to serve an *orchestrating function* for developmental gains and losses in other domains of life (Baltes, Lindenberger, & Staudinger, 2006). Specifically,

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Conflict of Interest

The authors declare no conflict of interest.

Publication Ethics

The study was approved by the research ethics committee of the Faculty of Behavioral and Cultural Studies at Heidelberg University.

Baltes and colleagues (2006) argued that personality should influence both the occurrence as well as the perception and evaluation of age-related changes.

To date, empirical evidence exists for the first claim. Namely, ... personality traits like conscientiousness indeed longitudinally influence the occurrence of age-related changes in the domains health and cognition (e.g., Chapman, Roberts, Lyness, & Duberstein, 2013; Wettstein, Tauber, Ku ma, & Wahl, 2017). Surprisingly, the second claim – that personality influences the perception of age-related changes – has received very little systematic attention. This article addresses this gap in the research and investigates links between personality traits and *awareness of age-related change* (AARC; Diehl & Wahl, 2010), a construct that reflects the processes of becoming aware of changes, interpreting them as gains or losses, and attributing them to the aging process.

An examination of the associations between personality traits and AARC may help to elucidate the role of individual difference variables in shaping important predictors of successful aging. In prior research, AARC was shown to predict crucial outcomes such as depressive symptoms and functional health with moderate effect sizes (Brothers, Gabrian, Wahl, & Diehl, 2016; Brothers, Miche, Wahl, & Diehl, 2017; Dutt Gabrian, & Wahl, 2018). However, the *antecedents* of AARC and the role of psychological factors in explaining why individuals differ in their AARC experiences are still unclear. By investigating cross-sectional and longitudinal associations between personality traits and AARC in the second half of life, we extend prior and mostly cross-sectional research on relations between personality and other subjective aging constructs.

Subjective Aging and Personality

Subjective aging constructs recently gained much attention in psychological aging research (Diehl & Wahl, 2015). Subjective aging comprises “all aspects of the awareness, perception, experience, evaluation, interpretation, and identification with one’s own aging process” (Westerhof, Whitbourne, & Freeman, 2012, p.52). Prominent subjective aging constructs are, for example, *felt age* (the age an individual feels to be) and *aging attitudes* as measured with the Attitude Toward Own Aging Questionnaire (ATOQ; Lawton, 1975) or the Attitudes to Aging Questionnaire (AAQ; Shenkin et al., 2014).

Most prior research on personality and subjective aging constructs focused on the Big Five personality traits neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (McCrae & John, 1992). Several studies in this context found significant small to moderate cross-sectional relations between these personality traits and the subjective aging constructs listed above. However, the relations appear to be construct- and domain-specific. For example, openness was the main correlate of felt age, with more open individuals feeling younger than less open individuals (Canada, Stephan, Caudroit, & Jaconelli, 2013; Hubley & Hultsch, 1994; Stephan, Demulier, & Terracciano, 2012). In contrast, neuroticism appeared to be the most consistent personality correlate of ATOQ, with more negative aging attitudes being associated with higher neuroticism (Miche, Elsässer, et al., 2014; Moor, Zimprich, Schmitt, & Kliegel, 2006). Furthermore, the AAQ subdomains were also differentially related to personality. Neuroticism, for example, was linked to worse

attitudes in the domains psychological growth and psychosocial loss, but was unrelated to attitudes toward physical change (Loi et al., 2015).

Emerging longitudinal analyses also showed that the bivariate relations between personality traits and subjective aging constructs persist over several years (Bryant et al., 2016; Shenkin et al., 2014). Research on the association between personality traits and *change in subjective aging* over time, however, is still scarce. The present study addresses this association in the context of AARC. Prior findings in the context of other subjective aging constructs thereby lead us to assume associations between personality and AARC. However, construct- and domain-specificity of these prior associations encouraged us to pay attention to the specific features not only of AARC, but also of its subconstructs AARC gains and AARC losses.

Awareness of Age-Related Change and Personality

AARC differs from other subjective aging constructs, such as felt age or attitudes toward aging, both empirically and conceptually (Brothers et al., 2017; Diehl et al., 2014). First, AARC explicitly relies on individuals' behavioral observations of everyday experiences (Miche, Wahl, et al., 2014). AARC therefore enables an investigation of how individuals consciously perceive and evaluate age-related changes and is expected to be a relevant informational source for *self-knowledge* in old age. Second, in line with central theoretical propositions of lifespan psychology (Baltes, 1987; Baltes et al., 2006), AARC differentiates between gains and losses. This distinction provides a new element to the existing subjective aging research. Third, AARC considers changes within a range of key behavioral domains such as physical, cognitive, and interpersonal functioning. It thereby considers the overall experience of age-related changes in daily life as the result of an interplay of aging experiences across these different life domains. Altogether, AARC thus allows for novel examinations related to personality and subjective aging.

