Perceptions of Competence:
Age Moderates Views of Healthy Aging and Alzheimer's Disease

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Abstract

Background/Study Context: Older adults have more complex and differentiated views of aging than do younger adults, but less is known about age-related perceptions of Alzheimer's disease. This study investigated age-related perceptions of competence of an older adult labeled as 'in good health' (healthy) or 'has Alzheimer's disease' (AD), using a person-perception paradigm. We predicted that older adults would provide more differentiated assessments of the two targets than would younger adults.

Methods: Younger (n = 84; 18-36 years) and older adults (n = 66; 61-95 years) rated activities of daily living (ADL), instrumental activities of daily living (IADL), and memory abilities of a female target aged 75 years, described as healthy or with AD. Data on anxiety about aging, knowledge of and experience with aging and AD, knowledge of memory aging, and positive and negative biases toward aging and AD were also collected.

Results: Older adults perceived the healthy target as more capable of cognitively effortful activities (e.g., managing finances) and as possessing better memory abilities than the AD target. As predicted, these differences were greater than differences between targets perceived by younger adults. The interaction effect remained significant after statistically controlling for relevant variables. Additionally, exploratory analyses revealed that older adults held less positively-biased views of AD than younger adults, but negatively-biased views were equivalent between age groups.

Conclusion: The results demonstrate that mere labels of 'healthy' and 'Alzheimer's disease' produce significant and subtle age differences in perceived competencies of older adults, and that biases towards AD vary by age group and valence. Our findings extend the person-perception paradigm to an integrative analysis of aging and AD, are consistent with models of adult development, and complement current research and theory on stereotypes of aging. Future directions for research on perceptions of aging are suggested.

Keywords: person perception, Alzheimer's disease, memory, IADL, competence, healthy aging (12)

Research on perceptions of Alzheimer's disease (AD) versus healthy aging is surprisingly limited (Anderson, Day, Beard, Reed, & Wu, 2009) yet important because knowledge of AD is related to social distancing (Werner, 2005) and intentions to seek help from family members and doctors (Werner, 2003). We used a person-perception paradigm (Smith & Collins, 2009) to test age-related perceptions of aging and AD competencies. Much is known about self-perceptions of aging (e.g., Kotter-Gruhn & Hess, 2012; Levy, Slade, Kunkel, & Kasl, 2002; Levy, Zonderman, Slade, & Ferrucci, 2012; Moser, Spagnoli, & Santos-Eggimann, 2011) and perceptions of memory failures in others (e.g., Erber & Prager, 1999), but little is known about perceptions of competence in others who are experiencing normal and pathological aging, and how these vary by age. Our research sought to address this gap.

Younger and older adults view older adults differently. Older adults create more subcategories and select more traits to describe older adults (Brewer & Lui, 1984; Hummert, Garstka, Shaner, & Strahm, 1994), rate positive and negative vignettes of older adults as equally typical (Chasteen, 2000), and see adult development as more differentiated (Heckhausen, Dixon, & Baltes, 1989) than do younger adults. Thus, it is argued that older adults hold more complex views of aging than do younger adults in reviews of the literature (Hummert, 2011) and meta-analytic studies of attitudes towards aging (Kite, Stockdale, Whitley, & Johnson, 2005). Greater complexity and differentiation is consistent with the out-group homogeneity principle, which predicts that "… perception of variability within a stereotyped group is influenced by one's status as an in-group or out-group member" (Park & Rothbart, 1982, p. 1052). Specifically, people tend to perceive out-group members as more similar and in-group members as more diverse. Indeed, in-group differentiation, variability, and favoritism (the 'in-group favoritism effect') by older adults have been demonstrated empirically (Linville, Fischer, & Salovey, 1989). By extrapolation, perceptions of older adults held by older adults should be more heterogeneous, differentiated, and favorable than those held by younger adults.

