ijbd

International Journal of
Behavioral Development
34(2) 147–158

DOI: 10.1177/0165025409350947
ijbd.sagepub.com
SAGE

Attitudes toward younger and older adults: The German Aging Semantic Differential

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Abstract

The present study used the German Aging Semantic Differential (ASD) to assess attitudes toward younger and older adults in a heterogeneous sample of $n = 151$ younger and $n = 143$ older adults. The questionnaire was administered in two versions, one referring to the evaluation of younger adults, the other to the evaluation of older adults. Multiple-group confirmatory factor analysis replicated the four-factor solution reported in the literature. Younger compared to older adults were rated as higher in terms of instrumentality (i.e., more active, adaptive to change) and integrity (i.e., more personally satisfied, at peace with oneself), whereas older adults were described as more autonomous and self-sufficient than younger adults. Younger participants reported more negative attitudes toward younger and older adults in some of the factors than did older participants. Structural equation modeling furthermore showed that attitudes correlated with personality characteristics and positive and negative affect, in that more agreeable, extraverted, and positively tempered participants reported less negative attitudes toward younger and older adults. Results are discussed in the context of multidimensional assessment of age stereotypes.

Keywords

age stereotypes, Aging Semantic Differential, attitudes, confirmatory factor analysis, personality and affect

Our beliefs about, and our attitudes toward, other people can have a strong impact on our behavior and our social interactions (Ferguson & Bargh, 2004; Rosenhan, 1973; Rosenthal, 1985) and they can influence what we think and how we feel about ourselves. This renders the investigation of beliefs, attitudes, and stereotypes an interesting topic for research with great relevance for our everyday lives. Attitudes toward others, defined as the feelings and beliefs that individuals have toward other people (Kogan, 1961), can refer to various aspects such as race, gender, or the age of a person.

The majority of studies on age stereotypes report more negative attitudes toward older than younger adults (Bell & Stanfield, 1973; Hummert, Garstka, Shaner, & Strahm, 1994; Kite, Deaux, & Miele, 1991; Kite, Stockdale, Whitley, & Johnson, 2005). Older adults are often described as "ill, tired, senile, and physically and mentally disabled" (McTavish, 1971, p. 97). Studies using self-report measures to assess explicit attitudes (Hummert, Gartska, & Shaner, 1997; Kite et al., 1991) and studies using implicit measures (Hummert, Gartska, O'Brien, Greenwald, & Mellot, 2002; Levy, 2000; Nosek, Banaji, & Greenwald, 2002) generally agree on this finding.

This overall finding of a negative stereotype toward old age needs further qualification (Hummert et al., 1994; Schmidt & Boland, 1986; Slotterback & Saarnio, 1996). These studies argue that it is necessary to consider different aspects of stereotypes toward older adults and take dimensions such as attractiveness, health, happiness, or independence into consideration (Hummert et al., 1994; Schmidt & Boland, 1986). Kite et al. (2005), for instance, find the strongest prejudice against older adults with respect to attractiveness, whereas differences in the evaluation of younger and older adults' cognitive competence and social interactions are relatively small (but still more negative for older than for younger adults). Furthermore, Slotterback and Saarnio (1996) find that a negative view on older adults is only prevalent with respect to physical attributes but not in terms of cognitive and personal-expressive aspects.

To date, the evidence on whether age stereotypes are more prevalent in younger than in older adults is still mixed. Theories of social roles (Eagly, 1987) and social identity (Tajfel & Turner, 1986) argue that attitudes toward members of one's own group are more positive than those toward members of other social groups, and that this can have a self-serving function and can enhance self-esteem. Brewer and Lui (1984) suggest that older compared to younger adults have more complex representations of older adults in that they hold more differentiated subcategories of older adults as a social group. In their meta-analysis, Kite et al. (2005) conclude that although older adults see fewer differences between younger and older adults, they do not show a more positive bias toward their own age group. Levy and Banaji (2002) even postulate implicit out-group favoritism among older adults in that older adults show comparable magnitude of implicitly negative attitudes toward older adults as do younger adults.

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The "contact hypothesis" (Allport, 1954) offers one explanation for negative attitudes toward members of social groups other than one's own. This hypothesis argues that stereotypes toward, and prejudice against, people of other social groups stem from lack of social contact and interaction with members of these groups and can be reduced by inter-group contact (Allport, 1954; Hewstone & Brown, 1986). In addition, not only the frequency of social contact but also its quality could be related to a more positive view toward other social groups (Hummert, 1994; Knox, Gekoski, & Johnson, 1986). Hale (1998) found that people with higher quality of social contact with older adults showed fewer negative stereotypes and had more substantiated knowledge about older people. This finding held for younger and older participants. Staudinger, Smith, and Baltes (1992) reported more wisdom-related knowledge about other people in younger and older women, if their profession facilitated social contact (i.e., human services). Personality characteristics, as well as positive and negative affect, are likely to have an influence on frequency and quality of social interactions with members of one's own and other social groups, with consequent effects on attitudes toward, and beliefs about, other people. Graziano and Eisenberg (1997), for instance, found a negative relationship between agreeableness and prejudice against various social groups. They argue that individuals with high levels of agreeableness can moderate or suppress negative feelings during social interactions in order to maintain their positive relations with others. Furthermore, the amount of social contact is mediated by a person's extraversion, as shown for younger adults (Neyer & Asendorpf, 2001) as well as older adults (Krause, Liang, & Keith, 1990).

The Aging Semantic Differential

The Aging Semantic Differential (ASD) is one of the most widely used instruments for the assessment of attitudes toward adults of different ages. It was developed by Rosencrantz and McNevin (1969) based on the semantic differential paradigm (Osgood, Suci, & Tannenbaum, 1957). The ASD constitutes a composite self-report instrument of 32 items that measures various facets of attitudes or perceptual dispositions toward others. Rosencrantz and McNevin (1969) proposed a three-factor solution for the original version of the questionnaire derived from exploratory factor analysis. They called the first factor "*instrumental–ineffective*." It measures a person's adaptability, vitality, or active pursuit of goals. Sample adjective pairs are "progressive–old-fashioned" and "active–passive." The second factor was termed "*autonomous–dependent*." It refers to a person's autonomy and self-sufficiency. Sample adjective pairs are "consistent–inconsistent" and "organized–disorganized." The third factor was named "*personal acceptability–unacceptability*". It reflects a person's sociability, that is, a person being socially at ease and pleasing to others. Sample adjective pairs are "generous–selfish" and "trustful–suspicious."

Later studies, however, failed to replicate these three distinct dimensions (Gekoski, Knox, & Kelly, 1991; Holtzman, Beck, & Kerber, 1979; Intrieri, von Eye, & Kelly, 1995; Underwood, Eklund, & Whisler, 1985), but agreed on a four-factor solution. The four-factor model of Intrieri et al. (1995) comprises 26 of the originally proposed 32 items and is the result of a comparison of the several models reported in the literature. It constitutes a modified version of the four-factor solution proposed by Holtzman et al. (1979) that comprised 28 items. Holtzman et al. (1979) and Intrieri et al. (1995) renamed the original three factors to "*instrumental*", "*autonomy*," and "*acceptability*" and termed the fourth "new" factor "*integrity*." Integrity reflects a person's personal satisfaction, optimism, and peacefulness with him or herself (Polizzi & Steitz, 1998).