Following Baltes and colleagues (2006), we assumed that personality influences the evaluation and perception of age-related changes once they have occurred. Thereby, affects AARC primarily in a cross-sectional way. Apart from this, we expected a longitudinal influence of personality on AARC which should primarily stem from the influence of personality on the actual occurrence of age-related changes (e.g., Baltes et al., 2006; Chapman et al., 2013). Such an occurrence of age-related changes is not fully equitable to a higher awareness of them, but it should nevertheless result in an increased probability of becoming aware of them over time.

Cross-Sectional Relations Between Personality and Awareness of Age-Related Gains and Losses

Personality traits may color an individual's processing of aging experiences in daily life. Specifically, by shaping the sensitivity toward, the evaluation of, and immediate affective reactions to experienced age-related changes (e.g., Baltes et al., 2006; Suchy, Williams, Kraybill, Franchow, & Butner, 2010), personality traits may elicit or strengthen an awareness of age-related gains and/or losses cross-sectionally.

Neuroticism – the predisposition for anxiety, proneness to worry, negative emotionality, and limited impulse control (Costa & McCrae, 1992) – might impact the awareness of age-related losses in a rather immediate way. Neuroticism is the personality trait linked the closest to anxiety and worries regarding the aging process (Harris & Dollinger, 2003; Loi et al., 2015) and may thus sensitize a person regarding age-related losses as well as increase the probability of becoming aware of them. In addition to such sensitivity effects, high neuroticism has been shown to be associated with negative evaluations and *over-reporting* of negative conditions and aspects, both in a rather general context (Uziel, 2006) and in an aging-specific context (i.e., limitations in instrumental activities of daily living; Suchy et al., 2010). Lastly, high neuroticism has been shown to be consistently associated with heightened reactivity and heightened affective reactions to adverse everyday experiences (Bolger & Schilling, 1991; Connor-Smith & Flachsbart, 2007), which should also apply to the immediate reaction to negative aging experiences. Specifically, negative aging experiences in daily life may elicit spontaneous affective responses such as sadness, anger, and frustration, which should be intensified by the personality trait neuroticism. These affective responses should make age-related losses more prominent, more memorable, and more threatening to the individual – and should ultimately lead to a stronger awareness of age-related losses. Taken together, neuroticism can be assumed to be related to stronger AARC losses because of a heightened sensitivity toward negative experiences and losses, negatively biased evaluations, and intensified affective responses toward negative experiences. Indeed, neuroticism has been positively linked to AARC losses measured with a prior version of the AARC questionnaire in a cross-sectional research design (Wahl, Konieczny, & Diehl, 2013).

In contrast to AARC losses, AARC gains constitute positive experiences and may thus be cross-sectionally affected by personality traits that come with positive evaluations and a heightened sensitivity toward positive experiences (i.e., valence-specific effects; cf. Uziel, 2006). Specifically, extraversion, openness, and conscientiousness may be positively related with AARC gains cross-sectionally. Extraversion is the predisposition for sociability, activity, enthusiasm, optimism, and assertiveness (Costa & McCrae, 1992). Extraversion is associated with a general tendency to perceive and evaluate different events and situations positively (Uziel, 2006). Also, individuals scoring high on extraversion tend to hold more positive attitudes toward the aging process (Harris & Dollinger, 2003; Loi et al., 2015). Highly extraverted individuals may therefore perceive their own aging in positive ways and may be more likely to become aware of gain-related changes. Indeed, extraversion has been positively linked to a prior version of AARC gains cross-sectionally (Wahl et al., 2013).

Openness, the predisposition for curiosity, active imagination, preference of variety, and independence of judgment (Costa & McCrae, 1992), tends to be related to a greater autonomy from prevailing age stereotypes (Allan, Johnson, & Emerson, 2014; Reitz & Staudinger, 2017). Open individuals should thus be less influenced by societal age stereotypes, which see old age as a time of stagnation at best, but not of gains. Accordingly, they might be more open to the positive aspects of the aging process, more receptive to new activities, relationships, and experiences throughout their lifespan, and ultimately become more readily aware of age-related gains.

Conscientiousness is the predisposition for reliability, ambition, purposefulness, and self-discipline (Costa & McCrae, 1992). Similar to extraversion, it has been linked to both more positive attitudes toward the aging process (Harris & Dollinger, 2003; Loi et al., 2015) and more positive evaluations of certain aspects of the aging process (e.g., Suchy et al., 2010). It may thus be linked to a greater awareness of age-related gains cross-sectionally.