Negative perceptions of aging at the societal level do not bode well for individual aging because stereotypes of aging are internalized through societal exposure and become self--stereotypes as people age (Levy, 2003). Older adults primed with negative aging stereotypes are less likely to choose life-prolonging treatment in a hypothetical scenario (Levy, Ashman, & Dror, 2000) and exhibit heightened cardiac response to stress (Levy, Hausdorff, Hencke, & Wei, 2000). In contrast, older adults with positive self-perceptions report better functional health than those with negative self-perceptions (Levy, Slade, & Kasl, 2002). Negative perceptions also affect interpersonal aging, inducing some older adults to dissociate themselves from age peers (Weiss & Lang, 2012). Indeed, an early person-perception study found that young, middle-aged, and older adults preferred targets closer to their own age on a measure of social distancing (Luszcz & Fitzgerald, 1986).

The deleterious effects of negative stereotypes of aging extend to actual and perceived memory functioning. Older adults under stereotype threat recall less than younger adults (Hess, Auman, Colcombe, & Rahhal, 2003) and less than older adults not under threat (Hess, Emery, & Queen, 2009). In research using person-perception methods, age differences and age similarities in perceivers emerge. For example, young, middle-aged, and older adults perceived better memory functioning in positive versus negative stereotypes of older targets (Lineweaver, Berger, & Hertzog, 2009), and younger and older adults perceived memory failures of a hypothetical older adult as more serious than identical memory failures in younger adults (Erber, Szuchman, & Rothberg, 1990). However, older adults view memory failures as less serious (e.g., Erber et al., 1990), and as more developmentally differentiated (Lineweaver et al., 2009) than younger adults do, suggesting that older adults hold more realistic and experienced-based views of normative memory aging

compared to younger adults. This would be consistent with research showing that older adults actually do know more about memory aging than do younger adults (Reese, Cherry, & Copeland, 2000). Older adults have also been found to know more about normative aging (O'Hanlon, Camp, & Osofsky, 1993) and Alzheimer's disease (Carpenter, Zoller, Balsis, Otilingam, & Gatz, 2011), and to be less anxious about aging (Chasteen, 2000), compared to younger adults. Not surprisingly, anxiety about aging is also inversely related to knowledge of aging (Lasher & Faulkender, 1993). Moreover, although many people are unsure of the distinctions between aging and AD (Corner & Bond, 2004), one study found that hypothetical older adult targets with middle-stage AD were rated as being less competent than early-stage targets, suggesting some awareness of distinctions *within* the category of AD (Werner, 2006). Greater awareness of competencies associated with AD may stem from increased experience with AD, as research has shown that experience is associated with increased knowledge about AD (Jackson, Cherry, Smitherman, & Hawley, 2008). Thus, age, knowledge of aging and memory aging, anxiety about aging, and experience with AD may influence perceptions of competence in older adults with and without AD. We integrated these diverse lines of inquiry into an investigation of age-related differences in perceived memory abilities and competencies in older adults labeled as healthy or with AD.

Our hypotheses derive from research demonstrating increased differentiation and complexity in adulthood, and the complementary processes of out-group homogeneity and in-group heterogeneity. Hypothesis 1 posited that a target's label as healthy or with AD would be more salient to older than younger adults. The targets represent an out-group for younger adults and an in-group for older adults. As such, the targets should appear more individuated and therefore different from each other to older adults, for whom the targets represent an in-group, than to younger adults, for whom the targets represent an out-group. Thus, we predicted relatively higher competence and memory ratings of the healthy target and relatively lower ratings of the AD target by older adults (the in-group) than by younger adults, who would be more likely to rate the targets more similarly. Hypothesis 2 was exploratory in nature, and posited age differences in biases towards aging and AD. If, as research suggests, older adults hold more differentiated and complex views of aging, and are members of the in-group category "old," it is possible they might exhibit predictable biases towards aging and AD, consistent with an in-group favoritism effect. Specifically, we reasoned that older adults would view aging more positively than do younger adults, and AD more negatively than younger adults, based on their in-group membership status, which provides access to more heterogeneous and extreme exemplars of both positive (normative, healthy) and negative (nonnormative, AD) aging. The negative exemplars of aging may actually represent out-group members who, when made salient, are devalued by normative in-group members (Weiss & Lang, 2012). Thus, we predicted that older adults would hold more positively-biased views of aging and more negatively-biased views of AD than younger adults.