One possible explanation for the discrepancies in the factor structure of the original and the later versions of the ASD is method variance (e.g., target of evaluation, sample size, and sample distribution), which makes direct comparison difficult. Rosencrantz and McNevin (1969) asked participants to evaluate a "*young man of 20–30 years*", a "*middle-aged man of 40–55 years*," and an "*old man of 70 years or older*", whereas later studies used more generalized social objects for evaluation: Underwood et al. (1985) used "*old persons*" and "*young persons*", Gekoski et al. (1991) used "*average mid-20s/ mid-40s/ early 70s man or woman*", and Intrieri et al. (1995) used "*an old person*" but did not investigate attitudes toward younger adults. Furthermore, the studies varied largely in terms of their sample sizes (from 100 subjects in Gekoski et al., 1991 and Intrieri et al., 1995, to over 500 subjects in Holtzman et al., 1979), the age of the participants, and the distribution of participants' gender and level of education. In fact, whereas Holtzman et al. (1979) and Rosencrantz and McNevin (1969) investigated younger and older participants, later studies (Gekoski et al., 1991; Intrieri et al., 1995; Underwood et al., 1985) only included university students.

Purpose of the present study

The present study used the German version of the ASD (Stange, 2003) in a heterogeneous sample of younger and older participants. Two otherwise identical versions of the questionnaire were administered: one version asked for attitudes toward younger adults ("younger adults" version) and the other version asked for attitudes toward older adults ("older adults" version). The aim of the study was fourfold: (1) We tested the factor structure of the German ASD. Given the mixed results in the literature and the psychometric difficulties of the original version of the ASD, we were interested whether the original three-factor structure proposed by Rosencrantz and McNevin (1969) or the more recently proposed four-factor structure (Holtzman et al., 1979; Intrieri et al., 1995) could be replicated. In addition, we expected that the obtained factor solution held in the "younger adults" version and the "older adults" version of the questionnaire would be invariant across younger and older participants. (2) We examined age-group differences in attitudes toward younger and older adults. Rosencrantz and McNevin (1969), for instance, found the strongest negative attitudes toward older adults with respect to the factor *instrumental–ineffective*. They furthermore reported less pronounced negative attitudes toward older adults with respect to the factor *autonomous–dependent*. We specifically hypothesized that older adults were only rated more negative than younger adults on dimensions that referred to typical features of young age such as attractiveness, adaptability, and future expectations (i.e., adjectives mostly comprised in the factors *instrumentality*[1] and *integrity*). (3) Based on evidence of an own-group bias (i.e., favoritism of people who belong to one's own social group; Eagly, 1987; Tajfel & Turner, 1986), we were furthermore interested in the extent to which younger and older adults differed in their evaluations of their own and the other age group. Specifically, we expected that younger compared to older adults held more negative attitudes toward older but that the two age groups did not differ in their views of younger

adults. (4) Finally, we explored correlations between personality characteristics and positive and negative affect and attitudes toward younger and older adults. Based on the assumption that certain personality characteristics (e.g., extraversion and agreeableness) and positive and negative affect influence frequency and quality of social interactions (Graziano & Eisenberg, 1997; Krause et al., 1990; Neyer & Asendorpf, 2001) with impacts on attitudes toward others (Allport, 1954; Hale, 1998; Hewstone & Brown, 1986), we hypothesized that individuals with higher levels of extraversion, conscientiousness, and openness would report more positive attitudes toward younger and older adults, and that more neurotic and less agreeable individuals would report more negative attitudes. Finally, we expected that negative affect was related to more negative views of others, whereas positive affect was related to greater acceptance of others.

Method

Participants

The German version of the ASD was administered to $n = 151$ younger (18–31 years, $M = 24.8$ years, $SD = 3.1$) and $n = 143$ older participants (68–81 years, $M = 73.4$ years, $SD = 3.1$).[2] Both younger and older participants were recruited through posters or handouts posted and distributed at, for instance, grocery stores and swimming pools and advertisements in newspapers. The sample was approximately stratified by gender and education: 51.0% of the younger and 46.9% of the older participants were female, and 56.3% of the younger and 57.3% of the older participants had higher secondary level of education (comparable to two years of college or more). Younger and older participants did not differ in terms of subjective health or subjective cognitive functioning ($p > .05$), both measured by single-item indicators. The age groups differed in terms of processing speed performance measured by the Digit-Symbol-Substitution test (Wechsler, 1981; $F_{(1,\ 292)} = 171.4$, $p < .01$, $\eta_p^2 = .37$), in that younger participants ($M = 56.9$, $SD = 11.9$) scored higher than older participants ($M = 40.7$, $SD = 9.0$). In addition, younger participants ($M = 22.3$, $SD = 4.7$) performed worse in the Spot-a-Word (Lindenberger, Mayr, & Kliegl, 1993; after Lehrl, 1977) measuring vocabulary, than older participants ($M = 28.7$, $SD = 3.1$; $F_{(1,\ 292)} = 184.3$, $p < .01$, $\eta_p^2 = .39$). The study was approved by the Institutional Review Board of the Max Planck Institute for Human Development, and informed consent was obtained from all participants.

Procedure and measures

Aging Semantic Differential. Participants responded to the German version of the ASD (Stange, 2003). To guarantee the quality of the translation, the original items by Rosencrantz and McNevin (1969) were first translated from English into German by a German native speaker and then back-translated by an English native speaker. Incongruities were solved in consensus of both native speakers. Two "parallel" versions of the questionnaire ("younger adults" version, "Older adults" version) were administered to each participant: first, participants responded to the "younger adults" version that referred to attitudes toward younger adults ("*Please indicate how you perceive younger adults*"); this was then followed by the "older adults" version that asked for attitudes toward older adults ("*Please indicate how you perceive older adults*"). Using a 7-point scale, participants responded to each of the 32 pairs of bipolar adjectives (e.g., "*most younger/older adults are . . .*", 1 = "*optimistic*", 7 = "*pessimistic*"). Lower scores represent a more positive attitude on the respective adjective pair. Table 1 gives an overview of the items of the original ASD and the German ASD.