Longitudinal Impact of Personality on Awareness of Age-Related Gains and Losses

Personality traits also represent predispositions for certain adverse or beneficial behavioral patterns, partly because they accompany personality-consistent goals and aspirations that guide an individual's behavior over time (Roberts & Robins, 2000). Thus, personality traits should impact the occurrence and magnitude of age-related changes in the long term. The occurrence of age-related changes may then, over time, be reflected in a higher awareness of them. This longitudinal association between personality traits and trajectories in AARC should be particularly relevant regarding the personality traits conscientiousness and openness.

Conscientiousness has been shown to impact health and cognitive functioning of individuals throughout adulthood (e.g., Chapman et al., 2013; Sutin, Zonderman, Ferrucci, & Terracciano, 2013; Wettstein et al., 2017). Much of this positive impact of conscientiousness stems from better health behavior (e.g., Turiano, Chapman, Gruenewald, & Mroczek, 2015), which in turn is probably elicited by the health-related cognitions, intentions, and goals of highly conscientious individuals (Conner & Abraham, 2001; Roberts & Robins, 2000). Conscientious individuals may thus enact active behavior known to prevent physical and cognitive decline (cf. Conner & Abraham, 2001) and thereby experience less age-related losses in the long term, which should prevent increases in awareness of age-related losses over time.

The aforementioned greater autonomy from age stereotypes among individuals scoring high in openness (Allan, Johnson, & Emerson, 2014) may also facilitate the formation of and the active striving for gain-related goals in the aging process. One prominent example for this is the striving for personal growth and wisdom as overarching life goals of highly open individuals (e.g., Roberts and Robins, 2000). And indeed, over time these goals toward age-related gains tend to be achieved by open individuals (Reitz & Staudinger, 2017). Hence, we expected openness to be positively related to awareness of age-related gains in the long term.

Relations Between Personality and Awareness of Age-Related Change Across Age Groups

Across the adult lifespan, age-related gains and losses can be expected to differ in their frequency, extent, and the behavioral domains they involve. When investigating the role of personality for awareness of age-related change across the lifespan, age group-specific processes seem possible. Particularly, personality traits may be more important for AARC in midlife, when age-related changes tend to be less evident and may only be noticed by an

individual who is – because of specific personality traits – more sensitive to them (cf. Miche, Elsässer et al., 2014). In addition, age-related *losses* oftentimes occur in midlife for the very first time, and their integration into the self-concept may depend stronger on personality than the integration of additional, normative, and expected age-related changes in old age. Hence, we used an exploratory approach to investigate age group differences and/or similarities in the associations between personality and AARC.

Research Aims and Hypotheses

Our aim was to better understand how individual difference characteristics in terms of personality shape the awareness of age-related changes in a sample covering the second half of life. Because of valence-specific effects (cf. Uziel, 2006), we expected that the personality traits would be related differentially to the awareness of age-related gains and losses. We assumed that neuroticism would primarily affect the awareness of age-related *losses*. In contrast, we expected that extraversion, openness, and conscientiousness would affect the awareness of age-related *gains*. Within these relations, we expected the one between neuroticism and AARC losses to be particularly strong, because processes of sensitivity, evaluation, and affective reactivity should contribute to it at the same time.

Furthermore, we expected longitudinal relations between personality traits and change in AARC over a period of 4.5 years. We expected high conscientiousness to be associated with less increases in AARC losses over time – a hypothesis driven by the observation that conscientiousness has been linked to objective age-related changes and respective behavioral patterns in past research (e.g., Chapman et al., 2013). We expected openness to be related to increases in AARC gains over time, driven by findings on the striving for and achievement of growth throughout the lifespan (cf. Reitz & Staudinger, 2017).

Lastly, we explored age group differences (midlife vs. old age) in the associations between personality and AARC.

Method

Sample and Procedure

Data collection took place in 2012 (T1) and 2017 (T2), with an average of 55.41 months between assessments ($SD = 0.56$ months). Participants were recruited via announcements in public locations or by word of mouth, and responded to a set of self-report questionnaires after providing informed consent. The study was approved by the Research Ethics Committee of the Faculty of Behavioral and Cultural Studies at Heidelberg University.

The T1 sample comprised 423 community-residing adults from southwest Germany. The participants were aged 40 to 98 years at T1 ($M = 62.94$ years, $SD = 11.84$ years). 64% of the participants were women, 61% were living in a partnership, and 40% were retired. Participants reported above-average education ($M = 11.53$ years of schooling, $SD = 1.95$ years) and a good self-rated health with an average of 3.55 ($SD = 0.88$) on a scale ranging from 1 (= *bad*) to 5 (= *very good*).