METHOD

Participants

Older (n = 66; 33 female; 61-95 years, *M* = 73.98) and younger (n = 86; 62 female; 65 undergraduate students; 18-36 years, *M* = 20.52) adults participated. The sample was 80% Caucasian, 11% African American, 5% Asian/Asian American, < 5% other. Participants were recruited through advertisements placed in newspapers, flyers, campus email announcements, and word-of-mouth, and received course credit or remuneration for their participation.

Design and Manipulation

Participants were assigned to one of two experimental conditions in which they viewed a photograph of an older woman (www.healthyalberta.com/activeliving.htm). In the healthy condition, the caption read: "*Mrs. Stevenson, pictured here, is 75 years old and is in good health.*" In the AD condition, the caption read: "*Mrs. Stevenson, pictured here, is 75 years old and has Alzheimer's disease.*" After viewing the photograph, participants rated Mrs. Stevenson's competencies on three measures. Roughly half of the participants were assigned to each condition (n = 74 healthy, n = 78 AD). In the healthy condition, there were 10 younger men and 33 younger women, and 18 older men and 13 older women. In the AD condition, there were 14 younger men and 29 younger women, and 15 older men and 20 older women.

Procedure and Measures[1]

Competence Measures. Participants completed three questionnaires designed to assess target competencies. Following LaPlante (2010), six items (bathing, dressing, toileting, transferring, eating, walking) from the Activities of Daily Living scale (ADL; Katz, 1983) assessed basic physical competencies. Mrs. Stevenson's ability to perform each ADL item was rated on a scale of 1 (Independent) to 4 (Does Not Do). Also following LaPlante, eight domains of Instrumental Activities of Daily Living (IADL; Galasko et al., 1997) assessed higher-order competencies. The eight activities can be performed at different levels of competence, ranging from highest (e.g., "Does personal laundry completely") to lowest (e.g., "All laundry must be done by others"). Mrs. Stevenson's ability to perform each IADL task at each level of competency was rated on a scale of 1 (Highly Unlikely) to 6 (Highly Likely). Ratings for the lowest level of competency in each domain were averaged for the measure of IADL. The third competence measure was designed by us to assess perceived memory competencies of another person: the Other Memory Efficacy Scale (OMES; see Table 1). ADL and IADL were reverse-scored so that high scores on all three measures indicate high competence. Estimates of reliability (Cronbach's alpha coefficient for internal consistency, α) for the three competence measures are provided in the caption to Figure 1.

Knowledge Measures. Participants also completed four questionnaires that assessed anxiety about aging, and knowledge of aging, Alzheimer's disease, and memory aging. The 20-item, Likert-scaled (1=Strongly Disagree to 6=Strongly Agree) Anxiety about Aging Scale (AAS; Lasher & Faulkender, 1993) measures anxiety related to psychological concerns and physical appearance, and fear of old people and loss. The 28-item, true/false Knowledge of Memory Aging Questionnaire (KMAQ; Cherry, West, Reese, Santa Maria, & Yassuda, 2000) measures knowledge of normal (healthy) and pathological (cognitively impaired) memory aging. The 25-item, multiple-choice Facts on Aging Quiz (FAQ; Harris, Changas, & Palmore, 1996) measures knowledge of physical, social, economic, and psychological aspects of aging. The 14-item, multiple-choice Alzheimer's Disease Knowledge test (ADKT; Dieckmann, Zarit, Zarit, & Gatz, 1988) measures knowledge about causes, symptoms, diagnosis, and treatment of Alzheimer's disease.[2] Data from these measures were collected to control for potential effects of knowledge of aging, AD, and memory functioning on perceptions of competence. Estimates of reliability (Cronbach's α) for the measures are provided in Table 1.

Background Measures. Participants also completed a 7-item, post-test questionnaire designed specifically for this study to assess self-reports of experience with aging and AD. Three items assessed contact with older adults ("How much contact do you have with older adults now?"), knowledge of healthy aging ("What I know about the behaviors and symptoms associated with healthy aging is …"), and knowledge of AD ("What I know about the behaviors

and symptoms associated with Alzheimer's disease is …"). Response options for these three items ranged from 1 ("Very Little") to 6 ("Very Much"). Two items assessed experience with having a relative or relatives with AD ("I have had a relative or relatives with Alzheimer's disease"), and having a friend or neighbor with AD ("I have had a close friend or neighbor with Alzheimer's disease"). Response options to these two items were No, Yes, or Not Sure. Two items assessed knowledge of aging through having had a course on aging ("Have you ever taken a course on aging and/or adult development?") and experience working with older adults ("Have you ever worked or volunteered in a nursing home, retirement home, hospital, senior center, or assisted living facility with older adults?"). Response options to these two questions were Yes or No. These data were collected in order to control for potential effects of personal experience with aging and AD on ratings of competence.