Table 1. Overview of the Items of the Original Version and the German Version of the ASD

Original ASD (Rosencrantz & McNevin, 1969)	German ASD (Stange, 2003)
Progressive–Old-fashioned	Fortschrittlich–Rückwärtsgewandt
Consistent–Inconsistent	Beständig–Unbeständig
Independent–Dependent	Unabhängig–Abhängig
Rich–Poor	Reich–Arm
Generous–Selfish	Großzügig–Eigennützig
Productive–Unproductive	Produktiv–Unproduktiv
Busy–Idle	Beschäftigt–Untätig
Secure–Insecure	Sicher–Unsicher
Strong–Weak	Stark–Schwach
Healthy–Unhealthy	Gesund–Ungesund
Active–Passive	Aktiv–Passiv
Handsome–Ugly	Gutaussehend–Hässlich
Cooperative–Uncooperative	Kooperativ–Unkooperativ
Optimistic–Pessimistic	Optimistisch–Pessimistisch
Satisfied–Dissatisfied	Zufrieden–Unzufrieden
Expectant–Resigned	Erwartungsvoll–Entmutigt
Flexible–Inflexible	Flexibel–Unflexibel
Hopeful–Dejected	Hoffnungsvoll–Niedergeschlagen
Organized–Disorganized	Organisiert–Chaotisch
Happy–Sad	Froh–Traurig
Friendly–Unfriendly	Freundlich–Unfreundlich
Neat–Untidy	Ordentlich–Unordentlich
Trustful–Suspicious	Vertrauensvoll–Misstrauisch
Self-reliant–Dependent	Selbständig–Unselbständig
Liberal–Conservative	Liberal–Konservativ
Certain–Uncertain	Sicher–Unsicher in ihren Ansichten
Tolerant–Intolerant	Tolerant–Intolerant
Pleasant–Unpleasant	Angenehm–Unangenehm
Ordinary–Eccentric	Normal–Exzentrisch
Aggressive–Defensive	Aggressiv–Verteidigend
Exciting–Dull	Aufregend–Langweilig
Decisive–Indecisive	Entschlossen–Unentschlossen

Personality characteristics. To assess the Big Five personality characteristics, we used the short version of the NEO Five Factor Inventory (NEO-FFI; Borkenau & Ostendorf, 1993; Costa & McCrae, 1992). It comprises 30 items, six items for each of the five factors *neuroticism*, *extraversion*, *openness*, *agreeableness*, and *conscientiousness* (see Smith & Baltes, 1996, for details). Participants were asked to indicate on an 8-point rating scale to what extent each of the items applied to them (1 = "*applies not at all*", 8 = "*applies very much*"). We computed separate mean scores for each of the five factors with higher scores indicating higher values in the respective factors. Cronbach's alpha of the five factors in the present study were: $\alpha_{Neuroticism} = .75$ (younger participants = .82/older participants = .56), $\alpha_{Extraversion} = .59$ (.62/.57), $\alpha_{Openness} = .22$ (.30/.03), $\alpha_{Agreeableness} = .58$ (.42/.71), $\alpha_{Conscientiousness} = .77$ (.73/.73).

Positive and Negative Affect. The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) was

administered to measure *positive affect* and *negative affect*. Participants were asked to evaluate on an 8-point rating scale (1 = "*not at all*", 8 = "*very often*") how often they had felt each of the respective emotions during the last year. We computed separate mean scores for the two subscales with higher scores indicating higher values in positive and negative affect, respectively. Cronbach's alpha of the two subscales in the present study were: $\alpha_{Positive\ affect} = .92$ (younger participants = .92/older participants = .93), $\alpha_{Negative\ affect} = .95$ (.93/.94).

At the end of the session, participants were debriefed and received financial reimbursement.

Data analyses

To determine the factor structure of the German ASD, to investigate differential attitudes toward younger and older adults, and to examine age-group differences in attitudes toward younger and older adults, we used multiple-group confirmatory factor analyses (CFA; Little, 1997; Steenkamp & Baumgartner, 1998). All respective analyses were conducted using Mplus 4.0 (Muthén & Muthén, 1998–2007). In order to control for effects of non-normality (e.g., kurtosis), we used the Robust Maximum Likelihood as estimation procedure.

Specification and testing of the model. Our purpose was to establish a clearly interpretable factor structure for the German ASD with acceptable fit based on earlier models suggested in the literature (Holtzman et al., 1979; Intrieri et al., 1995; Rosencrantz & McNevin, 1969). Furthermore, we were interested in examining the invariance of the final factor solution across the "younger adults" version and the "older adults" version of the questionnaire as well as across younger and older participants to justify subsequent comparison of attitudes toward younger and older adults and investigation of age-group differences in these evaluations. Specifically, we tested the original three-factor solution proposed by Rosencrantz and McNevin (1969) and the four-factor solution by Intrieri et al. (1995). Since Intrieri et al. (1995) only asked for attitudes toward older but not younger adults, we conducted our preliminary analyses on the "older adults" version of the German ASD only. We then enhanced the best-fitting model according to model modification indices (e.g., addition or deletion of items, changes in item–factor assignments) and in line with models in earlier studies on the ASD (e.g., Intrieri et al., 1995).

In a next step, we tested for *measurement invariance* (Horn & McArdle, 1992; Meredith & Teresi, 2006) across the two questionnaire versions ("younger adults" and "older adults" versions) to allow the comparison of their factor and latent mean structure. Specifically, in order to test commensurability of the two versions, we used a mean and covariance structure analysis approach (Steenkamp & Baumgartner, 1998; Vandenberg & Lance, 2000) comprising the three following steps: (1) We tested for *configural invariance* by examining whether the same factorial loading patterns, that revealed the best model fit in the "older adults" version, also lead to an adequate fit in the "younger adults" version. We then combined the two versions in one model using it as the baseline model (M1) for further analyses. (2) In a stepwise manner we added more model restrictions: To test for *metric invariance* between the two versions we set up a model (M2) in which we constrained the factor loadings of each parallel item pair across the two versions of the questionnaire. (3) We then held constant the intercepts of each item pair to test for *scalar invariance* (M3). In order to examine possible differences between the latent means of the parallelized factors (i.e., factors the same items were assigned to), we implemented the estimation of mean structure in this step of confirmatory analysis. Scaled χ^2 statistics were used to test for significant differences in latent means and Cohen's *d* (Cohen, 1988) were estimated to assess effect sizes.

After we had tested for measurement invariance across the two questionnaire versions, we used *multiple-group analysis* to investigate whether our specified model (i.e., the most restrictive model that still matched our fit criteria) held across younger and older participants and tested for age-group differences in attitudes toward younger and older adults.

Goodness-of-fit indices and model comparison. To estimate the goodness of fit for each model, we considered several fit indices: the Tucker and Lewis Index (TLI; Tucker & Lewis, 1973), the Comparative Fit Index (CFI; Bentler, 1990), the Root Mean Square Error of Approximation (RMSEA; Steiger, 1990; Steiger & Lind, 1980), and the Standardized Root Mean Square Residual (SRMR; Bentler, 1995; Jöreskog & Sörbom, 1981). According to the literature, several "rules-of-thumb" should be taken into consideration in order to decide whether an estimated model has an acceptable fit (e.g., Bentler, 1990; Hu & Bentler, 1997). For TLI and CFI a value of .90 or higher, for RMSEA and SRMR a value of .05 or lower is a common recommendation. TLI and CFI tend, however, to underestimate the fit of models that include more than three or four observed variables per latent factor (Kenny & McCoach, 2003; Vandenberg & Lance, 2000). As earlier studies on the ASD (e.g., Intrieri et al., 1995) report index values that were worse than suggested by "rules-of-thumb", we did not expect to fully meet the criteria in all models but rather focused on establishing a theoretically meaningful and not overly complex factor structure.