The response rate at T2 was 71% ($N = 299$). The main reasons for dropout between T1 and T2 were lack of interest (55%) and death (10%). Compared to T2 participants, dropouts were more likely to be men, $\chi^2(1) = 6.85$, $p = .009$, and were significantly older, $t(421) = -3.84$, $p < .001$. There were no significant differences in the other study variables. Analyses were thus based on all 423 T1 participants. Missing data were estimated using a full information maximum likelihood approach.

Measures

Big Five Personality Traits—The five personality traits were assessed only at T1 using the German NEO Five Factor Inventory (NEO-FFI; Borkenau & Ostendorf, 2008). Every personality trait was measured with 12 items such as “I often feel tense and jittery” (neuroticism). Participants indicated their agreement with the personality descriptions on a 5-point Likert scale, ranging from 0 (= *completely untrue*) to 4 (= *completely true*). Higher scores on the personality dimensions indicate more pronounced trait manifestations. In the present sample, Cronbach’s α ranged from .61 for openness to .84 for neuroticism.

Awareness of Age-Related Change—AARC gains and AARC losses were assessed at both measurement occasions. The AARC questionnaire comprises 25 gain-related and 25 loss-related items (Brothers, Gabrian, Wahl, & Diehl, 2018), which target changes across five behavioral domains (i.e., health and physical functioning, cognitive functioning, interpersonal relations, social-cognitive/social-emotional functioning, and lifestyle and engagement). All items start with the phrase “With my increasing age, I realize that ...,” followed either by gain-related experiences, such as “... I pay more attention to my health,” “... I have more foresight,” “... my friendships and relationships have become stronger,” “... I am more grateful for the things I have,” and “... I have more freedom to live my days the way I want,” or loss-related experiences, such as “... my ability to move around has gotten worse,” “... I am more forgetful,” “... I feel more dependent on the help of others,” “... I am more anxious about my future,” and “... I need more time for everything I do.” Participants indicated their agreement on a 5-point Likert scale ranging from 1 (= *not at all*) to 5 (= *very much*). Cronbach’s α ranged from .91 to .93 for the two subscales (AARC gains and AARC losses) and measurement points.

Control Variables—Sex, subjective health, and education served as control variables, because they have been related to both AARC and personality in earlier studies (e.g., Brothers et al., 2017; Löckenhoff, Sutin, Ferrucci, & Costa, 2008). Sex was coded as 0 for men and 1 for women. Health was operationalized as the physical health component summary score of the SF-36 (German version: Bullinger, Kirchberger, & Ware, 1995). Higher values on the SF-36 indicated better subjective health. Education was assessed as years of schooling.

Data Analyses

The relationships between personality traits and AARC gains as well as personality traits and AARC losses were studied with two separate latent change models (McArdle, 2009). We used latent change models because manifest change scores tend to lack reliability since both underlying manifest variables (T1 and T2) already contain measurement error (Steyer,

Eid, & Schwenkmezger, 1997). In contrast, latent change scores are largely free from measurement error, which allows to investigate interindividual differences in intraindividual change more precisely (McArdle, 2009). To estimate the latent change models, we used R version 3.4.3 and the package lavaan (Rosseel, 2012) following the guidelines by Ghisletta and McArdle (2012).

Measurement Models for Study Variables—AARC gains, AARC losses, and the five personality traits were modelled as latent variables using item parcels (Little, Cunningham, Shahar, & Widaman, 2002). For AARC gains and AARC losses, content-related item parcels were used following Brothers et al. (2017), so that each of the five behavioral domains constituted one parcel. The corresponding factor loadings of the AARC parcels were set to be equal across the two measurement points. Additionally, the corresponding error variances of the AARC parcels were allowed to co-vary over time.

The latent change scores were calculated separately for AARC gains and AARC losses over the 4.5-year period between T1 and T2. The latent change scores were modeled as the difference between the latent T2 variable and the latent T1 variable ($\Delta \text{AARC} = \text{AARC}_{T2} - \text{AARC}_{T1}$). Hence, the more positive the latent change score, the more the AARC score of an individual increased over time.

Three item parcels of four items each were created for each personality trait via an item-to-construct balance technique, resulting in an equal distribution of item factor loadings across parcels (Little, Cunningham, Shahar, & Widaman, 2002). The control variables were added to the models as manifest variables.

Structural Model for Regression Analyses—We were interested in the cross-sectional associations between personality traits and AARC as well as in the impact of personality traits on change in AARC over time, controlling for sex, physical health, education, and baseline level of AARC. Therefore, hierarchical regression analyses were performed for T1 AARC gains, T1 AARC losses, ΔAARC gains, and ΔAARC losses. Control variables and in case of the change analyses T1 AARC scores were entered in the first step. The five personality traits were entered in the second step. Standardized regression coefficients and their 95%-confidence intervals (CIs) are reported. Figure 1 illustrates the simplified structural model of our analyses.