Half of the participants completed the three competence measures first and half completed the four knowledge measures first. Order was counter-balanced to control for possible carry-over effects from the knowledge measures (e.g., anxiety about aging) to perceptions and competence ratings of the target. The target photograph always appeared immediately before the three competence measures.[3] The post-test questionnaire was always completed last. Participants completed the packet at their own pace and were debriefed, thanked, and compensated for their time.

RESULTS

Age Differences in Perceived Competencies by Target Type. To test the hypothesis that older adults would demonstrate more differentiated perceptions of competence than would younger adults, a MANOVA was conducted with age group (young/old) and target type (healthy/AD) as between-subjects factors and ADL, IADL, and OMES scores as dependent variables. As predicted, the multivariate interaction effect was significant, $_{multi}F(3, 141) = 3.87$, $p = .010$, $\eta_p^2 = .076$. At the univariate level, the interaction effects were significant for IADL, $F(1, 143) = 9.72$, $p = .002$, $\eta_p^2 = .064$, and OMES, $F(1, 143) = 8.01$, $p = .005$, $\eta_p^2 = .053$, but not ADL, $F < 1.0$. Within age groups, the healthy target received significantly higher competency ratings than the AD target (p's $< .05$) and these differences were greater in older adults than younger adults (Figure 1). These results support Hypothesis 1. Between age groups, older adults thought it *less* likely that the AD target could perform IADL, and *more* likely that the healthy target could perform the memory tasks (OMES) than did the younger adults, p's $< .05$.

The multivariate main effects for age group, $_{multi}F(3, 141) = 2.77$, $p = .044$, $\eta_p^2 = .056$, and target type, $_{multi}F(3, 141) = 78.22$, $p < .001$, $\eta_p^2 = .625$, were also significant. Univariate analyses revealed nonsignificant main effects of age group on ADL ($p = .087$) and OMES ($p = .635$) ratings, and a marginally nonsignificant effect of age group on IADL ratings, $F(1, 143) = 3.70$, $p = .056$, $\eta_p^2 = .025$. Collapsed across targets, older adults gave lower IADL ($M = 4.40$, $SD = 1.49$) ratings overall than did younger adults ($M = 4.77$, $SD = 1.11$). Univariate analyses also revealed significant main effects of target type on all three dependent variables: ADL, $F(1, 143) = 17.50$, $p < .001$, $\eta_p^2 = .109$; IADL, $F(1, 143) = 181.30$, $p < .001$, $\eta_p^2 = .559$; OMES, $F(1, 143) = 180.23$, $p < .001$, $\eta_p^2 = .558$. Competence ratings for the healthy target were significantly higher on all three measures than for the AD target (see Figure 1).

To examine the potential effects of relevant knowledge, background, and demographic variables on the obtained interaction effects for IADL and OMES, we conducted follow-up MANCOVA. Measures were included as covariates if they had yielded significant age differences and (where applicable) adequate estimates of internal consistency, as indicated by Cronbach's alpha coefficient. The covariates that met these criteria were: Years of education,

self-reported health, anxiety about aging (AAS), current contact with older adults, self-rated knowledge of healthy aging, close friend or neighbor with AD, course on aging, and number of years worked with older adults (see Table 2). In separate MANCOVA, none of the covariates rendered the age group x target type interaction effects nonsignificant, suggesting that these variables can be ruled out as confounds, alternative explanations, or possible mechanisms underlying the obtained interaction effect.