In order to test for measurement invariance and to compare between the model proposed by Intrieri et al. (1995) and our model, we used the test for scaled χ^2 differences and also the Root Deterioration per Restriction statistic (RDR; Browne & Du Toit, 1992). The use of scaled χ^2 rather than simple χ^2 differences is recommended when using Robust ML estimation (Muthén & Muthén, 1998–2007). The RDR statistic provides a comparison of the relative fit of nested models based on their RMSEA differences. Whereas (scaled) χ^2 differences simply test the null hypothesis of equality of the nested models, the RDR statistic tests the null hypothesis of essential equality based on the difference in the degrees of freedom of the to-be-compared models (Ho et al., 2000). RDR values below .05 suggest that restrictions can be made without substantially decreasing the model fit.

Structural Equation Modeling (SEM). To examine the impact of personality characteristics and affect on attitudes toward younger and older adults for both younger and older participants, we expanded our CFA model to an SEM (Figure 4 illustrates the SEM). In this approach, composite scores of attitudes toward younger and older adults were regressed on the sum scores of each of the five personality traits and of positive and negative affect. Since we did not have specific hypotheses concerning the relations between the personality traits or affect and the separate dimensions of the ASD, we specified two second-order factors, each constituting a composite of the four first-order factors of the

Table 2. Estimated Factor Models and Indices of Model Fit

Model	χ^2	*df*	CFI	TLI	RMSEA	SRMR
$M0_{Rosencrantz\ \&\ McNevin}$	1351.90	461	.676	.652	.081	.087
$M0_{Intrieri\ et\ al.}$	720.49	293	.801	.779	.070	.073
$M0_{Older\ adults}$	598.14	293	.858	.842	.060	.065
$M0_{Younger\ adults}$	529.93	293	.887	.875	.052	.059

Note. $M0_{Rosencrantz\ \&\ McNevin}$ = Three-factor model proposed by Rosencrantz and McNevin (1969; "older man"), $M0_{Intrieri\ et\ al.}$ = Four-factor model proposed by Intrieri et al. (1995; "older adults"), $M0_{Older\ adults}$ = Four-factor model for the German ASD ("older adults"), $M0_{Younger\ adults}$ = Four-factor model for the German ASD ("younger adults"); CFI = Comparative Fit Index, TLI = Tucker and Lewis Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual.

ASD—one for attitudes toward younger adults and another for attitudes toward older adults. We tested the relations between personality traits and attitudes and between affect and attitudes in separate models: in one model, the five personality traits were used as predictors for the two second-order factors of the ASD. In another model, the two subscales of the PANAS were used as predictors for the two second-order factors of the ASD. We used scaled χ^2 statistics to test for significance of standardized regressions coefficients.

Results

First, we report results pertaining to the factor structure of the German ASD (Hypothesis 1). Second, we present results about the differences between attitudes toward younger and older adults and about age-group differences in these evaluations (Hypotheses 2 and 3). Third, we report evidence about the relations between personality characteristics and positive and negative affect and attitudes toward younger and older adults (Hypothesis 4).

Factor structure underlying the German version of the ASD

With the aim to determine the factor structure of the German ASD, we compared the model fit of the original three-factor solution (Rosencrantz & McNevin, 1969) with the model fit of the four-factor solution as proposed by Intrieri et al. (1995). As shown in Table 2, none of the factor structures did yield adequate fit results: the CFI and the TLI were below .80 and RMSEA (.081 and .070) and SRMR (.087 and .073) were rather high for the two models. Direct comparison of the two models showed that the fit indices of the four-factor model were better than those of the three-factor model (scaled $\Delta\chi^2 = 536.18$, $\Delta df = 168$, $p < .001$). We therefore used the four-factor model as our baseline model from which to start the process of model modification.

By adding two items that had been excluded by Intrieri et al. (1995) and by excluding two other items, the model fit improved while the factor structure remained simple (i.e., each item was only assigned to one of the four factors).[3] Our final model ($M0_{Older\ adults}$) consisted of 26 items and had an acceptable fit (see Table 2). Twenty-two of the 26 items were assigned to the same factors as in the model by Intrieri et al. (1995), and the different assignments of the remaining four items did not change the meaning of the four factors (see Figure 1 for specific assignment of items to factors in the final model of the present study). We then tested this final model in the "younger adults" version of the questionnaire ($M0_{Younger\ adults}$) and obtained an even better model fit (see Table 2).

To test for configural invariance of our final model across the "younger adults" and the "older adults" versions of the ASD, we integrated both questionnaires in a single model M1. As presented in Table 3, the resulting model fits confirmed configural invariance: CFI and TLI were above .80 and RMSEA (.047) and SRMR (.062) were even better than in the models for both versions separately. The subsequent test for metric invariance also yielded acceptable fit indices (see model M2, Table 3). The scaled χ^2 difference between M1 and M2 were significant (scaled $\Delta\chi^2 = 66.71$, $\Delta df = 22$, $p < .001$). The RDR value of .048 did suggest that introducing metric invariance did not substantially worsen the fit. However, scalar invariance could not be supported (see M3 in Table 3). The scaled χ^2 difference between M2 and M3 was significant (scaled $\Delta\chi^2 = 808.7$, $\Delta df = 22$, $p < .001$) and neither the RDR nor the model fit indices were acceptable.

Cronbach's alpha for the four factors and the factor intercorrelations of the final model are shown in Table 4. Values for reliability and factor intercorrelations were consistently higher for older compared to younger participants. Factor intercorrelations were higher for factors within the "younger adults" and the "older adults" versions of the ASD than for factors between these two questionnaire versions. Factor loadings of the final model are provided in Figure 1.

Taken together, using multiple-group confirmatory factor analysis we were able to generally replicate the four-factor structure proposed by Intrieri et al. (1995) for the German ASD. As summarized in Figure 1, these four latent factors were *instrumentality* (i.e., a person's activity and adaptability), *autonomy* (i.e., a person's autonomy and self-sufficiency), *acceptability* (i.e., a person's sociability), and *integrity* (i.e., a person's satisfaction and peacefulness with him- or herself).

Differential attitudes toward younger and older adults and age-group differences in attitudes toward younger and older adults

Since scalar invariance was not supported, we could not test a model that estimated the latent mean structure for the "younger adults" and the "older adults" versions of the ASD and for both age groups simultaneously. We therefore conducted two separate analyses: one on differences in latent means between the two questionnaire versions, and another on differences in latent means between younger and older participants.