Age Group Comparisons—To test whether relations between personality traits and AARC differed across the age range of our sample, we performed the analyses not only for the whole sample but also separately for two age groups. The younger age group included participants aged 40–64 years ($N = 255$), the older age group included those aged 65 and older ($N = 168$). We chose age 65 as a cutoff because this is the legal retirement age in Germany and marks for most individuals the beginning of a new life stage as a senior citizen. We compared one model in which the regression weights were allowed to vary between age groups with a model in which the regression weights were set equal across age groups. Change in χ^2 was examined to test for differences in the model fit.

According to Welch's t -tests, the older age group reported a worse health status, $t(300.42) = 3.41, p < .001$, lower extraversion scores, $t(366.79) = 2.25, p = .025$, higher T1 AARC gains, $t(386.19) = -2.86, p = .004$, higher T1 AARC losses, $t(354.38) = -4.60, p < .001$, as well as higher T2 AARC losses, $t(209.18) = -4.08, p < .001$. Apart from this, the percentage of women was higher for the older age group, $\chi^2(1) = 10.37, p = .001$. No significant differences were found regarding the four other personality traits, education, and T2 AARC gains (all p -values $< .05$).

Measurement Invariance—Measurement invariance was tested for personality traits across age groups and for AARC gains and AARC losses across age groups and measurement points. Configural invariance, weak invariance, and strong invariance were successively imposed to the measurement models and their goodness of fit was compared via χ^2 -tests (Horn & McArdle, 1992). Evidence supporting weak measurement invariance was required to continue with latent change analyses (McArdle, 2009).

Results

Descriptive Statistics and Evaluation of Measurement Invariance

Means, standard deviations, and bivariate correlations of the manifest variables are shown in Table 1. Baseline AARC gains were positively related to extraversion, openness, and conscientiousness. AARC gains at T2 were positively related to openness, but also to neuroticism. Baseline AARC losses were positively related to neuroticism and negatively to the other four personality traits. AARC losses at T2 were negatively related to neuroticism and positively to extraversion and conscientiousness. The significant correlations between personality traits and AARC at T2 indicated that the bivariate correlations persisted over time. Whether personality traits had a longitudinal influence on AARC, in the sense that they predicted AARC at T2 while controlling for baseline levels of AARC at T1, was tested with the latent change models.

Next, we tested for measurement invariance. The longitudinal measurement models with correlated error terms achieved weak measurement invariance for both AARC gains and AARC losses, $\chi^2(4) = 4.26, p = .372$ and $\chi^2(4) = 7.06, p = .133$. Imposing strong invariance to the models lead to a significant worsening of fit. Across age groups, weak invariance could be established for AARC gains, $\chi^2(8) = 5.01$, AARC losses, $\chi^2(8) = 9.25$, extraversion, $\chi^2(2) = 2.93$, and agreeableness, $\chi^2(2) = 0.38$ (all p -values $> .05$). Strong invariance across age groups was established for neuroticism, $\chi^2(1) = 2.81$, openness, $\chi^2(1) = 1.67$, and conscientiousness, $\chi^2(1) = 2.67$ (all p -values $> .05$). Thus, requirements for latent change analyses were met (McArdle, 2009).

Personality Traits and AARC Gains

The overall model for AARC gains and personality achieved good to acceptable fit as indicated by CFI = .921 and RMSEA = .051, 90% CI [.046, .057]. AARC gains at T1 and T2 shared 46.9% of their variance. The remaining 53.1% of T2-variance formed the change score. The results of the regression analyses are shown in Table 2.

Baseline AARC gains were positively related to openness, $\beta = .23, p = .001$ and conscientiousness, $\beta = .20, p = .001$. Contrary to our assumptions, we found AARC gains to be also positively related to neuroticism, $\beta = .17, p = .023$. The control variables accounted for 2.8% of variance and the personality traits for an additional 12.2% of the baseline variance of AARC gains, totaling 15.0% of the variance.

Change in AARC gains over the 4.5 years was negatively related to baseline AARC gains, $\beta = -.30, p < .001$, and health, $\beta = -.14, p = .030$. Control variables and baseline AARC gains accounted for 16.5% of the variance in the change score. Personality traits accounted for an additional 3.4%, although none of the individual personality traits reached significance as a predictor of change in AARC gains.

Personality Traits and AARC Losses

The overall model for AARC losses and personality had an acceptable fit with CFI = .902 and RMSEA = .061, 90% CI [.056, .066]. AARC losses at T1 and T2 shared 55.2% of their variance. The remaining 44.8% of T2-variance formed the change score. The findings of the regression analyses are shown in Table 3.