    Age Differences in Biases Towards Aging and AD. We planned to assess positive and negative biases towards aging and AD by analyzing incorrect responses on the FAQ (aging) and the ADKT (AD), which were part of the battery of knowledge measures. However, the FAQ had inadequate internal consistency (Cronbach's α = .40), thus precluding its use in the test of Hypothesis 2. The ADKT had acceptable internal consistency (Cronbach's α = .65). Positive and negative ADKT bias scores were calculated using methods reported in Dieckmann et al. (1988). Positive bias (optimistic point of view) is indicated by endorsing incorrect responses such as "Prompt treatment of Alzheimer's may reverse symptoms," and negative bias (pessimistic point of view) by incorrect responses such as "It is best to institutionalize an Alzheimer's patient early in the course of the disease." A mixed ANOVA was conducted with age group (young/old) as a between-subjects factor and bias valence (positive/negative) as a within-subjects factor. The interaction effect was significant, $F(1, 150) = 4.23$, $p = .041$, $\eta_p^2 = .027$, driven by age differences in positive bias (Figure 2). Simple effects tests conducted within bias valence indicated that older adults held *less* positively-biased views of AD than did younger adults, $p = .002$, partially supporting Hypothesis 2. Older and younger adults' negatively-biased views of AD were comparable, $p = .657$, partially refuting Hypothesis 2, which posited more negatively-biased views of AD by older adults. The two main effects were also significant: Older adults ($M = 0.13$, $SD = 0.10$) were less biased overall than younger adults ($M = 0.17$, $SD = 0.10$), $F(1, 150) = 6.56$, $p = .011$, $\eta_p^2 = .042$, and positive bias ($M = 0.18$, $SD = .14$) was greater overall than negative bias ($M = 0.11$, $SD = .13$), $F(1, 150) = 17.78$, $p < .001$, $\eta_p^2 = .106$.

    2) Similarly, and again reflecting the potential significance of gender, the authors' response to R2.5, indicating that they tested for gender effects, could be incorporated into the results section, if only to report that analyses had assessed gender as a main effect and as a moderator and found little. This is a "non-finding" that's worth reporting.

    Controlling for Gender Effects. We examined the potential significance of gender on perceptions of competence, biases towards AD, and knowledge of aging and AD by conducting analyses of covariance with gender entered as a covariate in the tests of Hypotheses 1 and 2, and the tests of age differences on relevant variables reported in Table 2. in follow-up analyses to the major hypotheses. For Hypothesis 1, a MANCOVA with gender as a covariate and age group (young/old) and target type (healthy/AD) as between-subjects factors and ADL, IADL, and OMES as dependent variables yielded a nonsignificant effect of gender, $_{multi}F(3, 140) < 1.0$. The main effects for age group and condition were significant, $F's(3, 140) \geq 2.78$, $p's \leq .044$. as was the interaction effect, $F(3, 140) = 3.73$, $p = .013$, $\eta_p^2 = .074$. Thus, the conclusions for Hypothesis 1 remain unaffected by gender. For Hypothesis 2, a mixed ANCOVA with gender as a covariate and age group (young/old) as a between-subjects factor and ADK bias valence (positive/negative) as a within-subjects factor revealed nonsignificant effects for gender and the gender by bias type interaction, $F's(1,149) < 1.0$. The age group by bias type interaction effect was marginally nonsignificant, $F(1, 149) = 3.67$, $p = .057$, $\eta_p^2 = .024$; however, simple effects tests with gender covaried yielded almost identical mean differences and patterns of significance

as those obtained in the original test for Hypothesis 2: Older adults held *less* positively-biased views of AD than did younger adults, $p = .003$, and older and younger adults' negatively-biased views of AD were comparable, $p = .623$. Thus, although the significance level for Hypothesis 2 changed from $p = .041$ to $p = .057$ when taking into account the effect of gender on bias valence, the pattern of means did not change, and the effect size was comparable: $\eta_p^2 = .024$ (versus $\eta_p^2 = .027$, gender not partialled). We also examined gender effects on education, health, anxiety, self-reported contact with older adults, and self-reported knowledge of aging. ANCOVA indicated that the effects of gender on education and health were nonsignficant, $p's \geq .284$, and age group remained significant, $p's \leq .003$. For anxiety (AAS), gender was nonsignificant, $p = .092$, and age group remained significant, $p = .003$. A MANCOVA on self-reported contact with older adults and knowledge of healthy aging yielded a significant main effect of gender, $_{multi}F (2, 145) = 4.33$, $p = .015$, $\eta_p^2 = .056$. At the univariate level, only the effect of knowledge of healthy aging was significant, $F(1, 146) = 4.78$, $p = .030$, $\eta_p^2 = .032$: Females rated their knowledge significantly higher than did males, $p = .010$. Age differences remained significant at the multivariate and univariate levels for both items, $p's \leq .004$. Finally, four separate chi-square tests of association on the four nominal measures (relative, friend, course, worked) revealed one significant effect: Males were less likely than females to report having a relative with AD, $\chi^2 (1, 133) = 4.65$, $p = .031$.