To analyze differences in attitudes toward younger and older adults we introduced partial rather than full scalar invariance (Byrne, Shavelson, & Muthén, 1989). We freed six intercepts (items 1, 11, 12, 15, 19, 23—not more than two items per latent factor) that had been held equal in model M3 across the two

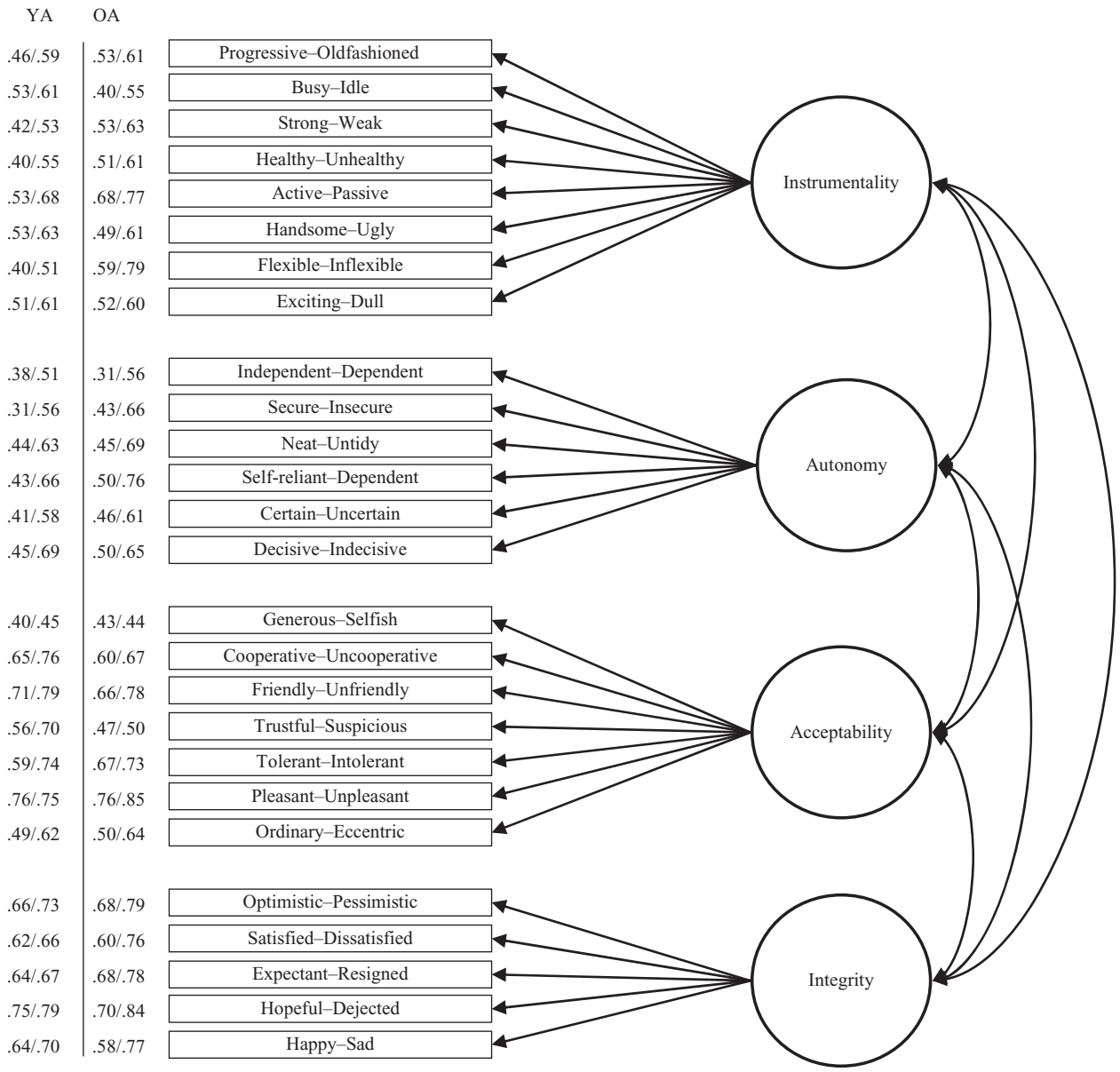

Figure 1. The four-factor model of the German ASD.
Note. This final four-factor solution is equal for the "younger adults" and the "older adults" questionnaire version; values on the left indicate factor loadings for each item; YA = "younger adults" version, OA = "older adults" version; values reported first in each row refer to younger participants, values reported second in each row refer to older participants.

questionnaire versions. This resulted in model M3* with the intercepts of 20 items constrained. The model fit was significantly worse than that of M2 (scaled $\Delta\chi^2 = 216.3$, $\Delta df = 16$, $p < .001$; RDR = .056; see Table 3) but allowed us to conduct the analysis of latent means. The results of the latent mean analysis are summarized in Figure 2. Overall attitudes toward older adults were more negative than those toward younger adults. This was true for both younger and older participants' evaluations. When examining the dimensions separately, however, both age groups rated older compared to younger adults as more negative in *instrumentality* (mean difference $\Delta M = 1.331$, S.E. = 0.134; scaled $\Delta\chi^2 = 227.06$, $p < .001$; Cohen's d = 1.80) and in *integrity* ($\Delta M = 1.108$, S.E. = 0.086; scaled $\Delta\chi^2 = 148.55$, $p < .001$; Cohen's d = 1.22), but reported more positive attitudes toward older than younger adults in terms of *autonomy* ($\Delta M = -0.719$, S.E. = 0.098; scaled $\Delta\chi^2 = 73.47$, $p < .001$; Cohen's d = −0.97). Differences in attitudes toward younger and older adults in terms of *acceptability* were not significant ($\Delta M = 0.036$, S.E. = 0.047; scaled $\Delta\chi^2 = 0.58$, ns.; Cohen's d = 0.06).

To next examine age-group differences in these differential attitudes toward younger and older adults, we conducted a multiple-group analysis for the model M2 (assuming metric invariance). This model ($M2_{\text{With multiple groups}}$) revealed low fit results (see Table 3), thus indicating substantial differences between the age groups. χ^2-contributions of the younger and the older participants in this model were, however, almost equal ($\chi^2_{\text{Younger participants}} = 2184.95$, $\chi^2_{\text{Older participants}} = 2203.94$), suggesting that the model fitted the data equally well in the two age groups and thus justifying the

Table 3. Results of test of measurement invariance

Model	χ^2	df	CFI	TLI	RMSEA	SRMR	RDR
M1	2041.78	1246	.836	.825	.047	.062	
M2	2108.49	1268	.826	.818	.047	.068	.047 (M1)
M3	2884.11	1290	.671	.661	.065	.100	.058 (M2)
M3*	2319.30	1284	.786	.779	.052	.080	.056 (M2)
$M2_{Second\text{-}order}$	2191.14	1287	.813	.808	.049	.076	.051 (M2)
$M2_{With\ multiple\ groups}$	4388.88	2602	.705	.699	.068	.094	

Note. All models integrate the "younger adults" and the "older adults" version of the ASD; M1 assumes configural invariance, M2 metric invariance, M3 scalar invariance, M3* partial scalar invariance; $M2_{Second\text{-}order}$ = Model with second-order factors used for the SEM; $M2_{With\ multiple\ groups}$ = Model used for multiple-group analysis between younger and older participants; CFI = Comparative Fit Index, TLI = Tucker and Lewis Index, RMSEA = Root Mean Square Error of Approximation, SRMR = Standardized Root Mean Square Residual, RDR = Root Deterioration per Restriction (in parentheses: the model compared with).