Baseline AARC losses were positively related to neuroticism, $\beta = .46, p < .001$, and negatively to health, $\beta = -.45, p < .001$. The control variables accounted for 33.7% and the personality traits for an additional 19.0% of the variance of baseline AARC losses, totaling 52.7% of the variance.

Change in AARC losses over the 4.5 years was negatively related to conscientiousness, $\beta = -.15, p = .038$, and baseline AARC losses, $\beta = -.45, p < .001$. Control variables and baseline AARC losses accounted for 13.7% of the variance in the AARC losses change score. Personality traits accounted for an additional 2.4% of the variance in the AARC losses change score, with higher conscientiousness being related to a decrease of AARC losses overtime.

The cross-sectional relation between neuroticism and AARC losses was the strongest of all personality–AARC associations as indicated by the estimated β -weights.

Examining the Effect of Age Groups

We compared models with varying regression weights and models with equal regression weights across the two age groups. For AARC gains, constraining the regression weights across age groups did not significantly attenuate the model fit, $\chi^2(17) = 14.96, p = .599$. The same was found for AARC losses, $\chi^2(17) = 12.39, p = .776$. Furthermore, an inspection of the freely estimated regression weights for the two age groups did not reveal any differences. Hence, the observed effects can be considered similar across the age range of our sample.

Discussion

We investigated cross-sectional relations between personality traits and AARC, as well as the impact of personality traits on trajectories of AARC over 4.5 years. The AARC-specific

reasoning with its differentiation between gains and losses stimulated an extension of prior cross-sectional research on personality and other subjective aging constructs. Taken together, our data confirmed significant cross-sectional associations between personality traits and both AARC domains. The impact of personality traits on change in AARC over time, however, was rather weak. Furthermore, the relations between personality traits and AARC seemed to be consistent across the second half of life in our sample.

Cross-Sectional Associations Between Personality and Awareness of Age-Related Change

Personality traits accounted for variance in both AARC gains and AARC losses cross-sectionally. As hypothesized, openness and conscientiousness were positively related to AARC gains, whereas neuroticism was positively related to AARC losses.

Out of all the personality–AARC relations studied, the one between neuroticism and AARC losses was the strongest, both at a bivariate and at a multivariate level. The strength of the relationship may result from the multiple ways via which neuroticism might affect AARC losses: Emotionally unstable individuals might apply more negative evaluations when facing age-related losses (cf. Uziel, 2006) – or even perceive losses where no changes may essentially be evident (Suchy et al., 2010). Additionally, these individuals should exhibit a stronger affective reactivity when experiencing age-related losses in daily life and might become overwhelmed by them more easily (cf. Bolger & Schilling, 1991). Eventually, such processes might even be exacerbated by worries regarding the whole aging process (see links to ATOA; Miche, Elsässer, et al., 2014). In contrast, emotionally stable individuals might focus less on developmental losses, put them into perspective, and encounter them in less emotionally reactive ways (e.g., Bolger & Schilling, 1991).

Contrary to our hypotheses, there was also a small positive association between neuroticism and AARC gains. This association may stem from tendencies toward caution and carefulness in individuals scoring high in neuroticism which may resonate with aspects of AARC gains (e.g., “With my increasing age, I realize that I pay more attention to my health”).¹ Neuroticism may thus be associated not only with negative aspects of subjective aging, but potentially also with positive ones. Also contrary to our hypotheses, extraversion was significantly related to AARC gains only at the bivariate level; at the multivariate level, the association between extraversion and AARC gains might thus be confounded with other personality traits and variables.

Longitudinal Associations Between Personality and Awareness of Age-Related Change

On a bivariate level, many of the significant cross-sectional relations persisted over the study period of 4.5 years. For example, neuroticism was strongly related not only to AARC losses at T1, but also to AARC losses at T2. However, because most of these bivariate longitudinal relations were not confirmed in the latent change models, they reflected a stability in cross-sectional relations (i.e., highly neurotic individuals were strongly aware of age-related losses both at T1 and T2), rather than a longitudinal influence of personality on change in AARC.

We thank an anonymous reviewer for providing us with this idea.

Regarding the latent change models, only conscientiousness was positively related to change in AARC losses over time. Highly conscientious individuals tended to show less increase or even decrease in AARC losses over time than individuals scoring low in conscientiousness. In prior research, conscientiousness was associated with a healthier lifestyle and fewer health problems over time as well as better cognitive functioning (Sutin et al., 2013; Wettstein et al., 2017). Much of this positive impact of conscientiousness results from better health behavior, establishing goals toward health maintenance, and the successful management of these goals (e.g., Roberts & Robins, 2000; Turiano et al., 2015). Conscientious individuals may thus actively behave to prevent physical and cognitive decline (cf. Conner & Abraham, 2001), and therefore experience and become aware of fewer age-related losses over time.