DISCUSSION

As predicted, older adults perceived the healthy target as more cognitively competent than the AD target; this distinction was significantly smaller in younger adults, and supports our prediction that younger adults would perceive *less* diversity between older adult targets, which might be explained by the out-group homogeneity principle (Park & Rothbart, 1982), and that older adults would perceive *more* diversity between older adult targets, which might be explained by in-group differentiation (Linville et al., 1989). This effect is also consistent with and extends extant research that demonstrates the increased differentiation and complexity (Heckhausen et al., 1989; Hummert, 2011; Kite et al., 2005) exhibited by older adults when asked to characterize other older adults in terms of traits (Brewer & Lui, 1984), stereotypes (Hummert et al., 1994), and memory functioning (Erber & Prager, 1999; Lineweaver et al., 2009).

Our study is the first to show that older and younger adults view older individuals differently when prompted by only a photograph and a label. That is, the labels of "good health" and "Alzheimer's disease" made a greater difference in the ratings given by older adults than by younger adults. First impressions based on faces or other salient cues (e.g., health status) are often lasting ones (McArthur, 1982; Zebrowitz, Franklin, Hillman, & Boc, 2012. Our targets differed only on health status; sex, age, and appearance were fixed attributes of the two stimuli. Each of these characteristics may impede individuation of people in the eyes of perceivers.

The critical age group by target type interaction effects for perceived IADL and memory competencies remained significant even when controlling for several potentially relevant background variables (see Table 2). We suspect that the processes underlying perceived competencies are more subtle and complex than our measures might have revealed. Like Chasteen (2000), we found that older adults were less anxious about aging than younger adults but this difference had no bearing on perceptions of competence. Additionally, the self-report data (i.e., single items on the post-test questionnaire; see Table 2) indicated that older adults in our sample had more contact with older adults and were more likely to have a close friend or neighbor with AD than the younger adults, but these differences likewise did not change the

nature of the age-related differences in perceptions of competence, as indicated by the MANCOVA results for Hypothesis 1. We believe that multiple-item measures of quantity and quality of contact with aging and AD would be informative, as would implicit and explicit measures, because age-related attitudes towards aging vary across implicit and explicit tests (Hummert, Garstka, O'Brien, Greenwald, & Mellott, 2002).

Our prediction that older adults would exhibit an in-group favoritism effect (Linville et al., 1989) through positively-biased views of aging could not be tested as planned, given inadequate reliability of the FAQ. However, analyses of incorrect responses on the ADKT revealed that older adults held less optimistic – and possibly more realistic – views of AD than did younger adults. These results are intriguing, and provide partial, indirect support for Hypothesis 2. Interestingly, younger and older adults held equivalently negative biases towards AD. This effect failed to support our prediction that older adults would perceive AD in a more negative light, but also suggests that positive and negative biases operate independently. Follow-up work is needed to determine not only what drives younger adults' relatively optimistic views of AD, and whether older adults are indeed more realistic about pathological aging than are younger adults, but also whether biased perceptions of negative exemplars by in-group members (intra-group biases) complement the more straightforward predictions of inter-group biases that characterize the out-group homogeneity principle and in-group favoritism. Distancing from negative exemplars of the in-group is a phenomenon captured by the so-called "black sheep effect" wherein "…under-rating or over-rating [of] evaluatively salient ingroup members is aimed at preserving the perceived positivity of the ingroup as a whole" (Marques & Yzerbyt, 1988, p. 291). Prospective research should focus systematically on attitudes towards and evaluations of a range of positive and negative exemplars of the broad, heterogeneous category "older adult" to test the black-sheep effect in the context of stereotypes of aging and AD (cf., Weiss & Lang, 2012).