Table 4. Cronbach's alpha of the four factors and factor intercorrelations of the final model

Factor	1 (Y)	2 (Y)	3 (Y)	4 (Y)	1 (O)	2 (O)	3 (O)	4 (O)
1 (Y)	**.71/.82**	.41	.55	.53	.48	.83	.70	.70
2 (Y)	.70	**.59/.82**	.29	.50	.47	.25	.84	.75
3 (Y)	.57	.42	**.78/.87**	.45	.53	.47	.42	.80
4 (Y)	.48	.54	.56	**.80/.81**	.29	.65	.54	.26
1 (O)	−.17	.32	.08	.02	**.80/.81**	.85	.60	.75
2 (O)	.47	.09	.59	.13	.29	**.61/.82**	.74	.78
3 (O)	.50	.36	.03	.23	.00	.24	**.78/.85**	.73
4 (O)	.69	.66	.81	−.12	.45	.09	.20	**.80/.89**

Note. 1 = Instrumentality, 2 = Autonomy, 3 = Acceptability, 4 = Integrity; (Y) = "younger adults" version, (O) = "older adults" version; Cronbach's alpha for each factor are in bold; values reported first in the diagonal refer to younger participants, values reported second in the diagonal refer to older participants.

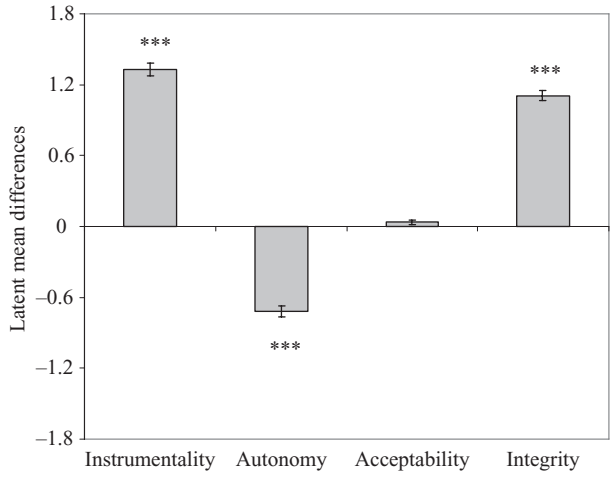

Figure 2. Latent mean differences in attitudes toward younger and older adults in the four factors of the ASD.
Note. Error bars represent standard errors. Positive values indicate more positive attitudes toward younger adults, negative values indicate more positive attitudes toward older adults. ***$p < .001$.

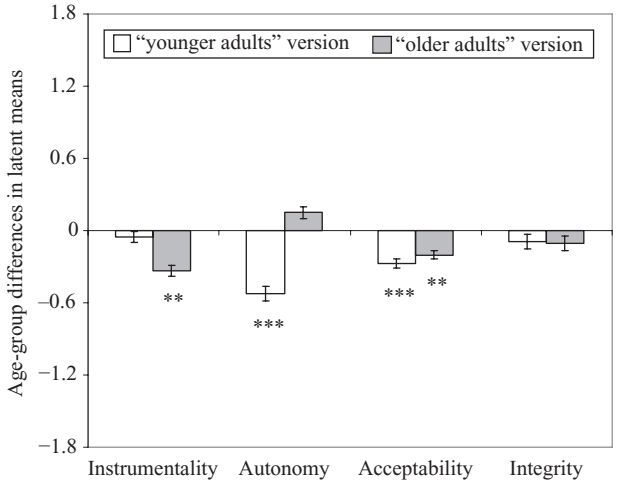

Figure 3. Age-group differences in latent means of attitudes toward younger and older adults in the four factors of the ASD.
Note. Error bars represent standard errors. Positive values indicate more positive attitudes held by younger participants, negative values indicate more positive attitudes held by older participants. **$p < .01$; ***$p < .001$.

age-group comparison. Figure 3 displays differences in latent means between younger and older participants for the two questionnaire versions separately. Younger participants' attitudes toward younger adults were more negative with respect to *autonomy* and *acceptability* than older participants' attitudes (mean difference $\Delta M = -0.526$, S.E. = 0.117; scaled $\Delta\chi^2 = 26.67$, $p < .001$; Cohen's d = −0.98, and $\Delta M = -0.274$, S.E. = −0.077; scaled $\Delta\chi^2 = 13.94$, $p < .001$; Cohen's d = −0.52, respectively). Younger participants' attitudes toward older adults were more negative with respect to *instrumentality* and *acceptability* than older adults' attitudes ($\Delta M = -0.322$, S.E. = 0.098; scaled $\Delta\chi^2 = 12.15$, $p < .01$; Cohen's d = −0.51, and $\Delta M = -0.203$, S.E. = 0.071; scaled $\Delta\chi^2 = 7.84$, $p < .01$; Cohen's d = −0.36).