None of the other personality traits predicted change in AARC gains or AARC losses longitudinally. There might be several reasons for this lack of evidence for our hypothesis. First, the timeframe of 4.5 years may have been too narrow to depict major changes in AARC. Second, most of our participants could be considered as either middle-aged or young-old and were mainly free of cognitive impairments and overall in good health. Thus, most of them were probably not in a phase of their life where they experienced major age-related changes that might be more strongly related to personality traits. Third, stronger personality effects on change in AARC might be found when investigating specific behavioral domains of AARC, such as socioemotional functioning and neuroticism, or interpersonal relations and extraversion. Fourth, we may have underestimated how the stability of personality traits over time may lead to the same sensitivity and reactivity toward AARC at T1 and T2, and therefore rather reinforce the stability of AARC instead of influencing its changes. Future research could work with longer observational periods, building on a sample that is more likely to experience major age-related changes, as well as investigate the relations between single personality traits and specific behavioral domains of AARC.

Implications and Future Research

Primarily, our results indicate that there are clear cross-sectional relations between personality traits and AARC. By shaping the perception and awareness of age-related gains and losses, personality traits may thus also influence outcomes of AARC, such as depressive symptoms, and psychological well-being (Brothers et al., 2016; Dutt et al., 2018). Whereas openness and conscientiousness should thereby mainly be related with more positive aging experiences and outcomes, the implications of neuroticism are more difficult to forecast. Next to the more obvious negative consequences stemming from strong AARC losses (e.g., increased depressive symptoms), neuroticism may also have positive consequences regarding AARC gains, but also regarding a higher awareness of current and future losses and needs which may for example result in a better oldage preparation (Sörensen, Duberstein, Chapman, Lyness, & Pinquart, 2008).

Future research could thus concentrate on AARC as a mediator or moderator in the relationships between personality traits and such outcome variables. Apart from this, research on the mechanisms that link personality and AARC seems promising. For example,

the behavioral pathways proposed to link conscientiousness and AARC losses in the long term might be tested. Also, future research could target the discrepancies between AARC and objectively occurring changes (i.e., overreporting and underreporting of changes) and link those to personality. Baltes et al. (2006) suggested other aspects of personality to be related to age-related changes as well, such as control beliefs, coping styles, and self-evaluation. All of these personality-like constructs seem of interest in the context of AARC.

Limitations

This study has several limitations. Our sample was positively biased regarding education and health, which limits the generalizability of the results to individuals with lower educational achievement and poorer health.

Regarding our measurement instruments, the reliability of the NEO-FFI scales was comparatively low. We consider this a sample-specific limitation, because the NEO-FFI is a well-established and widely used questionnaire. The parceling approach and operating in latent space addressed this limitation by putting less weight on single item loadings. Similarly, the measurement of AARC might have been suboptimal. For reasons of scale development, AARC was assessed with 194 items at T1, 50 of which formed the scale used in this study. At T2, AARC was measured only with these 50 remaining items. Potentially, T1 participants might have felt overwhelmed by the 194 AARC items and thus overestimated or underestimated their loss-or gain-related aging experiences, respectively, compared with T2. This might explain the regression to the mean dynamic found for both AARC gains and AARC losses over time.

Lastly, personality traits were measured only at T1. Thus, we could not test the reciprocal effects AARC could have had on change in personality. Research on felt age however indicates that such relations may exist as well (Stephan, Sutin, & Terracciano, 2015). Future research may thus concentrate on cross-lagged relations between personality and AARC.

Conclusion

We were able to expand the previously studied cross-sectional relations between personality and other subjective aging constructs to the specific context of AARC. Personality traits were clearly associated with the awareness of age-related changes cross-sectionally. Specifically, neuroticism served as the main correlate of AARC losses, whereas conscientiousness and openness were the main correlates of AARC gains. Apart from cross-sectional analyses, we also investigated the influence of personality traits on trajectories in AARC covering a 4.5-year period. Although the longitudinal associations were overall less pronounced, high conscientiousness was a significant predictor of decreases in AARC losses over time. In terms of the longitudinal influences of personality on individuals' awareness of age-related change, more data especially over longer time periods are needed to come to a definitive conclusion. Lastly, age group comparisons suggested that the personality–AARC relationships were stable across the second half of life.