Contrary to expectation, the interaction effect for ADL was nonsignificant. We suspect that basic ADL may not be applicable to our target because she looks alert, and is smiling and well-groomed. Because memory and higher-order cognition deteriorate earlier in AD than basic grooming and hygiene, it is likely that the test of our hypothesis was stronger for higher-level IADL and OMES domains; indeed, power estimates were .87 (IADL) and .80 (OMES) versus .10 (ADL). A more neutral photograph might render the AD target more plausible for testing perceptions of ADL competencies. A statistical trend ($p = .056$) towards age differences on the overall IADL ratings indicated that older adults rated both types of targets, regardless of health status (good health or AD), as less able to complete the everyday tasks measured by IADL than did younger adults, although this effect was quite small ($\eta_p^2 = .025$).

The generalizability of our results should be tested in experiments that systematically vary target facial expressions (e.g., negative, neutral, positive) and other target characteristics (e.g., sex, race, AD severity), and perceiver characteristics (e.g., education level). Sex and race of targets are common foci in person-perception research, with less attention on age (Montepare & Zebrowitz, 1998; North & Fiske, 2012). Our use of two types of aging targets helps fill this gap. Use of a single photograph of a female for our two targets, however, is a limitation of this study and may have introduced potential biases (e.g., the smiling target may have induced inflated competency ratings). Yet, our smiling, female photograph has high external validity as photographic representations of people with dementia in news magazines are typically females who exude positive affect (Kessler & Schwender, 2012). Our rationale for use of a single female target was to establish the effect first and then test its generalizability to other target stimuli,

especially gender. The boundary conditions of the effect should be pursued in future studies that examine the double-standard of aging (Kite et al., 2005; Sontag, 1979). Use of multiple male and female faces will help to establish the generalizability of the effect to "older adults in general" and provide a more systematic test of gender effects by perceiver and target. Additionally, gender differences were nominal in this study and did not affect the interpretation of the main results, but should be investigated in future research.

Another limitation to our study was sample selectivity. Our older adults were more highly educated than our younger adults, and half had earned at least 16 years of education, with three participants at 20, 21, and 24 years. These differences in education may influence perceptions and knowledge of aging and AD. Indeed, education was significantly related to ADK negative bias, $r (152) = -.185$, $p = .022$, but not to the other perceptions of competence and knowledge variables that were the foci of the primary analyses, i.e., ADL, IADL, OMES, ADK positive bias, all r's $< .105$, all p's $> .198$. Moreover, age-related differences in education level did not change the direction nor significance levels of results for Hypotheses 1 and 2. When education was entered as a covariate in both analyses, the multivariate and univariate effects for each remained comparable in direction and significance levels to the original tests. Future research using person-perception methods should examine multiple targets and target characteristics in samples drawn from educationally-representative populations to determine the generalizability of our results.

Our research contributes a novel perceiver-age by target-type effect to social cognitive aging studies of person-perception, extends previous work on normative aging to perceptions of AD, and complements Werner's (2006) work on perceptions that vary by AD severity. Our results are relevant to social distancing, discrimination, and other negative behavioral outcomes that occur when older adults are perceived as incompetent (Werner, 2005) and when stereotypes of aging are activated (Meisner, 2012; Weiss & Lang, 2012). These findings are important because, according to social developmental views of ageism, accurate perceptions regarding aging and AD could be shaped as early as early childhood (see Montepare & Zebrowitz, 2002). In turn, stereotype embodiment theory (Levy, 2009) would predict that accurate and positive perceptions of aging and AD would help mitigate the internalization of and negative sequelae associated with negative stereotypes of aging over the life course (see also Kornadt & Rothermund, 2012). **(3,937 words)**

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Footnotes

[1] Some participants completed the questionnaires on campus and some at home via mail. Analyses of age group (young / old) x target type (healthy / AD) x location (campus / mail) on the three dependent variables (ADL, IADL, OMES) yielded no significant effects related to location. Thus, this methodological difference did not change the outcome of the critical age by target type interaction effect.