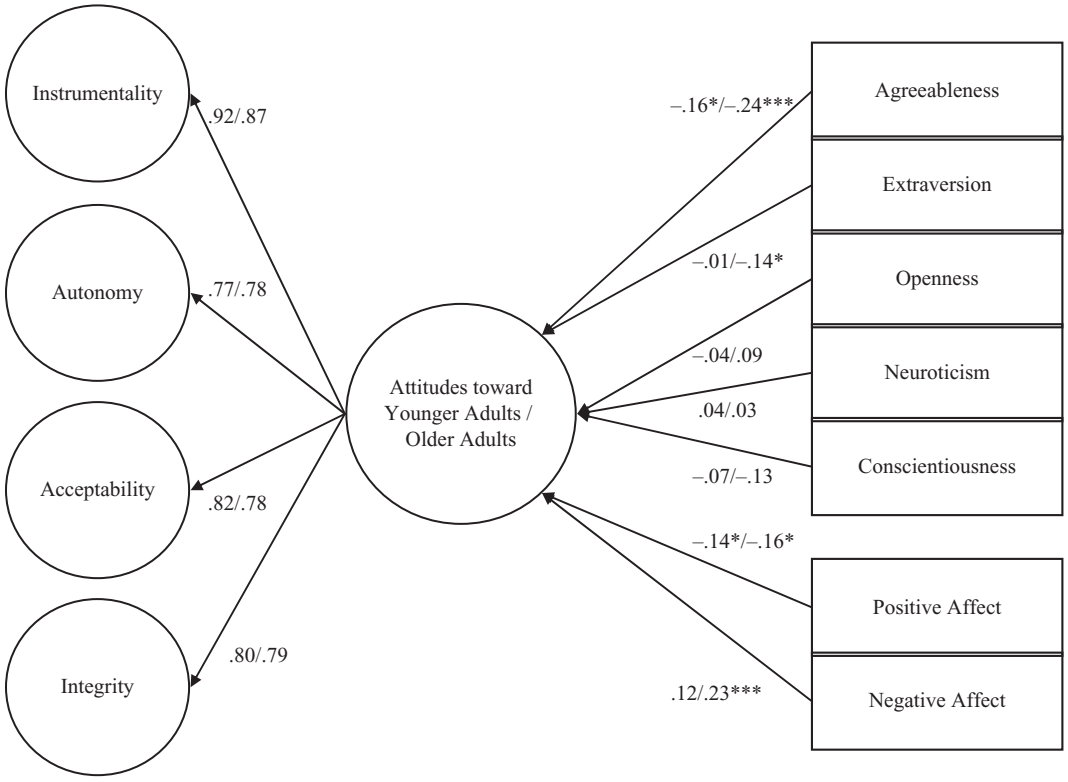

Figure 4. Structural equation model of relations between personality traits and attitudes toward younger and older adults and between positive and negative affect and attitudes toward younger and older adults.
Note. Separate SEMs were computed for the relations between the five personality characteristics and attitudes toward younger and older adults and between positive and negative affect and attitudes toward younger and older adults. Values indicate factor loadings (between ASD second-order factors and its first-order factors) and standardized regression coefficients (between the five personality characteristics and positive and negative affect scores and the ASD second-order factors), respectively. Values reported first refer to younger participants, values reported second refer to older participants. *$p < .05$; ***$p < .001$.

In sum, both age groups reported differential attitudes toward younger and older adults with respect to three of the four factors, namely *instrumentality*, *integrity*, and *autonomy*. In addition, the age groups differed in their attitudes toward younger and older adults in that younger participants rated younger adults as less autonomous and self-sufficient and less sociable and pleasant, and rated older adults as less active and able to adapt and less sociable and pleasant than did older participants.

Relations between personality characteristics and positive and negative affect and attitudes toward younger and older adults

We established an SEM with two second-order factors (i.e., attitudes toward younger adults and attitudes toward older adults, respectively; see Figure 4 for a graphical representation of the SEM), each of them integrating the four factors of the ASD (i.e., first-order factors) based on the model M2. The fit results of this model ($M2_{Second\text{-}order}$) were only slightly worse than that of M2 (see Table 3). As presented in Figure 4, the loadings of the first-order factors on the second-order factors ranged from .77 to .92, suggesting that the second-factors, indeed, represent composite attitudes toward younger and older adults. As outlined earlier, we conducted separate models for the influence of personality characteristics and of positive and negative affect on attitudes toward younger and older adults, respectively, as integration of all constructs into one model was not theoretically based and led to unacceptable fit indices.

In the model on the relations between *personality characteristics* and attitudes toward younger and older adults, we introduced the sum scores of neuroticism, extraversion, openness, agreeableness, and conscientiousness as predictors into the model. The fit for this model was acceptable: $\chi^2 = 2540.62$, $df = 1537$, CFI = .801, TLI = .795, RMSEA = .047, and SRMR = .074. In the model on the relations between *positive and negative affect* and attitudes toward younger and older adults, we introduced the sum scores for both positive and negative affect as predictors into the model. The fit of this model was also acceptable: $\chi^2 = 2359.06$, $df = 1387$, CFI = .804, TLI = .798, RMSEA = .049, SRMR = .075.

Figure 4 presents the standardized regression coefficients for the two models. Agreeableness and positive affect were negatively related to the second-order factors of both versions of the ASD: more agreeable participants and participants who reported more positive affect showed more positive evaluations for younger and older adults than less agreeable and less well tempered participants. Furthermore, extraversion was negatively, and negative affect was positively, related to negative attitudes toward older adults. All other regression coefficients did not reach significance.[4]

Discussion

We administered two, otherwise identical, versions of the German ASD (Stange, 2003), one referring to attitudes toward younger adults and the other referring to attitudes toward older adults, to a

heterogeneous sample of younger and older adults. The purpose of the present study was fourfold: (1) to test the factor structure of the German ASD, (2) to investigate differences between attitudes toward younger and older adults, (3) to examine whether younger and older participants differed in their evaluations of younger and older adults, and (4) to explore the influence of personality characteristics and affect on attitudes toward younger and older adults.

Four factors underlie the German ASD: Instrumentality, autonomy, acceptability, and integrity

Using multiple-group confirmatory factor analysis, we determined a four-factor structure for the German ASD with acceptable model fit. This factor structure held across questionnaire versions (''younger adults,'' ''older adults'') and across younger and older participants. The four latent factors were *instrumentality*, reflecting a person's activity and adaptability; *autonomy*, reflecting a person's autonomy and self-sufficiency; *acceptability*, reflecting a person's sociability and pleasantness; and finally, *integrity*, reflecting a person's satisfaction and optimism. This four-factor solution differed only slightly from the factor structure proposed by Intrieri et al. (1995) and was also generally in line with other findings reported in the literature (Gekoski et al., 1991; Holtzman et al., 1979; Underwood et al., 1985). Variations in the assignment of items to factors in our model from that by Intrieri et al. (1995) did not exceed more than one item per factor and did not change the meaning of any of the four factors.

Our findings lend support to the criticism of the original three-factor structure of the ASD identified by Rosencrantz and McNevin (1969). Method variance as one possible explanation for these different results cannot fully be ruled out but does not seem to be the only explanation as we find general convergence with the four-factor solution proposed by studies that also slightly differed in how they administered the ASD (Holtzman et al., 1979; Intrieri et al., 1995). It is important to note that the difficulties of establishing acceptable model fit and measurement invariance in the present study does further question the use of the ASD to adequately and reliably assess attitudes toward people of different ages (Polizzi & Steitz, 1998). To put the assessment of attitudes toward younger and older adults on a stronger theoretical basis, future studies could use the Big Five personality factors as a framework for sampling adjectives. Given that the Big Five personality characteristics are based on the entirety of existing adjectives, the ASD items should be assignable to these five factors. This approach would allow a direct linkage between evidence of age-related changes in personality and differential evaluations of younger and older adults. In this context, it would, for instance, be interesting to examine whether the well-described reduction of self-evaluated extraversion with age (Roberts, Walton, & Viechtbauer, 2006) has its analogy in different evaluations of extraversion for younger and older adults.

Attitudes toward younger and older adults are different

Configural and metric invariance was supported across the two questionnaire versions (''younger adults,'' ''older adults''). These findings suggest that the German version of the ASD can be used to assess attitudes toward younger *and* older adults. Introducing full scalar invariance between the two versions reduced the model fit below acceptable results. However, this finding is not surprising, as an acceptable model fit would have indicated equality of item means across the two versions. Instead we found differential attitudes toward younger and older adults. Older adults were seen as more negative in terms of *instrumentality*, that is they were described as less healthy, less attractive, more old-fashioned, and as less active in pursuing their goals or adapting to change than younger adults. This finding is in line with earlier results (Hummert et al., 1994; Kite et al., 2005; Rosencrantz & McNevin, 1969; Slotterback & Saarnio, 1996) and with well-documented evidence that old age is typically characterized by cognitive, physical, and health-related decline (see Smith & Baltes, 1997, for an overview). Furthermore, older compared to younger adults were rated as more negative in terms of *integrity*: they were, for instance, described as less hopeful, more resigned, and less optimistic than younger adults. The majority of the items that referred to the factor *integrity* reflect a person's expectations for the future. The present finding of more negative attitudes toward older compared to younger adults in terms of integrity corresponds with the notion of restricted time perspective—or at least the perception of a restricted time frame for the future—in older adults (Lang & Carstensen, 2002). This research suggests that less expectations for the future and a stronger orientation toward the present is more typical—and possibly more realistic—in older adults.