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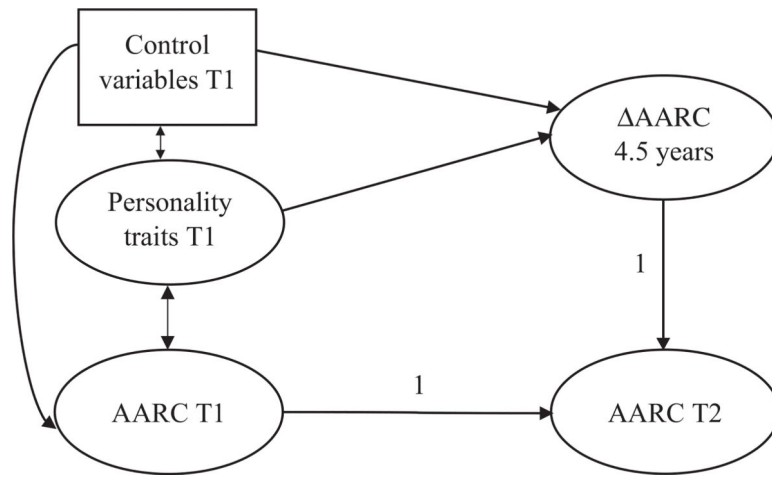


Figure 1.

Latent change model investigating associations between personality and awareness of age-related change (AARC). Control variables = sex, health, and education. Personality traits = neuroticism, extraversion, openness, agreeableness, conscientiousness. Separate models were calculated for AARC gains and AARC losses.

Table 1.

Descriptive statistics and bivariate correlations of the study variables

	<i>M (SD)</i>	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. AARC gains T1	3.10 (0.65)									
2. AARC gains T2	2.88 (0.70)	.64***								
3. AARC losses T1	2.23 (0.61)	.32***	.29***							
4. AARC losses T2	2.15 (0.61)	.20***	.36***	.72***						
5. Neuroticism T1	18.36 (7.44)	.03	.12*	.49***	.40***					
6. Extraversion T1	27.36 (6.36)	.13**	.07	-.29***	-.23***	-.37***				
7. Openness T1	29.88 (5.28)	.17***	.10*	-.11*	-.03	-.06	.20***			
8. Agreeableness T1	32.52 (5.16)	.09	.08	-.11*	-.07	-.22***	.28***	.18***		
9. Conscientiousness T1	34.32 (5.64)	.14**	.03	-.22***	-.23***	-.26***	.27***	-.01	.17***	
10. Chronological age T1	62.94 (11.84)	.13**	.06	.26***	.20***	-.09	-.07	-.08	-.03	-.04

Notes. *M* = mean, *SD* = standard deviation. Missing values were estimated with full information maximum likelihood estimation.

* $p < .05$

** $p < .01$

*** $p < .001$.

Table 2. Regression analyses for baseline awareness of age-related gains (AARC gains) and latent change in AARC gains

	AARC gains T1		Change in AARC gains T2–T1	
	β	95% CI	β	95% CI
Sex	.04	[−.07, .16]	.10	[−.04, .23]
Health	−.10	[−.20, .01]	−.14*	[−.02, −.27]
Education	.05	[−.06, .15]	−.07	[−.20, .05]
AARC gains T1			−.30***	[−.44, −.17]
Neuroticism	.17*	[.02, .31]	.10	[−.07, .26]
Extraversion	.13	[−.02, .28]	.02	[−.15, .20]
Openness	.23**	[.09, .36]	−.13	[−.30, .03]
Agreeableness	.03	[−.12, .18]	.11	[−.06, .27]
Conscientiousness	.20**	[.08, .32]	−.11	[−.26, .03]
R^2	.15		.20	

Notes. Higher change scores reflect increases in AARC gains. 95% CI = 95% confidence intervals of β . $N = 423$.

* $p < .05$
** $p < .01$
*** $p < .001$.

Table 3.

Regression analyses for baseline awareness of age-related losses (AARC losses) and latent change in AARC losses

	AARC losses T1		Change in AARC losses T2-T1	
	β	95% CI	β	95% CI
Sex	-.07	[-.16, .02]	-.02	[-.16, .11]
Health	-.45***	[-.53, -.37]	-.12	[-.27, .04]
Education	.01	[-.07, .10]	-.07	[-.19, .06]
AARC losses T1			-.45***	[-.64, -.27]
Neuroticism	.46***	[.34, .56]	.02	[-.18, .21]
Extraversion	.00	[-.12, .12]	.02	[-.16, .19]
Openness	-.09	[-.19, .02]	.06	[-.09, .22]
Agreeableness	.10	[-.02, .21]	.06	[-.10, .23]
Conscientiousness	-.08	[-.18, .02]	-.15*	[-.30, -.01]
R^2	.53		.16	

Notes. Higher change scores reflect increases in AARC losses. 95% CI = 95% confidence intervals of β . $N = 423$.

* $p < .05$

*** $p < .001$.