[2] Six items from the 20-item ADKT were dropped based on analyses of a more recent measure of AD knowledge (Carpenter, Balsis, Otilingam, Hanson, & Gatz, 2009): (1) estimates of AD prevalence, (2) change in AD prevalence, (5) aluminum as cause of AD, (11) lecithin to treat AD, (19) Medicare (coverage varies by US state), and (20) ADRDA (now known as the Alzheimer's Association, and which includes more than one of the response options provided on the original ADKT).

[3] Analyses of age group (young / old) x target type (healthy / AD) x order (competence measures first / knowledge measures first) on the three dependent variables (ADL, IADL, OMES) yielded no significant effects related to order. Thus, order effects did not change the outcome of the critical age by target type interaction effect.

Table 1.
Items and instructions for the Other Memory Efficacy Scale (OMES).

Please rate how likely it is that Mrs. Stevenson could perform the memory tasks below, where…
1=Very Unlikely, 2=Unlikely, 3=Slightly Unlikely, 4=Slightly Likely, 5=Likely, 6=Very Likely.

1. Remembering where she put her keys
2. Remembering to turn off the stove when she has finished cooking
3. Remembering where she put her reading glasses after reading the newspaper.
4. Remembering the name of a new neighbor whom she has met several times.
5. Remembering to stop for milk on the way home from choir practice.
6. Remembering to stop newspaper and mail delivery before vacation.
7. Remembering directions to the ice cream shop in the mall from the Information Desk assistant.
8. Remembering to water her plants regularly.
9. Remembering her grandchildren's birthdays.
10. Remembering the shortcut home from the grocery store.

Table 2.
Means (and standard deviations) and frequencies (and percentages within age group) for demographic, anxiety, knowledge, and personal experience measures.

Measure	α	Younger adults		Older adults		*p*
Years of education	--	13.86	(1.80)	14.98	(2.93)	<.001
Self-rated health	--	8.67	(1.27)	7.50	(1.74)	.004
AAS	.80	2.94	(.62)	2.59	(.63)	<.001
KMAQ proportion correct	.43	.69	(.09)	.70	(.12)	.350
Normal aging	.27	.69	(.13)	.66	(.13)	.242
Pathological aging	.48	.69	(.12)	.75	(.17)	.014
FAQ proportion correct	.40	.45	(.08)	.45	(.12)	.950
ADKT proportion correct	.65	.45	(.17)	.50	(.23)	.091
'I don't know' responses	--	.21	(.20)	.22	(.22)	.807
Post-test Questionnaire						
Current contact with older adults	--	3.09	(1.34)	4.16	(1.62)	<.001
Self-rated knowledge of healthy aging	--	3.33	(1.09)	3.81	(1.31)	.015
Self-rated knowledge of AD	--	2.99	(1.11)	2.91	(1.29)	.677
Relative with AD	--	24	(31%)	13	(23%)	.312
Close friend or neighbor with AD	--	6	(7%)	32	(53%)	<.001
Course on aging	--	26	(30%)	9	(15%)	.021
Worked with older adults	--	32	(37%)	18	(29%)	.270
If yes, years worked	--	0.98	(1.19)	1.75	(1.29)	.054

Note. Scale for self-rated health was 0 (poor) to 10 (excellent); AAS = Anxiety about Aging Scale (Lasher & Faulkender, 1993); KMAQ = Knowledge of Memory Aging Questionnaire (Cherry et al., 2000); FAQ = Facts on Aging Quiz (Harris et al., 1996); ADKT = Alzheimer's Disease Knowledge Test (Dieckmann et al., 1988).

Figure 1.

Mean ratings of target's competence (ADL, IADL) and memory ability (OMES) by younger (YA) and older adults (OA). Cronbach's index of internal consistency (α) for each measure: ADL = .92; IADL = .93; OMES = .96. Error bars show the standard error of the mean. The "less than" symbol (<) indicates greater differences between ratings of healthy and AD targets by OA than by YA as revealed by the significant Age Group x Target Type interaction effects for IADL and OMES.

Figure 2.

Mean positive and negative bias scores for younger (YA) and older adults (OA) on the ADKT. Error bars show the standard error of the mean.