Interestingly, attitudes toward older compared to younger adults were more positive with respect to *autonomy*: they were rated as more independent, organized, and self-secure than younger adults. These results differed from findings reported by Rosencrantz and McNevin (1969), who found less pronounced but still negative evaluations of the ''*older man*'' in terms of *autonomy*. The present study's finding that older adults are seen as more decisive and self-secure than younger adults is, however, consistent with evidence on increasing competencies in solving interpersonal everyday problems and in emotion regulation in old age (Blanchard-Fields, 2007). The typically more solid financial situation of older compared to younger adults might furthermore lead to more positive perceptions of older than younger adults in terms of autonomy and independence. Finally, attitudes toward younger and older adults did not differ in terms of *acceptability*, comprising adjectives such as ''friendly–unfriendly'' or ''pleasant–unpleasant,'' and thus representing relatively global aspects of a person's sociability.

Taken together, our findings clearly suggest that attitudes toward people of different ages do not only comprise one dimension on which older adults are perceived more negatively than younger adults, but rather encompass various dimensions, some of which are differentially associated with younger and older adults.

Younger and older adults differ in their attitudes toward others

The factor structure of the two versions of the German ASD was commensurable for younger and older participants, which allowed us to compare the two age groups in terms of their evaluations. The two age groups differed in their attitudes in that younger compared to older participants reported more negative attitudes toward younger adults in terms of *autonomy* and *acceptability* and more negative attitudes toward older adults with respect to *instrumentality* and *acceptability*. Younger participants' more pronounced ratings for three of the four factors of the ASD suggest that younger adults hold more age-stereotypical attitudes than older adults: younger participants more strongly associated younger adults with qualities that are generally seen as typical for younger

ages such as being more flexible but also more dependent, and more strongly associated older adults with qualities that are generally seen as typical for older ages such as being less flexible but also less dependent. These more pronounced associations and the stronger reliance on adopted beliefs about other people in younger participants might be explained by the fewer personal life experiences younger compared to older adults have gained in their lives.

Personality characteristics and positive and negative affect are related to attitudes toward younger and older adults

Finally, our results suggest that some personality characteristics and positive and negative affect are related to attitudes toward younger and older adults. Participants who showed higher scores on agreeableness or positive affect reported fewer negative attitudes toward younger and older adults than participants who showed lower scores. These findings suggest that being at ease with oneself and with others, expressed as experiencing more positive affect and as being more agreeable, may play a positive role in how we think and feel about others (Van Hiel & Kossowska, 2006). Further, the present study found that more extraverted individuals and individuals with less negative affect reported fewer negative attitudes toward older adults. A possible explanation for this finding is that more extraverted people may engage in more frequent social contact with other, younger and older, adults (Krause et al., 1990; Neyer & Asendorpf, 2001). If these more frequent social contacts are furthermore characterized by a higher quality such as by more friendliness and agreeableness and by less negative affect, they might lead to more pleasant interactions with people of their own as well as the other age group and consequently prevent or reduce negative attitudes toward others. It remains for future research to systematically investigate the role of frequency, nature, and quality of social contacts with, and the influence of knowledge about, one's own and the other age group on attitudes toward younger and older adults. Further understanding of the impact of personality characteristics and affect on attitudes toward younger and older adults will contribute to our understanding of stereotypes toward, and prejudice against, people of different ages and will help to develop strategies and means to overcoming negative aging stereotypes and ageism.

Contrary to our expectations, we did not find any relation between attitudes toward younger and older adults and openness. However, this might be due to the very low reliability in the personality characteristics in our sample. There was also a high variability in reliability values between younger and older participants, which was one of the reasons why we did not further investigate age-group differences in the relations between personality characteristics or affect and attitudes toward younger and older adults, besides not having had a priori hypotheses derived from the literature.

It is important to note that the present study does not investigate change over time and therefore does not allow distinction between causes and effects in the personality/affect–attitudes relation. It is possible that attitudes toward younger and older adults influence affective states. It seems, however, unlikely that attitudes toward others influence relatively stable personality traits or long-term affective dispositions such as measured in the present context.

In conclusion, the present study supports the use of the German ASD for research purposes as a measure of attitudes toward younger and older adults in younger and older participants. It is the first study that used this questionnaire in a heterogeneous sample of younger and older adults and showed, by use of confirmatory factor analysis with measurement invariance and multiple-group analysis, age-group differences in attitudes toward younger and older adults. However, given the methodical weaknesses of the ASD as reported in the present study, we recommend some caution when using it: we regard it as important to always provide a detailed description of the investigated sample and the measurement procedures used when applying the questionnaire, since this will make possible a systematic examination of the conditions under which the German ASD can be successfully assessed. In addition, the combined use of questionnaire versions (e.g., "younger adults" and "older adults" version) referring to the different age groups under study has proven successful. Finally, we recommend use of the items included in the present study since the present study's model had a better fit than the original model proposed by Rosencrantz and McNevin (1969).

The present study also provides first evidence on the influence of personality characteristics and positive and negative affect on attitudes toward younger and older adults. These personality/affect–attitudes relations need further exploration in future studies with the aim of overcoming negative age stereotypes in order to prevent age-discriminatory behaviors, such as in personal life or the workplace (McCann & Giles, 2002), and negative consequences for personal self-esteem, life satisfaction, future expectations, and health (Levy, Hausdorff, Hencke, & Wei, 2000; Schmitt & Branscombe, 2002).

Notes

1. We will refer to this factor as *instrumentality* (instead of *instrumental*) in line with the other three factors (i.e. *autonomy, acceptability, integrity*).
2. Overall, $N = 306$ younger and older participants took part in the study. We excluded 12 participants ($n_{\text{Younger participants}} = 2$; $n_{\text{Older participants}} = 10$) as they had more than one missing value in the two versions of the ASD.
3. The six deleted items of the original version of the ASD (Rosencrantz & McNevin, 1969) were "consistent–inconsistent", "rich–poor", "productive–unproductive", "organized–disorganized", "liberal–conservative," and "aggressive–defensive". The two items that were included in the model by Intrieri et al. (1995) but not in the present model were "productive–unproductive" and "organized–disorganized." The two items that were included in the present model but not in the model by Intrieri et al. were "progressive–old-fashioned" and "expectant–resigned".
4. These relations also speak to the issue of convergent and discriminant validity of the German ASD. The correlations were meaningful without the constructs (personality characteristics, affect, and attitude) strongly overlapping in their content.

Funding

The research reported in the article was conducted at and funded by the Max Planck Institute for Human Development, Berlin, Germany.

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